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Lausanne, 18.–20.09.2019

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O1

Do complications associated with intermittent or continuous use of peripheral venous catheters differ?

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Objective: For 30-80% of all inpatients, peripheral venous catheters (PVC) are indispensable. Their use, however, may be complicated by phlebitis, infection, volume overload or impaired patient mobilization.
Intermittent use of PVC is common practice in many countries despite the lack of good data on associated complications. Thus, the aim of this study was to compare continuous vs. intermittent PVC use.
Design: An observation study from January-December 2018 in the Kantonsspital Aarau, a tertiary care hospital with 500 beds.
Patients and methods: We included all adult inpatients with a PVC placed for a minimum of 24 hours. Continuous or intermittent PVC use was at the discretion of the care givers. For intermittent use, PVC hubs were disinfected, filled with NaCl and locked with a lid without mandrin. PVC placement, removal and the reason for removal were prospectively documented in the electronic patient chart. Similarly, continuous and intermittent use, access frequency and purpose (nutrition, antibiotics and chemotherapy) were recorded. Phlebitis was defined by the presence of ≥2 local signs of inflammation.
Results: We included 20`505 patients with 50% males and a median PVC retention time of 3 days in both groups. Patients with intermittent PVC use were slightly older (63 years, IQR 18-102) vs.61 years (IQR 18-106)). Intermittent PVC use was more frequent on surgical wards than in internal medicine (48.1% vs. 36%). PVC dislocation was most common complications in both groups with 3.5% and 2.3%, respectively. Unintentional PVC removal predominated in the continuous PVC group. The phlebitis incidence was 0.4% for continuous vs. 0.5% for intermittent PVC use (p=0.33). PVC-associated bacteremia was rare with 0.05% in the intermittent PVC vs. 0.02% for continues PVC (p=0.24).
Conclusions: Complications were similarly rare in both groups and comparable to the published literature. s. Intermittent PVC use represents a safe option to enhance patient comfort and to prevent fluid overload.

O2

New concept of hand hygiene surveillance in nursing homes - canton de Vaud

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Introduction
Health care-associated infections constitute a concern for the safety of patients and are considered by the experts a major issue in public health.
Hand hygiene (HH) is the most important measure to avoid the transmission of harmful germs and to prevent cross transmission of such germs. The promotion of HH, according to the five WHO indications is integrated into the cantonal strategy of infection control in nursing homes introduced by Cantonal Unit for Prevention and Infection Control (unité HPCi). Since 2004, in nursing homes, the promotion has been applied through the yearly surveillance of hand rub solution consumption and in 2010 began a surveillance of HH compliance via audits.
While audits reveals a 80% HH compliance, the consumption of hand rub solution is only 2.5 disinfections/day/resident (target = 5). There was no correlation between HH observations and the volume of hand rub used, when comparing the two surveillances.
Therefore, the unité HPCi developed a new tool for nursing homes, to evaluate the consumption of hand rub solution, taking into account, nursing homes missions and the number of delivered cares per day (degree of dependency of residents). In 2018, a test phase allowed the adjustment of the tool, in collaboration with healthcare workers involved in this new concept.
Methodology
Elaboration of the form survey for data collection; tutoring; calculation of the average number of opportunities of HH for the nursing home; determination of the expected averages of consumption of hand rub solution; quarterly calculation of the consumption of hand rub solution before collecting the number of delivered cares per day (base line); determination of the minimum personalized target of consumption of hand rub solution, which the nursing home has to reach ; new quarterly calculation of the consumption of hand rub solution.
Conclusion
This new concept aims to promote HH by means of a personalized indirect tool. The method can help healthcare workers to adhere to correct HH procedures and favors a better adoption of HH surveillance. It allows the determination of personalized objectives of progress regarding HH compliance. This tool has been implemented in 2019 in all nursing homes of canton de Vaud.

O3

Vermittlung von Standardhygienerichtlinien via Sperrbildschirm in einer Spitalgruppe

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Hintergrund
Seit Dezember 2017 erlebt die Insel Gruppe einen Ausbruch von Vancomycin-resistenten Enterokokken (VRE). Um Übertragungen eines multiresistenten Erregers zu verhindern, gilt die strikte Einhaltung der Standardhygiene – darunter insbesondere die Händehygiene - als eine der wichtigsten Massnahmen. In einem Grossbetrieb mit über 10'000 Mitarbeitenden ist die Vermittlung von spitalhygienischen Informationen eine grosse Herausforderung.
Material und Methoden
Das Format des Sperrbildschirms lässt nur stehende Bilder zu. Die Bilder selber sollten nicht erzieherisch wirken, sondern auf eine ungezwungene Art aufklären und erinnern. Aus diesem Grund hat man sich für eine gezeichnete Umsetzung entschieden. Um die Bilder nicht ohne wichtige Erläuterungen zu belassen, sollten begleitende Kurzfilme produziert werden.
In der Gestaltung der Bilder und Produktion der begleitenden Filme wurde die Spitalhygiene von einem Team aus Grafiker und Videoproduzent unterstützt. Zeitgleich bereitete die Informatik den Feldtest für den ersten Sperrbildschirm und die alternierenden Wechsel alle 2 Monate vor. Im Oktober 2018 konnte der erste Sperrbildschirm mit dem Schwerpunktthema Indikationen der Händehygiene verteilt werden.
Die begleitenden Filme wurden für alle Mitarbeitenden zugänglich auf eine SharePoint Ablage gestellt.
Ferner sollte der Effekt des lancierten Sperrbildschirms auf das Verhalten der Mitarbeiter gemessen werden. Dies wurde mittels Verbrauch von Händedesinfektionsmittel (normiert auf Patiententage) über die Zeit in Relation zum Go-live gesetzt.
Resultate
Der wöchentliche Händedesinfektionsmittelkonsum pro 100 Patiententage ist seit Go-live der Sperrbildschirme messbar gestiegen.
Schlussfolgerungen
Die zahlreichen Reaktionen sowie der steigende Verbrauch der verwendeten Desinfektionsmittel lassen keinen Zweifel an der grossen Sichtbarkeit und einprägenden Wirkung einer bildhaften Darstellung auf dem Sperrbildschirm. Die gewählte Projektionsfläche eignet sich sehr gut, um eine Mehrheit zu erreichen und die Aufmerksamkeit auf ein Alltagsthema zu lenken.

O4

Evaluation d'une politique de promotion de la vaccination antigrippale pour les professionnels de santé dans un CHU

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1. Introduction/objectif du travail
La vaccination antigrippale des professionnels de santé, bien qu'étant la mesure de prévention principale de la transmission nosocomiale de la grippe, reste trop peu observée dans les établissements de santé. Notre CHU s'est engagé dans une promotion très active de cette vaccination. Ce travail a décrit et évalué l'impact des campagnes de promotion de cette vaccination et d'une politique institutionnelle depuis plusieurs années.
2. Matériel et Méthodes
La vaccination antigrippale a été portée par la médecine du personnel (MDP). Avec un virage de communication en 2015, une sensibilisation large a reposé sur i) des campagnes d'affiches déployées sur tout l'établissement, ii) un jeu de piste (affichettes portant des QRcodes ouvrant de courtes vidéos) et iii) des messages intranet et dans le journal d'entreprise reprenant le même graphisme spécifique. D'autre part, l'accessibilité au vaccin a été étendue avec plusieurs stands sur des points stratégiques (vestiaires, entrées de l'hôpital …), la nomination de délégués vaccinaux dans les services (n = 100) et l'accès large sans rendez-vous en MDP. Toutes les vaccinations réalisées ont été colligées pour calculer la couverture vaccinale (CV) chaque année. Une directive institutionnelle a rendu obligatoire le port continu d'un masque de soins tout au long de l'épidémie de grippe pour les professionnels non vaccinés. L'évolution de la CV antigrippale ainsi que la part des grippes suspectées d'être nosocomiales ont été suivies.
3. Résultats
Entre les saisons grippales 2011-12 et 2017-18, la CV des professionnels de santé au contact des patients est passée de 29,5 à 46 % ($p < 10\text{-}6$), en hausse autant pour les soignants (+ 75 %) que pour les médecins (+ 57 %), même si ceux-ci restaient mieux vaccinés que les soignants (respectivement 55 % vs 42 % en 2017-18). La part des vaccinations réalisée par les délégués vaccinaux était de 36 % en 2017-18. En parallèle, la proportion des grippes nosocomiales est passée de 27 % à 22 % sur les deux dernières saisons. Les outils de la campagne ont été partagés avec les établissements voisins avec mutualisation des moyens de communication et homogénéité des messages.
4. Conclusion
Cette stratégie multimodale de promotion de la vaccination antigrippale a permis de largement augmenter la CV. L'appui institutionnel fort apparaît comme un levier. Cette expérience éclaire les résultats d'une démarche multimodale incitative.

O5

Nosocomial respiratory infections using droplet precautions on-site (DroPS) - a pragmatic, controlled intervention study during the 2018/2019 influenza season

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Background and aim
Current guidelines recommend a pathogen-based isolation precautions strategy for patients hospitalized with respiratory virus infection (RVI). Our aim was to assess the effect of droplet precautions on-site (DroPS) versus the traditional private room droplet (influenza) or contact (RSV) precautions strategy on the rate of nosocomial RVI.
Materials and Methods
Single center, 3:1 controlled non-randomized intervention study during the 2018/19 influenza season, at the Department of General Internal Medicine, Bern University Hospital, Switzerland. The intervention ward introduced the DroPS strategy while the control ward used the traditional isolation precautions. DroPS included nurse-driven initiation of precautions based on respiratory symptoms, signage of the patient bed, surgical masks for patient contact < 1.5m, and enforcement of standard hygiene precautions. Patients on both wards were screened for the onset of respiratory symptoms on a daily basis. For each newly initiated respiratory precaution of a patient admitted > 48 hours, an influenza/RSV molecular rapid test was performed. If negative, this was followed by a multiplex respiratory virus PCR.
The primary outcome was the rate of laboratory-confirmed nosocomial RVI, compared between the two strategies. Patients with nosocomial respiratory symptoms and no laboratory tests were considered having a nosocomial RVI.
Results
We included 1230 hospitalizations. In the DroPS ward, 250/933 (26.8%) patients were set on precautions due to respiratory symptoms, versus 9/297 (3.0%) in the control ward. Influenza/RSV molecular rapid testing detected 117/933 (12.5%) infections in the DroPS ward and 8/297 (2.7%) in the control ward (between group difference, 9.8%; 95% CI, 6.8 to 12.9; $p < 0.001$).
In the DroPS ward, the nosocomial infection rate was 8/933 (0.86%; 1x influenza A, 1x RSV, 3x coronavirus, 3x laboratory tests incompletely performed), compared to 2/297 (0.67%; 2x influenza A) in the control ward. The difference between the groups was 0.19% (95% CI;
–1.10 to 1.47; $p = 0.9$).
Conclusion
DroPS represents a safe, simple and resource-saving alternative to the traditional strategy for RVI. The difference in the rate of respiratory precautions between the two groups indicated a preferred admission of patients with suspected RVI to the DroPS ward.

O6

«THE POWER OF SOUR» – Change management to reduce inadequate proton pump inhibitor (PPI) use

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Background
Proton pump inhibitors (PPI) are widely overused. According to point prevalence analyses in our hospital, up to 49% of our inpatients had been exposed to PPI, 30% of whom without solid indication. In order to prevent PPI-related adverse events (osteoporosis, pneumonia, electrolyte disorders or Clostridium difficile infections), we ran an intervention study to reduce PPI consumption. We discuss our interventions against the background of established change management concepts.
Methods
We quantified PPI exposure in our patients as 1) percentage of inpatients exposed to PPI and 2) proportion of hospital days with PPI-exposure. Based on hospital pharmacy data, PPI consumption was quantified during 3 months before (baseline) and 3 months along the course of the 16 months of interventions. Interventions included 1) the interdisciplinary establishment of PPI indications and dosing recommendations, 2) instruction of doctors and nurses on PPI use and adverse events, 3) linkage of the indication list and electronic prescribing, 4) feedback on PPI consumption of every department after each data collection and 5) periodic reminders with flyers and give-aways (lemon candy, lemon soda or lemon tea bags according to the season) carrying the “POWER OF SOUR” slogan and logo.
Results
At baseline, 2’622 / 7’274 inpatients (36%) got exposed to PPI. PPI exposure was higher in the department of surgery (43.7%) than in internal medicine (33.3%) or gynecology (23.4%). By the end of the study, PPI exposure could be reduced from 36.0% to 28.8% of patients, the proportion of PPI days / overall hospital days from 36.8% to 28.1%. This corresponds to relative reductions of 20% and 23.6%, respectively. Relevant reductions in the departments of gynecology and surgery contrast with no significant reduction in internal medicine. The proportion of prophylactic esomeprazole dosing (20mg instead of 40mg) increased from 28% to 35.3%.
Discussion
Point prevalence assessments had over-estimated PPI consumption by 36%. Still, a relevant reduction of PPI exposure could be achieved. Although all the steps described in change management concepts by K Lewin, W. Krüger or P. Kotter were followed, the seductive term “Magenschoner” and incomplete information on the indication for pre-established PPI treatments by GPs left many patients and physicians reluctant to discontinue PPIs. Public information on the disadvantages of PPI use and interventions targeting GPs may be more effective.

O7

"Vater sein" auf der neonatologischen Intensivstation

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Hintergrund: Die Aufnahme eines Früh- oder Neugeborenen auf der neonatologischen Intensivstation ist für die Eltern eine schwierige emotionale Situation. Vor allem für die Väter dieser Kinder ist die Verlegung eine grosse Herausforderung. Der Vater muss neben den eigenen Sorgen und Ängsten mehrere Aufgaben und Rollen übernehmen.
Methode: Um beantworten zu können, wie Väter von Früh- und Neugeborenen ihre Rolle auf der neonatologischen Intensivstation empfinden, wurde eine ausführliche Literaturrecherche durchgeführt. Dadurch sollte aufgezeigt werden, welche Unterstützungsmöglichkeiten es durch das Pflegepersonal gibt.
Resultate: Väter kranker Früh- und Neugeborener erleben die Aufnahme ihres Kindes auf der neonatologischen Intensivstation multidimensional. Durch die Trennung der Familie ist der Beziehungsaufbau erschwert. Sowohl die Gefühle des Vaters, als auch das Verhalten des Personals beeinflussen das Entstehen von Nähe und Distanz zum Kind.
Für Väter ist es im Kontext der Intensivstation nicht einfach sich in ihrer Vaterrolle zu finden. Sie benötigen dafür, sowie zur Bewältigung der Situation die Unterstützung des Behandlungsteams. Essentiell für eine gute Bewältigung sind die Anerkennung der Emotionen des Vaters, der Einbezug in die Pflege sowie ausreichend Informationen.
Schlussfolgerungen: Die Bedürfnisse der Väter kranker Früh- und Neugeborener werden noch zu wenig erkannt. Es ist notwendig, dass das Behandlungsteam die Bedürfnisse der Väter ernst nimmt, um Gefühle von ausgeschlossen zu sein zu vermeiden. Ziel sollte es sein, den Vater als gleichwertigen Elternteil und wertvollen Partner in der Pflege des Kindes zu sehen.

O8

Intérêt d'une évaluation objective de l'effort de toux du patient intubé pour prévenir le risque d'échec d'extubation

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RÉSUMÉ
Problématique : La possibilité de libérer le patient intubé de soins intensifs du ventilateur se doit d'être questionnée quotidiennement. L'inefficacité de la toux du patient intubé est un facteur important d'échec de sevrage et d'extubation. Pourtant, en pratique, son évaluation n'est pas formalisée et relève d'un caractère subjectif.
Objectif : Déterminer l'utilité pour l'infirmier de l'emploi d'une mesure objective de la force de toux du patient intubé dans le cadre du sevrage ventilatoire.
Méthodologie : Pour répondre à ce questionnement, une revue de littérature non exhaustive a été réalisée. Celle ci s'axe autour de 4 études et une revue de littérature. Elle s'attache à confronter une méthode de mesure objective de l'effort de toux avec le pronostic de succès ou d'échec d'extubation.
Résultats : La confrontation des articles démontre l'intérêt à qualifier plus précisément la capacité à tousser de ces patients. Le paramètre communément employé est le Cough Peak Flow (CPF). Cette mesure du débit d'air expiré du patient intubé lors d'une toux forcée est réalisée, via un spiromètre ou un débitmètre intégré au ventilateur. Le résultat permet la détermination d'une valeur seuil (environ 60L/min pour 7 études sur 11) en dessous de laquelle il existe un réel risque d'échec d'extubation.
Conclusion : La mesure de l'effort de toux du patient intubé et ventilé peut avoir une réelle utilité. Elle permettrait surtout d'identifier une population à risque d'échec d'extubation et ainsi d'anticiper les thérapeutiques nécessaires. S'appuyant sur ce travail on pourrait envisager, sous réserve d'approbation médicale, son application dans la pratique de façon ciblée.
Mots Clés : ventilation mécanique, soins intensifs, effort de toux, sevrage ventilatoire, extubation, échecs d'extubation

O9

Ein Krankheitsbild, viele Herausforderungen - Beatmungsstrategien bei kongenitaler Zwerchfellhernie

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Einleitung
Die kongenitale Zwerchfellhernie (CDH) ist eine angeborene Fehlbildung bei der die Bauchorgane durch einen Defekt im Diaphragma in den Thorax prolabieren. Es entsteht eine ipsilateral betonte Lungenhypoplasie, welche die Atemfläche stark einschränkt. Durch einen plötzlichen Anstieg des pulmonalen Widerstandes wird der transpulmonale Blutfluss unterbrochen, es kommt zu Ventilationsproblemen. Schnell kann dies zu einem kardiorespiratorischen Versagen und damit zu einer lebensbedrohlichen Situation führen. So bedarf es postnatal einer hoch differenzierten Beatmungsstrategie und einer intensivmedizinischen Behandlung und Betreuung durch geschultes Personal.
Fragestellung
Welche Beatmungsstrategien werden bei intubierten Neugeborenen (NG) mit CDH angewendet und welche spezifischen Pflegeschwerpunkte lassen sich daraus ableiten?
Methode
Zur fundierten Beantwortung der Fragestellung wurde eine Literaturarbeit verfasst.
Resultate
Durch lungenprotektive Beatmung treten deutlich weniger Lungenschädigungen auf.
Ziel dieser Beatmungsstrategie ist ein suffizienter pulmonaler Gasaustausch, ohne dass die Lunge durch die mechanische Beatmung Schaden erleidet. Im Gegenzug werden permissive Hyperkapnie und Hypoxie toleriert.
Primär werden NG mit CDH konventionell beatmet. Wird dadurch keine suffiziente Oxygenation und Ventilation erreicht, wird die Hochfrequenzoszillationsbeatmung angewandt. Zeigt sich eine anhaltende, relevante Hypoxie, wird versucht, die Oxygenation durch die Beatmung mit Stickstoffmonoxid (NO) zu verbessern. Bei Kindern mit CDH ist der Nutzen von NO jedoch nicht gesichert.
Um Stress und dadurch das Risiko sowie das Ausmass der pulmonalen Hypertension zu verringern, wird gemäss „Optimal Handling“ gepflegt.
Schlussfolgerung
Um Komplikationen rascher erfassen und Änderungen des Behandlungsplans schneller einleiten zu können, ist es essentiell wichtig, die verschiedenen Beatmungsformen und deren Wirkungsweise zu kennen.
Dank „Optimal Handling“, adäquatem Einsatz von Analgosedation und dem richtigen Agieren bei Veränderungen der Beatmungssituation kann der Stress für die kleinen Patienten deutlich verringert werden.
Das Pflegefachpersonal setzt nicht nur Verordnungen um, sondern ist Teil eines Teams, das gemeinsam Entscheidungen trifft. Dies ist nur möglich, wenn es dank fundiertem Wissen sachlich und fachlich korrekt argumentieren kann.

O10

Prévention de l'agitation lors du réveil des patients dépendants aux opiacés

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Contexte et objet de réflexion :
Un patient traité par méthadone, non reprise aux soins intensifs, même lors de l'arrêt de l'analgo-sédation, présente un réveil pathologique et une agitation qui le met en danger :
- Cela entraine la nécessité de le re-sédater afin d'assurer sa sécurité.
- De plus, des questionnements autour de la raison de cette agitation et liens avec addiction et syndrome de sevrage apparaissent.
Méthode de la recherche documentaire en 2 axes :
- Recherche documentaire à l'aide des bases de données PUBMED et Google Scholar afin d'obtenir des articles validés sur le sujet
Sélection de 7 articles principaux.
- Entretien avec l'infirmier spécialiste clinique des addictions des HUG afin d'approfondir mes résultats et confronter les résultats obtenus lors de la recherche documentaire.
S'en est suivie une discussion sur les résultats trouvés.
Résultats :
- Importance de garder la dose d'opiacés que prend le patient ou substituer de manière équivalente (Estebe & Olivier, 2013, p. 143); (Laroche, Rostaing, Aubrun, & Perrot, 2012, pp. 308-309); (Manguzzi, Wainstein, Desmeules, & Broers, 2018, p. 1283); (Questel, Kierzek, Pham-Tourreau, & Pourriat, 2011, p. 6).
- Penser à l'hyperalgésie chez ces patients et traiter les douleurs (antalgie multimodale) (Manguzzi, Wainstein, Desmeules, & Broers, 2018)
- Les échelles d'évaluation de sevrage aux opiacés existent mais ne sont pas adaptées aux patients intubés/sédatés
- Importance du travail de réseau et de la relation de confiance avec le patient
Propositions d'amélioration :
- Proposition d'une échelle de sevrage aux opiacés dérivée du COWS (D. Wesson, J of Psychoactive drugs, 2003, 35(2), 253-259) utilisable chez les patients intubés/sédatés
- Proposition d'informations pratiques (durée, délai d'action, mode d'administration) et de tableau d'équivalence d'opiacés dans un document facilement utilisable par les soignants des soins intensifs (Vdoc)
- Proposition de mettre les contacts d'addictologie dans un document facilement utilisable par les soignants des soins intensifs (Vdoc)

O11

Akute Desaturation beim beatmeten Patienten - Ein symptombasierter Ansatz

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Einleitung: Sättigungsabfälle wirken rasch bedrohlich: Handelt es sich um eine echte Verschlechterung des Patienten, eine Komplikation oder lediglich um einen Messfehler? Die Ursachen sind vielfältig, nicht selten tragen pflegerische Interventionen dazu bei. Die Betreuung von beatmeten Patienten gestaltet sich für den Intensivpflegeneuling daher herausfordernd.
Fragestellung: Welche Auswirkungen kann eine akute arterielle Hypoxämie auf den Intensivpatienten haben? Welches Vorgehen wird im Falle einer akuten Desaturation empfohlen, um ursächliche Probleme schnell identifizieren und pflegerische Massnahmen daraus ableiten zu können?
Methode: Für die theoretische Fundierung fand eine Auseinandersetzung mit deutscher und englischer Literatur statt.
Resultate: Ein mangelndes Sauerstoffangebot aktiviert das sympathische Nervensystem, was zu einem erhöhten Herz- und Atemminutenvolumen führt. Hält der Sauerstoffmangel an, stellt sich eine Azidose mit Zelluntergang ein. Eine kurze schwere Hypoxie, definiert als eine SaO2 von 50-70 % während ca. 10 min, hinterlässt beim Gesunden keine bleibenden Defizite. Kritisch kranke Patienten mit vorbestehenden respiratorischen und kardiovaskulären Einschränkungen sind aufgrund mangelnder Kompensationsfähigkeit grösseren Risiken ausgesetzt. Im Gegensatz zur schweren Hypoxie mit nachfolgendem Kreislaufversagen, fehlen Belege für bleibende Auswirkungen auf Hirn, Herz, Leber und Nieren aufgrund einer reinen Hypoxie ohne Ischämie. Die spezifischen, vor allem neurologischen Auswirkungen beim Intensivpatienten sind schwierig zu evaluieren, da Faktoren wie Hypotension, Infektionen, Elektrolytstörungen und Medikamente das Outcome beeinflussen.
Der ABCDE- Algorithmus bietet eine Hilfestellung für ein symptombasiertes, strukturiertes Vorgehen bei einem Sättigungsabfall. Der Fokus liegt dabei auf der Durchgängigkeit von Tubus und Trachealkanüle und der Aufrechterhaltung von Oxygenation und Ventilation. Im Sinne des Sauerstoffangebotes soll die Blutzirkulation aufrecht erhalten werden, Agitation, Schmerz oder zu tiefe Analgosedation als Grund für die Hypoxämie ausgeschlossen, und nach technischen Problemen gesucht werden.
Schlussfolgerungen: Die Sensibilisierung für eine Hypoxämie scheint in der Praxis gegeben. Zu deren Verhinderung wird eher eine Hyperoxämie in Kauf genommen. Es stellt sich die Frage, was dem Patienten mehr schadet; eine kurzfristige Hypoxämie oder eine unreflektierte Hyperoxämie.

O12

Comparison of organ dysfunction criteria as a predictor of death in children with blood culture-proven sepsis - Results of the Swiss Pediatric Sepsis Study

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Background: Previous studies applying Sepsis-3 criteria to pediatric sepsis were based on retrospective analyses of pediatric intensive care unit (PICU) cohorts not designed to investigate sepsis and included children without microbiologically defined infections. We aimed to validate organ dysfunction criteria in a prospective cohort of children with blood culture-proven sepsis, including emergency department, PICU, and ward patients.
Methods: Between 1.9.2011 and 31.12.2015, this multi-center prospective population-based cohort study recruited children < 17 years with blood culture-proven sepsis defined according to 2005 International Pediatric Sepsis Consensus Conference (IPSCC) criteria. We excluded prematurely born infants and term born infants aged ≤ 7 days. We compared the performance of 2005 IPSCC, Pediatric Logistic Organ Dysfunction (PELOD)-2, and pediatric Sequential Organ Failure Assessment (pSOFA) score on the day of blood culture sampling to identify children who died ≤ 30 days after sepsis onset using ROC curves. To adjust 2005 IPSCC, PELOD-2, and pSOFA for age, sex, and presence of chronic medical conditions, we fitted logistic mixed-models.
Results: We analyzed 878 sepsis episodes in 807 children. In 288 (33%) episodes an organ dysfunction was present. Thirty-eight (4%) children died within 30 days after sepsis onset. Case fatality ratio was 1% in children without organ dysfunction, 5% in children with a single organ dysfunction, and 21% in children with multi organ dysfunction. The AUC to discriminate sepsis episodes with fatal outcome was 0.82 (95% CI 0.74 - 0.90) for 2005 IPSCC, 0.73 (0.63 - 0.83) for PELOD-2, and 0.78 (0.69 - 0.88) for pSOFA, with adjusted AUCs of 0.87 (0.82 - 0.92), 0.83 (0.76 - 0.89), and 0.85 (0.78 - 0.92). Cardiac, respiratory, and neurological dysfunction were the most relevant organ dysfunctions in our population. Considering only these three organs AUCs were 0.78 (0.70 - 0.87) for 2005 IPSCC, 0.72 (0.62 - 0.82) for PELOD-2, and 0.76 (0.66 - 0.86) for pSOFA, with adjusted AUCs of 0.9 (0.85 - 0.94) for 2005 IPSCC, 0.87 (0.82 - 0.93) for PELOD-2, and 0.88 (0.82 - 0.94) for pSFOA.
Conclusions: Different measures of pediatric organ dysfunction performed comparably, which can inform the revision of pediatric sepsis definitions. While presence of any organ failure increased the risk of death in pediatric sepsis, cardiac, pulmonary, and neurological dysfunction were most important with respect to death.

O13

Acetate versus Lactate buffered balanced Infusates on Hemodynamic Stability in Patients undergoing Cardiac Surgery – a randomized controlled double-blind Trial

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Introduction: Recent evidence suggests that acetate-buffered infusions result in better hemodynamic stabilization than 0.9% saline in patients undergoing major surgery. The choice of buffer in balanced crystalloid solutions may modify their hemodynamic effects. We therefore compared the inopressor requirements of Ringer's acetate and lactate for perioperative fluid management in patients undergoing cardiac surgery.
Methods: Using a randomized controlled double blind design, we compared acetated Ringer's (RA) to lactated Ringer's (RL) with respect to the cumulative dose of inopressors administered until postoperative hemodynamic stabilization. Secondary outcomes were the duration of inopressor administration, the total fluid volume administered, and changes in acid-base homeostasis. Patients undergoing elective valvular +/- bypass surgery were included. Patients with severe cardiac (EF< 30%), renal (eGFR< 30ml/min/1.73m2), liver dysfunction (bilirubin >3mg/dl), florid endocarditis or chronic inflammatory disease were excluded from the analysis.
Results: Seventy-five patients were randomly allocated to the RA arm, 73 to RL. The hemodynamic profiles were comparable between the groups. The groups did not differ with respect to the average rate of inopressors (RA 2.1 mcg/kg/h, IQR 0.5-8.1 vs. RL 1.7 mcg/kg/h, IQR 0.7-8.2, p=0.989). Cumulative doses of inopressors and time on individual and combined inopressors did not differ between the groups. Sensitivity analysis showed that patients in the RL-group received a significantly higher dose of epinephrine per hour of epinephrine when compared to the RA-group (median 4.5 µg/kg/h, IQR 0.4-33.0 vs. median 0.2 µg/kg/h, IQR 0.1-9.3, p=0.047). If considered only for the period in the ICU, more patients in the lactated Ringer's group received epinephrine infusions (14 (19.2%) vs. 6 (8.0%), p=0.047). No differences were found in acid-base parameters and their evolution over time.
Conclusions: In this study, acetate-buffered and lactated-buffered infusion solutions are equal for early hemodynamic stabilization in patients undergoing cardiac surgery and the evolution of acid-base parameters was similar.

O14

Complications of regional citrate anti-coagulation for CRRT: An observational study

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Context and Aims
Regional citrate anticoagulation (RCA) has been recommended as the default anticoagulation modality for continuous renal replacement therapy (CRRT). It was associated with a low rate of complications in randomized controlled trials. However, little is known about the incidence of such complications in real life. In our institution, CRRT is applied either as continuous veno-venous hemodialysis (CVVHD) with RCA (default modality) or as continuous veno-venous hemofiltration (CVVH) with heparin anticoagulation (in case of RCA contra-indications).
Hence, we sought to retrospectively evaluate the type and rate of complications associated with CRRT according to the type CRRT modality used.
Methods
We retrospectively identified all patients who received CRRT in our institution between January and December 2016. In those patients, using scanned medical records, we reviewed each CRRT session and determined circuit duration as well as therapy associated complications. For this purpose, we recorded, the highest and lowest level of the following variables: pH, base excess, sodium, ionized calcium, platelets and body temperature. Only new alterations (not present at the time of circuit initiation) were considered. Medical records were also screened for other complications potentially attributable to the therapy. The incidence of such parameters were compared according to whether the circuit was run in CVVHD-RCA or CVVH-Heparin mode.
Results
We analyzed 636 CRRT sessions in 121 patients. Of those 385 (60.5%) were performed in CVVHD-RCA mode and 251 (39.5%) in CVVH-Heparin mode. Compared with CVVH-Heparin mode, CVVHD-RCA mode was associated with a longer circuit lifespan (median duration 54.9 (IQR 44.6) vs 15.3 hours (IQR 22.4, $p < 0.0001$), a higher rate of metabolic acidosis (77 (20.2%) vs 18 (7.2%) ($p < 0.0001$), and of metabolic alkalosis (186 (48.7%) vs 43 (17.1%), ($p=0.0001$) as well as mild hypocalcemia (96 (25.1%) vs 26 (10.8%), $p < 0.0001$). The majority of these alterations were mild and of unknown clinical significance. Only one possible citrate intoxication was observed. There was no difference in the rate of other CRRT associated complications.
Conclusions
CVVHD-RCA was associated with a much longer circuit life and with an increased rate of minor metabolic complications, in particular acid-base derangements. CVVHD-RCA appears safe in patients without contra-indications but requires the application of a strict protocol.

O15

Adequacy of Stress Ulcer Prophylaxis Prescription in ICU: an Observational Study

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Background & Aims: The Swiss Society of Intensive Medicine, as part of its "Choosing wisely" campaign, has recently recommended to assess the adequacy of stress ulcer prophylaxis (SUP) among other common practices in intensive medicine. Indeed, SUP prescription might not be sufficiently challenged throughout patients' stay in the intensive care unit (ICU) and might erroneously be maintained on ICU or even hospital discharge. The aims of this study are: 1. To describe the frequency of SUP prescription in our unit and to determine its adequacy with local guidelines 2. To determine the proportion of patients still receiving SUP on ICU and hospital discharge in the absence of a new indication for acid-suppressive therapy.
Methods: This is a retrospective study conducted in the 35-beds adult medico-surgical ICU of a tertiary care center. Medical records of all patients admitted between October 1st and November 30th 2017 were screened. Patients with an ICU length of stay shorter than 24 hours, with prior indication for acid-suppressive therapy or admitted for a gastrointestinal bleeding were excluded. SUP prescription's adequacy was assessed on a day-to-day basis, according to our local guidelines. We then assessed the continuation of SUP on ICU and hospital discharge and considered any new indication(s) for acid-suppressive therapy.
Results: Among the 372 patients admitted during the study period, 140 (855 patient days (PD)) fulfilled inclusion criteria. Among them 130 (92.9%) received SUP during their ICU stay corresponding to 796 (93.1%) PD). SUP consisted in esomeprazole in 686 (86.2%) PD. Overall, the SUP was inadequate in 558 (65.3%) PD: prescribed while not indicated in 543 (63.5%) or not prescribed while indicated in 15 (1.8%). On ICU discharge, SUP prescription was maintained in 58 (44.6%) patients of which 8 had a new indication for acid-suppressive therapy. Similarly, SUP was maintained on hospital discharge in 39 (67%) patients of which 11 had a new indication for acid-suppressive therapy. Hence, SUP was inadequately maintained in 38% of patients on ICU discharge and 21% on hospital discharge.
Conclusions: SUP was inappropriate (not indicated or forgotten) in almost two thirds of ICU patient-days. Moreover this prescription was erroneously maintained in a very large number of patients both on ICU and hospital discharge. SUP guidelines and the need for a daily reevaluation in particular on ICU discharge should be reminded to prescribers.

O16

Information conveyed by electrical diaphragmatic activity during unstressed, stressed and assisted spontaneous breathing: a physiologic study.

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Background: The electrical activity of the crural diaphragm (Eadi), a surrogate of respiratory drive, can now be measured at the bedside in mechanically ventilated patients with a specific catheter. The expected range of Eadi values under stressed or assisted spontaneous breathing is unknown. This study explored Eadi values in healthy subjects during unstressed (baseline), stressed (with a resistance) and assisted spontaneous breathing. Relation between Eadi and inspiratory effort was analyzed.
Methods: Thirteen healthy male volunteers were included in this randomized crossover study. Eadi and esophageal pressure (Peso) were recorded during unstressed and stressed spontaneous breathing and under assisted ventilation delivered in pressure support (PS) at low and high assist level and in neurally adjusted ventilatory assist (NAVA). Peak, mean and integral of Eadi, breathing pattern, esophageal pressure-time product (PTPeso) and work of breathing (WOB) were calculated offline.
Results: Median [interquartile range] peak Eadi at baseline was 17 [13-22] µV and was above 10 µV in 92% of the cases. Eadi max defined as Eadi measured at maximal inspiratory capacity reached 90 [63 to 99] µV. Median peak Eadi/Eadi max ratio was 16.8 [15.6-27.9] %. Compared to baseline, respiratory rate and minute ventilation were decreased during stressed non assisted breathing whereas peak Eadi and PTPeso were increased. During unstressed assisted breathing, peak Eadi decreased during high level PS compared to unstressed non-assisted breathing and to NAVA ($p = 0.047$). During stressed breathing, peak Eadi was lower during all assisted ventilation modalities compared to stressed non-assisted breathing. During assisted ventilation, across the different conditions, peak Eadi changed significantly whereas PTPeso and WOB/minute were not significantly modified. Finally, Eadi signal was still present even when Peso signal was suppressed due to high assist levels.
Conclusion: Eadi analysis provides complementary information compared to respiratory pattern and to Peso monitoring, particularly in presence of high assist levels.

O17

Man Vs Machine in ICU: perception of nurses and physicians towards IA's implementation: Opportunity, Threat or Fiction

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Background
The use of artificial intelligence (AI) in healthcare is receiving increasing interest, driven by a surge in scientific research, medical and non-medical expert reports and funding. Given the large amount of data collected in ICU, AI opens news perspectives. We aimed to evaluate physicians and nurses' knowledge on AI and their perceptions regarding its implementation in ICU.
Methodology
A prospective national multicentre survey was conducted among all members of the Swiss Society of Intensive Care Medicine from March to April 2019 through an electronic link. 21 questions on AI were established exploring cultural representations of AI, basic knowledge on AI, perception of AI's implementation in ICU (positive, negative, mixed perception and, neutral or skeptical) and interest for potential training sessions on AI.
Results
194 professionals answered the survey. 42% were physicians and 58% were nurses. AI was defined as a complex computer network, as a humanoid assisting people, as a machine with super powers, or as a machine willing to replace humans by respectively 52% (N=101), 25% (N=49), 20% (N=39), and 11% (N=22) of the responders. Big data and machine learning are familiar concepts for more than half of the responders. 53% of responders, declared mixed perceptions regarding AI's implementation (N=103) and 38% were skeptical on the matter (N=74). Most opportunities related to AI were reduction of administrative tasks (60%) and potential data use in clinical trial (48%). Reported concerns were related to data protection (62%), alteration of the patient-caregiver relationship (55%) and disruption of the communication between team members (48%).
70% of skeptical responders consider that AI's implementation should first be framed before its development in ICU.
83% (N=161) of professionals are favorable to organize sessions on AI to raise awareness about its ICU's implementation.
Conclusion
This survey shows that ICU's professionals consider AI as an asset for data management and decision-making but also as a threat for interpersonal relations. To achieve successful implementation of AI in ICU some important considerations should be addressed: AI should be supervised and adequate training provided.

O18

Adverse Events in the Adult ICU Setting: A Descriptive Study

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Background /Aim
Patients in the Intensive Care Unit (ICU) are at high risk for Adverse Events (AEs). Effective AE detection is of high value to improve patient safety. We aimed to assess the prevalence of AEs based on the IHI Global Trigger Tool (GTT) plus six self-developed triggers and to determine interrater reliability of the GTT methodology.
Methods
This descriptive study retrospectively assessed the AE detection rate based on GTT, complemented with six self- developed triggers. The random sample comprised data from 249 electronic patient records. Records were reviewed independently by two nurses and validated by a physician. Rates for triggers and AEs were computed. To assess interrater reliability, Cohen's kappa was calculated in 10% of all patient records.
Results
1153 positive triggers and 520 AEs were identified (mean 2.1 AEs per record). The most frequent AEs were agitation (n=104), physical restraints (n=104), and ICU-acquired infections (n=106). Cohen's kappa was calculated in 24 (10%) patient records. One deviation of one positive trigger was found. Complete agreement was achieved for the identified AEs.
Conclusion
The GTT plus 6 new triggers is useful to identify weaknesses in health care delivered, providing the foundation for targeted interventions to improve patient safety. The observed number of AEs was considerably higher than reported previously; therefore, validation of our results is recommended.

O19

ChrOnic CriTical illness in Pediatric intensive care in Switzerland (OCToPuS): Children' care characteristics and PICU resource utilization

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Context & Objectives. Medical and technical improvements result in a growing population of chronic critically ill (CCI) children in pediatric intensive care unit (PICU). CCI children require complex care due to multisystem-related diseases and comorbidities. These patients have either prolonged PICU stay, repeated hospitalisations, and dependence on technologies to sustain vital functions. Despite their low prevalence (1-5%), CCI children account for a considerable amount of PICU healthcare resources (80%). Because they are highly exposed to repeated PICU stressors, CCI children seems particularly vulnerable to develop negative psychological and psychiatric outcomes. In Switzerland, there is to date no published data about CCI children. Because patients with chronic conditions, critical or not, are largely influenced by local healthcare systems and policies, it is important to build up a set of knowledge related to the Swiss CCI population. This study aims to a) describe and compare care characteristics and PICU resource utilization, between CCI and non-CCI patients in PICU; b) identify predictors of pediatric CCI, based on a national sample.
Material & methods. Population: Pediatric patients (0-18 years) admitted to all Swiss PICUs (n = 8) between 1 January 2014 and 31 December 2017. CCI children will be identify according to an adapted definition of Shapiro and colleagues (2017): PICU length of stay (>14 days, >28 days postterm corrected age) or repeated acute hospitalizations (≥2x/year) and ongoing dependence on ≥1 forms of technology to sustain vital functions. Data source: Retrospective anonymous clinical and administrative data from the minimal dataset (MDSi) of the Swiss Society of Intensive Care Medicine will be analysed. Variables: Administrative, demographic & clinical characteristics, PICU resource utilization. Statistical Analyses: Variables will be compared between CCI and non-CCI patients, using, for nominal data a Fisher's exact test, and for continuous data a Student's t-test or a Wilcoxon's test. Multivariable logistic regression analyses will be performed to identify predictors of pediatric CCI.
Results. Data analyses are in progress and preliminary results will be presented.
Conclusion. Findings of this study will help to better understand the care of children with chronic conditions in acute care settings, and allow for early identification and future individualized care intervention.

Additional information:
Shapiro MC, Henderson CM, Hutton N, Boss RD. Defining Pediatric Chronic Critical Illness for Clinical Care, Research, and Policy. Hospital pediatrics. 2017:7:236.

O20

Entwicklung und Evaluation einer Licht- und Lärmreduzierenden Intervention zur Senkung von Stress von Frühgeborenen auf einer NICU: Eine Hybrid Trial Typ 2 Studie

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Hintergrund
Frühgeborene Kinder auf der NICU sind eine extrem vulnerable Population. Eine erhöhte Licht- und Lärmexposition kann deren Stresspegel und Entwicklung negativ beeinflussen. Wirksame Interventionen zur Senkung vom Licht- und Lärmpegel beruhen auf strukturellen, kognitiven und edukativen Komponenten.
Ziele
1. Eine signifikante Senkung des Licht- und Lärmpegels auf der NICU. 2. Die Entwicklung, die Implementierung und die Evaluation einer Licht- und Lärmreduzierenden Intervention. 3. Eine Senkung des mit Licht und Lärm verbundenen Stresslevels bei Frühgeborenen Kindern auf der NICU.
Methode
Ein Hybrid Trial Typ 2 Studiendesign mit einem Vortest-Nachtest Design diente der Untersuchung der Implementierung und Wirksamkeit der entwickelten Intervention. Die Untersuchung stützte sich auf eine retrospektive Analyse von Patientendaten, Observationsrunden (Kontextfaktoren) und eine umfangreiche Mitarbeiterbefragung.
In einer je vierwöchigen Testperiode wurden Patientendossiers auf klinische Indikatoren von Licht- und Lärminduziertem Stress untersucht, Observationsrunden zur Beobachtung von Licht- und Lärmverursachende Vorgängen im Patientenzimmer und Licht- und Lärmpegel gemessen. Eine Mitarbeiterbefragung diente der Evaluation der Kenntnisse, der Gewohnheiten und der Änderungsbereitschaft der Mitarbeitenden bezüglich Licht- und Lärmmanagement.
Die Intervention beruhte auf strukturellen Änderungen, kognitiven Komponenten und einem Schulungsprogramm und wurde zeitgleich mit strukturellen Änderungen und einer neuen Dokumentation über eine vierwöchige Periode durchgeführt.
Resultate
Eine Senkung der Durchschnittlichen Licht- und Lärmwerte auf der NICU konnte nach der Intervention über die meisten Schichten beobachtet werden. Die stärksten Differenzen wurden Tagsüber gemessen und waren nur für Licht Tagsüber signifikant.
Patienten mit einer Atemunterstützung waren signifikant höheren Lärmwerten ausgesetzt. Gespräche und Interventionen im Zimmer waren verbunden mit deutlich erhöten Lärmwerten. Keine signifikanten Unterschiede der klinischen Stress-Indikatoren wurden beobachtet.
Eine deutliche Erhöhung der Kenntnisse der Mitarbeiter wurde beobachtet. Eingriffe, Versorgungsrunden und Ärztevisite wurden als Hauptursachen für erhöhte Licht- und Lärmpegel erkannt. Eine bessere Koordination der Versorgung und Gespräche und Telefonate ausserhalb des Zimmers führen wurden am häufigsten erwähnt als Massnahmen um Licht- und Lärmpegel zu reduzieren.

O21

Bildung von Resilienz – ein Aspekt der Führungskompetenz?

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Hintergrund und Ziele
Weltweit ist ein Mangel an spezialisierten Gesundheitsfachpersonen zu beklagen. Ursächlich dafür ist die zunehmende Komplexität von kritisch Kranken, insbesondere auf Intensivstationen. Dipl. Pflegefachpersonen NDS HF IP (Dipl. PP NDS HF IP) sind deshalb häufiger mit leidenden und sterbenden Patienten konfrontiert. Dadurch entsteht vermehrt moralischer Stress, der zu Burnout, Posttraumatischen Belastungen und konsekutiv zum frühen Aus-scheiden aus dem Pflegeberuf führen kann. Trotz dieser Arbeitsbelastung gelingt es Dipl. PP NDS HF IP im Beruf zu verbleiben, und zwar aufgrund hoher Resilienz. Während der Begriff «Resilienz» sowie Interventionen zum Erlernen von Resilienz beschrieben sind, wird die Bedeutung von Leadership und damit von Führungsverhalten im Zusammenhang mit Erlernbarkeit und Stärkung der Resilienz kaum diskutiert.
Fragestellung
Welche Interventionen gibt es für Dipl. PP NDS HF IP um Resilienz zu erlernen und zu stärken, und welches Führungsverhalten kann das Entwickeln und Stärken von Resilienz unterstützen?
Material und Methoden
Der erste Teil der Frage wird mittels Literaturanalyse beantwortet. Die Literatursuche erfolgt in den Datenbanken Pubmed, Cochrane und EconBiz mit den Schlagwörtern: Resilience, ICU Nurses, ICU und Critical Care. Der zweite Teil der Frage wird mittels persönlich geführten Paarinterviews beantwortet, wobei eine Führungsperson jeweils aus dem pflegerischen, die andere aus einem anderen beruflichen Setting stammt. Damit sollen Parallelen, Unterschiede und Potenziale aufgezeigt werden. Die Analyse erfolgt anhand der Analyse nach Bohnsack.
Resultate und Schlussfolgerungen
Eine erste Sichtung der Literatur zeigt, dass Interventionen zur Steigerung der Achtsamkeit eine Verbesserung der Resilienz erzielen. Auffallend ist, dass der Einfluss von Führungsverhalten auf die Entwicklung und Stärkung von Resilienz kaum diskutiert wird. Aus den Interviews geht hervor, dass Resilienz in Pflegekadern zwar thematisiert, Massnahmen jedoch nicht mit letzter Konsequenz umgesetzt werden. Führungspersonen aus anderen Settings vermuten daher, dass der Mangel von Dipl. PP NDS HF IP noch zu wenig prekär ist.

O22

Innate and adaptive immunity interactions following PD-1/PDL-1 immune checkpoint blockade in murine alveolar echinococcosis

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PD-1/PD-L1 immune checkpoint blockade has shown to be efficient in cancer therapy, by modulating immune cell responses in favor of the host thus inducing immunological memory and limiting tissue pathology. One of our previous study showed that PD-1/PD-L1 was also effective against both primary and secondary E. multilocularis infection (alveolar echinococcosis, AE) by regulating T cell immunity. This ensuing study tackles the potential to combine PD-1/PD-L1 blockade with conventional albandazole (ABZ) medication in experimental murine AE. Treatment was started at 6 weeks post E. multilocularis infection, and maintained for 8 weeks with twice/week anti-PD-L1 intraperitoneally, or 5 days/week ABZ perorally, or BOTH combined. As key parameters we assessed parasite weight, immune cell profile, tissue histology, and liver tissue cytokine levels. Findings showed that E. multilocularis infection alone led to the formation of an excess in inflammatory cytokines, Treg cells, and a decrease in Kupffer cells, in neutrophils and in high cytotoxicity upon NK and NKT cells. Combined therapy showed the highest effect against the parasite (lowest parasite mass recovered), while ABZ alone already increased the inflammatory immune response, and PD-L1 blockade alone increased T cell immune responses (mainly via Tregs) but with decreased inflammation and cytotoxic NK and NKT cells. Moreover, PD-L1 blockade increased numbers of Kupffer cells and neutrophils infiltrating the liver. This study suggests that the PD-1/PD-L1 pathway plays an important role by regulating adaptive and innate immune cells against E. multilocularis infection, without causing significant tissue damage.
Based on this, future studies will have to be designed, aiming at clinical trials with PD-1/PD-L1 blockade in human AE patients, which may yield into an alternative therapeutic approach to control AE especially in those patients who do not respond well to ABZ, or this approach may even putatively provide a curative therapeutical outcome in all AE patients receiving a combined PD-1/PD-L1 blockade and ABZ medication.

O23

Metabolic signatures of urinary schistosomiasis and praziquantel pharmacokinetics in pre-school and school aged children from rural Côte d'Ivoire

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Schistosomiasis has been linked to paediatric malnutrition and stunting in children, yet the causal pathways are not known. Moreover, praziquantel is the only treatment, yet its erratic absorption and excretion may play a role in variable treatment efficacy and can hamper efforts to inform proper dosing for pediatric populations. Metabolic profiling of biofluids has been successfully applied to elucidate the metabolic perturbations resulting from infections and their links to consequent morbidities, while pharmacometabolomics is an important tool for predicting and enhancing treatment outcomes. In this work, we characterized the metabolic effects of Schistosoma hameatobium infection (urinary schistosomiasis) before and after praziquantel treatment, in a clinical trial cohort of pre-school aged and school-aged children. In the health district of Azaguié, Côte d'Ivoire, 170 pre-school aged and 174 school aged children were screened, shown to be positive for S. haematobium and enrolled in the study. Children were stratified according to age category and infection intensity and randomized to receive 20, 40 or 60 mg/kg of praziquantel or a placebo. Urine samples were taken pre-treatment, 24 hours post-treatment, and at the 3-week follow up time-points of infected and 42 non-infected children. Samples were analysed using 1H NMR spectroscopy followed by unsupervised and supervised multivariate statistical analysis to investigate variation between groups. Infection was associated with TCA cycle and microbial co-metabolism. Moreover, a cross-analysis with matching pharmacokinetic data showed microbial co-metabolites were associated with higher praziquantel exposure both before and after treatment, hinting at a gut microbial role in praziquantel absorption. The results are compared to our previous findings in intestinal schistosomiasis to outline potential mechanisms of schistosomiasis-associated paediatric stunting as well as a potential role for gut microbial modulations to standardize praziquantel treatment outcomes.

O24

Assessing the precision of a semiinvasive, extended hemodynamic monitoring device for cardiac output estimation in critically ill: A prospective single-center study

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Introduction
Assessment of cardiac output is an imperative for the optimal treatment of critically ill patients with cardiac impairment. Thermodilution by means of the pulmonary artery catheter (PAC) is since its design the gold standard for this purpose. Non-calibrated pulse contour analysis devices offer a cardiac output estimation by means of analysis of the standard arterial line and may be a less invasive alternative, especially intra-operatively [1, 2].
Objectives
To assess the accuracy and precision of semi-invasive cardiac monitoring by means of the Pulsioflex device in a critically ill population comparing it to pulmonary artery catheter measurements.
Methods
Between 2016 and 2019, patients admitted to the medical ICU of the University Hospital Zurich, extendedly hemodynamically monitored by means of a PAC were prospectively included. Hemodynamic data simultaneously recorded by the PAC and the Pulsioflex device as well as routine clinical parameters over the course of 51 hours were collected.
Results
The study population consisted of 35 patients (69% male, age of 66 [56 - 74] years). The SAPS II at admission was 49 [37 - 64], the SOFA was 9 [6 – 11], the Vasopressor Dependency Index was 0.55 [0.19 – 5.82] and 77% of the patients were mechanically ventilated. Median time between ICU admission and data collection was 41 [25 – 73] hours. 29% of the patients were admitted due to a cardiogenic shock, 25% due to other cardiac pathologies, 17% due to a severe respiratory failure and 14% due to a sepsis/ septic shock.
Bland Altman (BA) analysis of proAQT versus PAC measured cardiac index (CI), after autocalibration, was -0.87 ± 1.96 l/min/m2 with a precision error (PE) of 64.8%. After external calibration of the proAQT with a PAC measurement, BA characteristics were 0.1 ± 0.61 l/min/m2 with a of PE 19.4%. One hour after external calibration the PE increased to 40.5%, 12 hours later the PE was 48.7% and 24 hours later it was 86.9%. The Concordance Correlation Coefficient over 48 hours showed a correlation of 0.76 [0.57 – 0.80]. The precision was dependent on changes in vasopressor needs during the observation period.
Conclusion
In a general medical ICU population the Pulsioflex device fails to accurately and precisely reproduce the CI in comparison to the PAC. After external calibration, precision is maintained below 40% for less than one hour, thus yielding useful information only across very short interventions such as volume challenges.

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O25

PROtocolized Care to Reduce HYpotension after Spinal Anaesthesia (ProCRHYSA). A randomized, parallel group trial

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Spinal anaesthesia is a safe procedure commonly used for a wide-ranging of surgical applications. One of the most common issues is arterial hypotension. Among the non-invasive methods for predicting and identifying fluid-responsive patients in spontaneous breath, there are currently two tests. The Passive Leg Raising Test (PLRT) consists in raising passively the patient's legs to increase venous return and therefore cardiac output. Ultrasound o f Inferior Vena Cava (IVC) is another useful test that analyses IVC's variability during spontaneous breathing activity, which has been proven to be inaccurate in spontaneous ventilated critically ill patients, but there are little data in spontaneously breathing non-critical patients. Aim of this trial is to determine whether these two methods are effective in guiding fluid therapy both to reduce the rate of hypotension and fluid overload in non-critical patients.
Methods: This was a prospective, controlled, randomized, three-arm, parallel-group trial of consecutive patients undergoing elective surgery under spinal anaesthesia, randomized into three parallel groups. Inclusion criteria were spontaneously breathing adult patients of both sex, ASA-risk class I to III, undergoing an elective intervention under spinal anaesthesia. Primary outcome was the hypotension rate after spinal anaesthesia following fluid optimization therapy guided by IVCUS and PLRT test compared to empirical fluid administration.
Results: 484 consecutive patients were recruited (35 were excluded) and then randomized. The primary outcome about the hypotension rate shows 68 cases (46%) in the control group, 46 cases (35%) in the echo group and 65 cases (44%) in the PLRT group. Comparison the hypotension rates between the echo group and the control group, there is a reduction of 9% ($p = 0.154$), while among the echo group and the PLRT group there is a reduction of 11% ($p = 0.086$). The average amount of fluids administered to the patient between arrival under anesthesia and the onset of anesthesia is 141 ml for the control group, 336 ml for the echocardiography group and 168 ml for the PLRT group ($p < 0.001$). Globally the total amount of fluids administered is 453 ml for the control group, 593 ml for the echo group and 511 ml for the PLRT group, with significantly greater administration in the echocardiography group (p 0.01498).
Conclusion: IVC ultrasound seems to be a valid and safe method to reduce the rate of hypotension before spinal anesthesia.

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O26

Can New Wearable Technology significantly increase the Efficacy Cardiopulmonary Resuscitation? A controlled, randomized trial testing

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Contexte & Objectives: Cardiovascular accidents are the leading cause of death. A cardiopulmonary resuscitation (CPR) of quality has well shown that can reduce the mortality; despite this, survival rate has not changed significantly during last years. Aim of this study is to test a new wearable glove to provide lay people with instructions during out-of-hospital CPR.
Methods: After ethical committee approval, we performed a blinded, controlled trial on an electronic mannequin AmbuMan to test the performance of adult volunteers, non-healthcare professionals performing a simulated CPR both, without and with glove, following the glove instructions. The group without glove, also called “no-glove” is intended as control group. Each compression performed on theelectronic mannequin AmbuMan was recorded by a connected laptop computer, drawing a depth frequency curve over the time. Primary outcome was to compare the accuracy of the two simulated CPR sessions in terms of depth and frequency of chest compression performed by the same lay volunteers. Secondary outcome was to compare the decay of performance and percentage of time in which the candidate performed accurate CPR. The difference between the two groups in regard to change in chest compression depth over time due to fatigue, defined as decay were also analyzed.
Results: 571 chest compressions were included: 293 in control group, 278 in glove group. Mean depth of compression in the control group was 55.17 mm versus 52.11 mm in the glove-group ($p = 0.000016$). Compressions with an appropriate depth were not statistically different (81.9% vs 73.6%, $p = 0.017$). Mean frequency of compressions in the group with glove was 117.67 rpm vs 103.02 rpm in the control group ($p < 0.00001$). The percentage of compression cycles with an appropriate rate (> 100 rpm) was 92.4% in the group with the glove versus 71% in the control group, with an observed difference of 21.4% between the two groups, which was statistically significant ($p < 0.0001$). A mean reduction over time of compressions depth of 5.3 mm (SD 10.28) was observed in the control group versus a mean reduction of 0.83 mm in the group wearing the glove (SD 9.91), but this mean difference in the decay of compressions delivery was not statistically significant ($p = 0.018$).
Conclusion: The use of the glove was effective in reducing by more than 20% the inappropriateness of the frequency of chest compressions during CPR.

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O27

Respiratory mechanics can be measured during spontaneous breathing at the bedside : illustration of feasibility

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CONTEXT: End-inspiratory (EIP) and end-expiratory (EEP) pauses are commonly used during volume assist control to assess respiratory mechanics. They can also be used during assisted ventilation (AV) for muscle pressure assessment [1]. It requires ventilators able to perform EIP and EEP during AV. Plateau pressure (Pplat) usually increases in AV during EIP due to “hidden” inspiratory effort [2]. Pressure muscular index (PMI) is equal to Pplat minus the sum of total positive end-expiratory pressure (PEEPtot, measured during an EEP) and set pressure support (PS); it theoretically reflects patient’s effort without esophageal pressure (Pes) monitoring, which is the gold standard to assess inspiratory muscle pressure (Pmus, difference of Pes during EIP and maximal drop of Pes during inspiration) [3]. We aimed to illustrate the feasibility of measuring PMI using a standard ICU ventilator at the bedside and study the correlation between Pmus and PMI.
METHOD: Measurements were recorded in two ICU patients. Pes was measured using an esophageal balloon-equipped nasogastric tubes placed for advanced monitoring (severe acute respiratory distress syndrome – ARDS) and for a study protocol (difficult weaning after COPD exacerbation). Recorded EIP, EEP and Pes were used for post-hoc analyses. Results reported as ranges for the ARDS patient and as median [IQR] for the COPD patient. Correlation between Pmus and PMI tested with Spearman correlation test.
RESULTS: For the ARDS patient, 4 out of 5 EIP and EEP recorded over a 1-week span could be analyzed (1 was disrupted by an esophageal spasm). Both Pplat and PEEPtot could otherwise be assessed. Ventilator mode was pressure support ventilation (PSV 9-12 cmH2O). Pplat ranged from 23.1 to 33.3 cmH2O, PEEPtot ranged from 9.1 - 12.2 cmH2O, Pmus ranged from 7.1 - 14.6 cmH2O and PMI ranged from 2 - 8.7 cmH2O. For the COPD patient, 5 EIP and EEP were recorded in a 3-hour span and analyzed. Pplat = 18 [16.8 - 18.7] cmH2O, PEEPtot = 5.3 [5.3 – 5.8] cmH2O, Pmus = 21.5 [20.5 - 28.6] cmH2O, PMI = 7.9 [7.1 - 11.3] cmH2O. For all the recordings, Spearman r coefficient between Pmus and PMI was 0.63 (p = 0.08).
CONCLUSION: Muscular effort can be assessed in AV using EIP and EEP using ICU ventilators. However, real-time bedside analysis is difficult. Even recordings can be disrupted by artifacts (esophageal spasms) or active expiration. There seem to be a correlation in our small sample between muscular pressure assessed without and with Pes.

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O28

Artificial intelligence-supported digital microscopy for rapid malaria diagnosis

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Besides the very frequent use of rapid diagnostic tests (RDTs) for malaria diagnosis in the field, expert microscopy is still used for reliable diagnosis. In contrast to microscopy, RDTs are unable to quantify parasitemia, identify gametocytes, and cannot distinguish all malaria species. Furthermore, the rapid spread of Plasmodium parasites having the hrp2/hrp3 gene deleted compromises the reliable use of RDTs. Here we present an innovative platform that is designed to be employed in endemic areas that automatically generates microscopic blood smears termed miLab. These smears are liquid-free stained using a hydrogel-based stamping technology coupled with automatic digital microscopy. Images are captured digitally and analysed by a machine-learning algorithm that results in parasite quantification, parasite speciation and gametocytes identification. Here we report the instrument validation with full human blood samples spiked with various numbers of synchronized and non-synchronized cultured P. falciparum parasites. In addition, we have used cultures and induced gametocytes for training the algorithm to also detect gametocytes. The platform has also been employed in a clinical field study and first results will be reported.

O29

Detection of Dicistroviruses RNA in Blood of Febrile Tanzanian Children

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Background & Objectives

Fever is the leading cause of paediatric outpatient consultations in Sub-Saharan Africa. Although most are suspected to be of viral origin, a putative causative pathogen is not identified in over a quarter of these febrile episodes.

Material and method

This study includes sera from 692 febrile children (aged 2-59 months) and plasma from 77 febrile adults recruited at outpatient clinics in Tanzania. These blood products were analysed by high-throughput sequencing for novel viruses using a de novo assembly approach.

Results

We report the presence of RNA from a dicistrovirus (DicV) in 15.4% of the paediatric cohort. In contrast, DicV RNA was only detected in 1/77 (1.3%) plasma samples from febrile Tanzanian adults, suggesting that children could represent the primary susceptible population. The virus is novel to human tissue and phylogenetic analysis of the capsid region in the three full-length genomes obtained showed the presence of two clusters representing a tentative novel genus. Estimated viral load across all samples by specific quantitative real-time RT-PCR assay ranged from < 1.32E3 to 1.44E7 viral RNA copies/mL serum (median = 5.67E3). Although DicV-positive cases were detected throughout the year, a significantly higher positivity rate was observed during the rainy season. A comparative analysis between DicV-positive and negative patients did not reveal any significant clinical differences, except that DicV-positive patients had a lower mean age (16.4 vs 18.9 months, p = 0.02).

Conclusion

Dicistrovirus is part of a family of RNA viruses that have been detected in some hematophagous insects that are known vectors of parasitic disease in humans (such as triatomes). This study reveals that novel DicV RNA is frequently detected in the blood of Tanzanian children and works to encourage further investigations to determine whether DicV may be a novel infectious agent in humans.

Additional information:

We thank the patients and their care-takers for their participation and contribution to improved medical care for febrile illness in Tanzania.

P1

Tackling the challenges of decentralized HIV testing and care in Southern Africa - two interlinked cluster-randomized trials in rural Lesotho (The GET ON Project)

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Background
Reaching high HIV testing coverage during home-based testing campaigns in sub-Saharan Africa, and engaging those newly diagnosed to long-term HIV care, remains challenging. This is particularly difficult in remote areas where access to health facilities is a major impediment. Two interlinked cluster-randomized trials, HOSENG (HOme-based SElf-testiNG) and VIBRA (VIllage-Based Refill of Antiretroviral therapy (ART)), explore innovative interventions to improve testing coverage and subsequent engagement in care in rural Lesotho, Southern Africa. Together, they constitute the GET ON (GETting tOwards Ninety) research project, that is designed to reach the UNAIDS 90-90-90 targets, and in line with the UNAIDS strategy to recruit more than 2 million community health workers in Africa.
Methods
The HOSENG trial (NCT03598686) measures the effect of secondary distribution of oral HIV self-tests during home-based testing on testing coverage within 120 days after the campaign. In intervention clusters (i.e. villages), self-tests are left for household members who are absent or decline testing. Distributed self-tests are then followed up by trained lay community health personnel known as village health workers (VHWs). A long-standing public sector cadre of VHW already exists in Lesotho with more than 4000 VHWs currently successfully operating in all districts.
The VIBRA trial (NCT03630549) assesses a new decentralized ART delivery model that builds on the VHW program and uses SMS technology. It enrolls individuals found HIV positive and not on ART during the HOSENG trial. In control clusters, participants are offered same-day ART initiation with follow-up at the clinic. In intervention clusters, participants are offered same-day ART with the possibility of further follow-up by the nearby trained VHW. Moreover, they may receive automatically generated coded SMS with adherence reminders or viral load results.
Results
Overall recruitment will successful be closed on May 31, 2019. By September we will be able to present final results from the HOSENG trial and preliminary results from the VIBRA trial.
Conclusions
The HOSENG trial results will inform the feasibility and additive effect of secondary distribution of self-tests during home-based HIV testing in rural Africa. The VIBRA trial will be the first randomized trial assessing follow-up of patients by medical lay-workers directly after home-based same-day ART initiation.

P2

The HepCare Project of the Swiss Hepatitis Strategy: With GP empowerment towards hepatitis C elimination

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Background:
Both, the Swiss Hepatitis Strategy and the first Global Health Sector Strategy on Viral Hepatitis aim to eliminate Hepatitis C (HCV) until 2030. The main gaps in the cascade of care are awareness, testing and linkage to care. General Practitioners (GP) play a critical role to fill these gaps, but are cannot prescribe HCV direct acting antivirals (DAA) due to a 'FOPH limitatio'. This has a negative impact on the motivation of GP to test and refer for treatment.
Aim:
HepCare aims to improve the cascade of care of HCV by directly involving GPs in HCV therapy. This is supposed to enhance the motivation of GPs for case finding and linkage to care. HepCare should relevantly contribute to the elimination of HCV in Switzerland.
Method:
The HepCare Project allows GPs to provide DAA treatment to their patients on their own. A network of specialist supports GPs with prescribing DAA. This optimally only needs a consultation of the patient file. Patients remain with their GPs resulting in a lowered threshold in the access to therapy, higher chance of adherence and less risk of stigmatisation. A special focus of HepCare is on GPs taking care of patients in opioid-agonist therapy. The project provides all necessary documents and support, like a checklist with all required parameters for the file consultation, a letter template for the specialist and different education materials for GPs and patients. All documents are available on the project website www.hepcare.ch. HepCare is one of the flagship project of the civil society initiated and run by the Swiss Hepatitis Strategy.
Current status of project:
First patients got treated in April 2019 within pilot projects with GP networks in the cantons of Zurich, Aargau, St. Gallen and Zug. The project roll out in other cantons will follow a pilot phase of 6 months. The project is financed by FOPH, cantonal health authorities and pharmaceutical industry.
Conclusion:
The HepCare project brings HCV therapy from tertiary to primary care with the potential to raise awareness and motivation for HCV care among GPs and to facilitate access to care for patients. A successful nationwide execution of the project would bring Switzerland an important step closer towards elimination of hepatitis C.

P3

Surveillance of sexually transmitted infections using innovative laboratory testing approaches in Kampala, Uganda

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Introduction: Sexually transmitted infections (STIs) are among the most common infectious diseases. Syphilis infection continues to be an important global health problem in Uganda and other sub-Saharan African countries; whereas screening for STIs such as gonorrhea and chlamydia remains a concern due to challenges in the implementation of testing. This project set out to improve diagnosis and treatment of three key STIs in a sustainable manner, using innovative laboratory testing approaches.
Objectives: The project had four key objectives; 1) to screen 800 pregnant women during antenatal care for syphilis using Immunochromatographic Strip (ICS) tests 2) to screen 400 asymptomatic individuals at high risk for acquisition of STIs for chlamydia and gonorrhea using GeneXpert® cartridges 3) to diagnose at least 50-100 STIs and link 20 partners to care and 4) to hold 3 Continuous Medical Education (CME).
Results: 2040 pregnant women were screened for syphilis, 82 (4%) tested positive and all were linked to care and treatment. 456 asymptomatic individuals were screened for gonorrhea and chlamydia, of which 299 (66%) females. 37 (8%) tested positive for chlamydia and 28 (6%) for gonorrhea while 6 (1%)individuals had dual infection. In total, 147 STIs were diagnosed and 65 (44%) partners were treated as well. Six trainings were conducted among health care workers.
Conclusions: As a direct result, IDI has established a surveillance platform for STIs that is routinely used; STIs screening is now standard of care at the clinic. Beyond the objectives of the project itself, this project has also spurred further study ideas. Antimicrobial resistance testing of N. gonorrhea isolates is one of the priority areas for further studies with this partnership.

P4

Respiratory Syncytial Virus, a threat for nursing homes residents?

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Nursing home residents live confined, in close contact with one another and staff, increasing opportunities for viral spread. During winter season, Respiratory Syncytial Virus (RSV) might affect the residents as much as influenza virus. However, data estimating RSV morbidity and mortality in nursing homes remain scarce.
In influenza seasons 2016-2017 and 2017-2018, a study on the burden of influenza was led in nursing homes of canton de Vaud. Nasal swabs were collected in residents symptomatic with an influenza-like illness. The samples were analyzed with a coupled PCR diagnosing influenza A/B as well as RSV. As a result, the diagnosis of RSV was underlined, even though it was not the purpose of the study.Demographic characteristics of resident were recorded (clinical data, hospitalization, mortality).
509 residents with influenza-like illness (ILI) symptoms were included. 38 RSV infected residents (7.5%) were diagnosed in 15 different nursing homes. 10 of these nursing homes experienced an epidemic situation with ≥2 residents diagnosed and 2 of them with 5 and 6 simultaneous cases respectively. Median age was 87 years (SD 7). Median temperature at diagnosis was 37.9°C (SD 1.1). The three most represented symptoms were cough (89.5%), malaise (73.7%) and fever (71.1%). 12 residents (31.2%) required oxygen therapy and 26 residents (68.4%) were treated with an antibiotic. 3 residents were hospitalized within 30 days after diagnosis (7.9%). 8 residents died within the first 30 days (21%) and a total of 14 residents died within 90 days (37%).
This study revealed that RSV infections in the institutionalized elderly is an underestimated threat. Residents with a RSV infection encounter a risk for hospitalization and mortality. Although the study was conducted on a relatively small number of residents, it reveals the need to take into account this pathogen in case of influenza-like illness outbreak in nursing home. Moreover, RSV outbreaks can occur in nursing homes. In case of influenza-like illness epidemic in a nursing home, if samples are negative for influenza, RSV should be looked for.

P5

The management of invasive fungal disease prior hematopoietic stem-cell transplant and its effects on post-allogeneic fungal infections

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Objectives: Patients with prior invasive fungal disease (IFD) increasingly proceed to allogeneic hematopoietic cell transplantation (allo-HCT). Nevertheless, the optimal management of pre-existing IFD remains unclear. We investigated the management of patients with pre-existing IFD, the incidence of IFD and outcomes post-allogeneic HCT within the Swiss Transplant Cohort Study (STCS). Methods: The STCS is a prospective, clinic-based, observational study of HCT recipients since 2009. Data were collected on the diagnosis and treatment of IFD prior to allo-HCT by retrospective chart review from 01.2009 to 11.2013. Patients with pre-allo-HCT IFD were compared to non-IFD patients. Results: We included 456 allo-HCT recipients with 23 (5.0%) IFD prior to HCT: 8/23 (34.8%) invasive yeast infections (IYI) and 15/23 (65.2%) probable/proven invasive mold disease (IMD), consisting of 13 invasive aspergillosis and 2 non-Aspergillus IMD. Median time between IFD diagnosis and allo-HCT was 102 days [IQR 67;171] for all patients, 77 days [IQR 45;131] in IMD and 126 days [IQR 82;171] in IYI respectively. The vast majority (21/23, 91.3%) of patients with pre-allo-HCT IFD were transplanted during the first year after IFD-diagnosis: 7/8 (87.5%) and 14/15 (93.3%) of IYI and IMD patients, respectively. More than half (14/23; 60.9%) patients with pre-allo-HCT IFD received treatment with a single antifungal agent. Sequential treatment changes were documented in 7/23 (30.4%) patients. Initial antifungal treatment consisted of voriconazole (9/23, 39.1%), followed by echinocandins (7/23, 30.4%) and liposomal amphotericin-B (6/23, 26.1%). Treatment changes during conditioning were performed in 47.8% (11/23). Post-HCT, 87% (20/23) of IFD patients received mold-active antifungal treatment for median 7 months [range 1-27]. Additional surgical resection was performed in 9/23 (39.1%) patients. One-year probability of post-HCT IFD was 4.4% (1/23) and 8.3% (36/433) for IFD patients and non-IFD patients, respectively (P-value: ns). Overall one-year survival was 52.2 % (IFD patients) and 58.2% (non-IFD patients; P-value 0.021). Conclusion: Pre-allo-HCT IFD was not associated with higher post-allogeneic HCT IFD incidence or mortality. Careful management, including long-term appropriate antifungal treatment and pre-HCT surgical intervention with secondary post-HCT prophylaxis may contribute to beneficial outcomes. Larger studies are needed to optimally guide the management of these patients.

P6

Malaria Standby Emergency Treatment (SBET) for Travelers Visiting Malaria Endemic Areas: a Systematic Review and Meta-Analysis

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Background:
Malaria prevention methods for travelers to low or moderate malaria risk areas varies and remains controversial. Standby Emergency Treatment (SBET) for malaria is one possible strategy increasingly recommended since 1988 with little evidence on its effectiveness or how it is truly being used.
Methods:
A systematic review and meta-analysis were performed based on a structured search in Embase, Medline, PubMed, Cochrane, and Web of Science on September 7, 2018. The primary outcome was the overall prevalence of SBET use in travelers, and secondary outcomes were the proportion carrying SBET, the response to fever (use of SBET, health facility attendance, use of malaria rapid diagnostic test [mRDT]), adverse events to SBET, and the proportion using SBET incorrectly (incorrect dosage/duration). The pooled SBET use prevalence was analyzed using a random-effects model. A descriptive summary was done to present secondary outcomes. The study protocol was registered with PROSPERO CRD42018103703.
Results:
11 studies were eligible for inclusion among the 1027 titles identified by our search. The studies included 7/11 prospective cohort studies that recruited pre-travel clinic attendees in Europe, and 4/11 cross-sectional studies, of which 3 recruited travelers at airports before their return home from South-East-Asia and Africa, and 1 from an employee registry including long-term travelers. The overall pooled prevalence of SBET use among the 26’403 travelers was 2.5% (95%CI 1.1%-4.3%; range 0.4%-10.8%). There was significant variation in the proportion of travelers carrying SBET medication (40%-100%), the proportion of travelers with appropriate response to fever (23%-100%), adverse events (0%-33%) and incorrect dosage/duration of SBET (0%-100%).
Conclusions:
Adherence to the proposed recommendations for SBET use, notably the response to fever, was poor. If the use of SBET is to be pursued, modifications to the current SBET strategy should be considered, such as better selection of travelers at higher risk for malaria, and the potential addition of mRDTs.

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P7

Impact of Pseudomonas aeruginosa intracellular reservoir and antibiotic therapy on Pseudomonas lung infection

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Background/aim
P. aeruginosa is considered an extracellular pathogen but it is also internalized by epithelial cells. Infection treatment relies, among others, on aminoglycosides and fluoroquinolones. Fluoroquinolones are highly diffusible molecules. Aminoglycosides display poor cell penetration. The consequences of bacteria internalization on cellular function and on response to antibiotics have not been studied. The type three secretion system (T3SS) is a virulence factor of P. aeruginosa, whose absence is associated with intracellular localization. CHA is cystic fibrosis clinical isolate of Pseudomonas. CHAΔpopBD is an isogenic mutant of CHA in which T3SS synthesis has been inactivated. We aim to characterize the impact of P. aeruginosa intracellular location on the behavior of lung epithelial cells and how antibiotic diffusion affects the response to intracellular and extracellular P. aeruginosa during infection.
Methods
A549 lung epithelial cells were incubated with CHA or CHAΔpopBD. Cells were either washed and lysed for intracellular bacteria enumeration, or treated with tobramycin or ciprofloxacin for ROS quantification using CM-H2DCFDA ROS sensitive dye. Cell death was obtained through MTT assay. Mice challenged with either CHA (3*106 CFU, i.n.) or CHAΔpopBD (8*107 CFU, i.n.) received 40 mg/kg of ciprofloxacin i.p.. Lung permeability was assessed 24 h post infection. The control group was not infected nor treated with antibiotics.
Results
A459 internalize more CHAΔpopBD than CHA. Cell death was significantly higher when A549 were incubated with CHA. Antibiotic induced-ROS production by A549 is the highest when cells are treated with ciprofloxacin (fluoroquinolone with high cellular diffusion capacity) in the presence of intracellular bacteria. In a mouse model of lung infection where the inocula of CHA and CHAΔpopBD were titrated to produce similar lung injury, the subsequent treatment with ciprofloxacin worsened lung injury in both CHA and CHAΔpopBD infected mice compared to the non-treated infected mice. The antibiotic-induced increase in lung injury was more important in mice infected with CHAΔpopBD compared to mice infected with the wild type strain CHA.
Conclusions
The internalization of P. aeruginosa affects cell viability and both cell ROS production and mice response to antibiotic treatment during infection. Further work is ongoing to better understand how intracellular P. aeruginosa impact on lung infection and antibiotic treatment.

P8

The TransFLUas influenza transmission study in acute healthcare – attack rates, symptoms and transmission clusters

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Background
Nosocomial acquisition of influenza from asymptomatic individuals may occur and is a major concern for infection control in hospitals. However, no prospective studies within acute care settings have studied transmission of influenza from asymptomatic individuals. In this study, we aimed to dissect transmission dynamics of influenza virus trajectories in a tertiary care hospital.
Materials and methods
This prospective study followed patients in medical wards and acute care healthcare workers (HCW) working on the same wards over two consecutive influenza seasons. Inpatients and acute care HCW provided mid-turbinate nasal swabs for multiplex real-time PCR and whole-genome sequencing. Illness diaries were recorded on a daily basis, and contacts between study participants were tracked.
Results
We recruited 152 HCWs and 543 inpatients in the 2015/16 and 2016/17 influenza seasons. 16 (10.5%) of HCW and 19 (3.5%) of inpatients were diagnosed with an influenza infection. A total number of 1241 swabs were collected in these 35 subjects. Of these, 109 swabs tested positive. The number of positive swabs per individual ranged from 1 to 13. The majority of subjects (83.1% of HCW and 91.9% of patients) had influenza symptoms when their tests were positive, and this always included respiratory symptoms. However, 11/71 (15.5%) influenza-positive swabs among HCW and 3/37 (8.1%) influenza-positive swabs among patients were collected on days without symptoms. Among the symptomatic individuals, 2/14 (14.3%) of HCW and 0/17 inpatients had a positive influenza test before symptoms developed. 2/16 (12.5%) HCW and 2/19 inpatients (10.5%) remained asymptomatic. Preliminary analyses based on local and temporal proximity of HCW and inpatients revealed at least seven clusters of potential transmission events among HCW, among inpatients or between HCW and inpatients, and one cluster revealed a possible transmission from an asymptomatic HCW to an inpatient. Evidence, based on local and temporal proximity, for one possible transmission from an asymptomatic healthcare worker to an inpatient was not supported by phylogenetic analysis.
Conclusions
Influenza infection in acute care is common and a significant proportion of individuals shed influenza virus without harboring any symptoms, thereby potentially exposing their vicinity. Asymptomatic transmission seemed likely in one cluster, but was not supported by phylogenetic analyses.

P9

Burden of respiratory virus infections in solid-organ transplant recipients: a nationwide multi-season cohort study

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Purpose: Respiratory virus infections (RVI) are common in solid-organ transplant recipients (SOTr) and are caused by a wide range of viruses. However, beside influenza, little is known about the burden of RVI in SOTr. We aimed to study the burden of RVI in the Swiss Transplant Cohort Study (STCS): a large, nationwide cohort of SOTr including > 95 % of transplant performed in Switzerland.
Methods: For this study, patients participating to the STCS and transplanted between May 2008 and December 2015 were included. Infectious episodes were prospectively collected at each study center. Testing for RVI was performed as part of routine practice at each center. Additional clinical information not included in the STCS database was collected through chart review. Logistic regression was used to identify risk factors for severe RVI.
Results: Among 3308 patients [1834 (55 %) kidney, 687 (21 %) liver, 250 (8 %) heart, and 337 (10 %) lung transplant] with a median follow-up of 3.7 years (IQR 1.9 - 5.8), we identified 750 episodes of microbiologically documented RVI (26 % Influenza, 11 % Respiratory Syncytial virus, 7 % Parainfluenza virus, 4 % Human metapneumovirus, 35 % Rhinovirus, 10 % Coronavirus, 1 % Adenovirus, 0.7 % Bocavirus and 5 % mixed infections) in 442 patients (13 %). Estimated incidence was 61 cases per 1000 person-year. RVI was hospital acquired in 57 (8 %) of cases. RVI was asymptomatic in 62 / 592 (10 %), whereas lower respiratory tract infection was diagnosed in 266 / 592 (45 %) of RVI episodes. Among 343 RVI episodes, for which imaging was performed, pneumonia was diagnosed in 147 (43 %). Microbiologically-confirmed bacterial and fungal coinfection occurred in 8% and 4% of RVI. Hospital and Intensive Care Unit (ICU) admission-rates were 35% and 4%. In univariate analysis, Influenza (OR 2.2; P = 0.035), nosocomial infection (OR 6.9; P < 0.001), and microbiologically confirmed bacterial (OR 10.2; P < 0.001) and fungal coinfections (OR 4.8; P = 0.006) were associated with ICU admission.
Conclusions: In this nationwide, multiseason cohort, RVI in SOTr were associated with important morbidity. In particular, Influenza, nosocomial infection, and microbiologically confirmed coinfection, were associated with severe disease.

P10

First detection of TR34/L98H Aspergillus fumigatus mutants in Switzerland

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Background: Azole resistance in Aspergillus fumigatus has emerged as a global health problem and has been associated with high mortality rates in patients with invasive aspergillosis. The aim of this study is to assess the distribution and antifungal susceptibility profile of clinical respiratory Aspergillus spp. isolates in Switzerland. Here we present first preliminary results.
Materials/methods: This prospective multicenter study was conducted at all hospitals participating in the Fungal Infection Network of Switzerland (FUNGINOS). A one-year period starting from January 2018 was covered. All patients with detection of Aspergillus spp. in a respiratory sample were included. The main demographic, clinical and microbiological data were collected according to a specific case report form. All isolates were sent to a central laboratory for antifungal phenotypic susceptibility testing by Sensititre YeastOne panel. Aspergillus isolates with high minimum inhibitory concentration (MIC) for one of the tested triazoles were analysed by complete sequencing of the cyp51A gene and promoter region for detection of mutations.
Results: In the first 8 months, 136 respiratory samples with Aspergillus spp. were included. Samples were obtained from sputum (n=80, 59%), bronchoalveolar lavage or tracheobronchial aspirate (44, 32%), lung biopsy (7, 5%) and others (5, 4%). The isolates consisted of A. fumigatus (n=104, 76%), A. niger (15, 11%), A. flavus (7, 5%) and others (10, 7%). Two A. fumigatus strains were resistant to azoles and were found to carry the typical environmental TR34/L98H mutation. The first isolate (Case 1) was obtained from a lung biopsy of a 62-year-old patient with proven invasive aspergillosis after allogeneic stem cell transplantation who had grade III graft-versus-host disease and had received long-term mold-active treatment. The other isolate (Case 2) was obtained from the sputum of a 73-year-old male patient with chronic obstructive pulmonary disease and was interpreted as colonisation.
Conclusions: The prevalence of azole resistance among respiratory Aspergillus spp. isolates in Switzerland is low (< 2%). We detected the first two cases of TR34/L98H A. fumigatus mutants in clinical isolates in our country.

P11

How to develop and implement a computerized decision support system integrated with electronic prescribing for antimicrobial stewardship? Experience from two Swiss hospital systems.

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Background
Many antimicrobial stewardship (AMS) interventions require intensive human resources and are difficult to sustain in the long-term. Computerized decision support systems (CDSS) provide new opportunities for automating AMS interventions and integrating them in routine healthcare. CDSS are recommended as part of AMS programs by international guidelines (1), yet developing and implementing such systems faces several challenges that we wish to describe here.
Methods
We developed and implemented two CDSS integrated into the in-house electronic health records in three public hospitals in Switzerland (Geneva, Lugano and Bellinzona) in the context of the COMPASS study (2). The CDSS encourages physicians to follow local guidelines for antimicrobial therapy and duration of treatment and to regularly reevaluate treatment.
Results
Despite a relatively simple algorithm without incorporation of much patient-specific data, the development of the system and its integration into the computerized physician order entry was complex and took between 9 (Ticino) and 12 months (Geneva). The trade-off between entering in the system structured data and providing a safe and user-friendly prescribing process through the user interfaces was challenging. The use of standardized terminologies to avoid free-text is essential for analysis purposes and long-term sustainability. The CDSSs have now been used in 12 wards for 8 (Ticino) and 5 months (Geneva) respectively. Feed-back based on the use of the system is delivered to end-users approximately every three months. One major challenge encountered is to get physicians to actively use the CDSS in case of transfer of patients who are already receiving antimicrobials (whereas the use of the system is automatic in case of prescriptions initiated in the unit). Users satisfaction survey showed a global satisfaction score of 3.3 for Ticino (18 answers) and 2.7 for Geneva (26 answers) on a 5-points Likert-scale. The main complaint by end-users is the extra-time required compared to the standard prescribing process.
Conclusions
When designing and developing a CDSS, close collaboration between an IT team with development expertise and clinicians is essential. End-users views and experience should be taken into account for future improvement. Future developments will be part of a more global clinical information system platform designed to support new CDSS COMPASS-like initiatives and adaptation of COMPASS for other areas (such as pediatrics).

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P12

Mycoplasma pneumoniae-induced mucocutaneous disease: a prospective longitudinal cohort study

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Objectives: To report the occurrence and clinical presentation of Mycoplasma pneumoniae-induced mucocutaneous disease in a prospective longitudinal cohort study of children with community-acquired pneumonia (CAP).
Methods: We investigated M. pneumoniae-induced mucocutaneous disease among 152 children enrolled during a prospective longitudinal CAP study from May 1, 2016, to April 30, 2017 at the University Children's Hospital Zurich. Infection with M. pneumoniae was diagnosed by polymerase chain reaction (PCR) in pharyngeal samples and confirmed with the measurement of peripheral blood immunoglobulin (Ig) M antibody-secreting cells (ASCs) by enzyme-linked immunospot (ELISpot) assay.
Results: Mucocutaneous eruptions developed in 10 (23%) cases of CAP positive for M. pneumoniae by PCR (n = 44), all of whom tested positive for specific IgM ASCs. M. pneumoniae PCR-negative CAP cases had skin manifestations in 3% ($p < 0.001$). The spectrum of M. pneumoniae-induced mucocutaneous disease included M. pneumoniae-induced rash and mucositis (MIRM; n = 3/44, 7%), urticaria (n = 2, 5%), and exanthematous skin eruptions (n = 5, 11%). Two cases had ocular involvement as sole mucosal manifestation (bilateral anterior uveitis and non-purulent conjunctivitis). Cases with M. pneumoniae-induced mucocutaneous disease had longer prodromal fever ($p = 0.02$) and higher CRP levels ($p = 0.04$) than cases with M. pneumoniae CAP without skin manifestations. They were also more likely to require oxygen ($p = 0.007$), hospitalization ($p = 0.01$), and to develop long-term sequelae ($p = 0.03$).
Conclusion: Mucocutaneous disease occurred in one out of four cases with M. pneumoniae CAP, significantly more frequent than in CAP of other etiology. M. pneumoniae-induced mucocutaneous disease was associated with increased systemic inflammation, morbidity, and higher risk of long-term sequelae.

P13

Zimmerdesinfektion mit UV-C-Licht bei Vancomycin-resistenten Enterokokken – eine zusätzliche Sicherheit? Eine Pilotstudie.

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Hintergrund
Oberflächen können durch Patientinnen und Patienten, die mit multiresistenten Keimen kolonisiert oder infiziert sind, kontaminiert sein. Um nosokomiale Infektionen zu vermeiden, werden die Zimmer bei der Entlassung dieser Patienten einer Schlussdesinfektion (SD) unterzogen. Bei unzureichender SD besteht die Gefahr der Keimübertragung nachfolgenden im Zimmer stationierten Patienten.
Ziele
Bringt eine UV-C-Desinfektion bei Austritt von Patienten, die mit Vancomycin-resistenten Enterokokken (VRE) kolonisiert oder infiziert sind, eine messbare Abnahme von Erregern gegenüber den Standardverfahren der SD?
Material und Methoden
Am Universitätsspital Basel wurden zwischen Oktober 2018 bis April 2019 zwanzig Zimmer nach Austritt von VRE-Patienten untersucht. Acht Abstrichstellen wurden dabei berücksichtigt: Toiletten-Brille, WC-Knopf Spülung, Abdeckung WC-Papier, Wasserhahn der Nasszelle, Boden, Patienten-Bettklingel, Schublade des Nachttisches und Klapptisch.
Die mikrobiologischen Proben wurden mittels RODAC-Abklatschplatten (Merck) und eSwab™ (COPAN) zu drei Zeitpunkten entnommen: a) vor SD, b) nach SD und vor UV-C-Desinfektion, c) nach UV-C-Desinfektion. Von den eSwab™ wurden 0,2 ml Flüssigkeit entnommen und auf CNA-Platten ausgestrichen. Abklatsch- und CNA-Platten wurden während 48 Std. bei 35°C bebrütet.
Bei Wachstum wurde je eine Subkultur auf Columbia Blut-Agar und CNA-Platten angesetzt. Eine weitere Differenzierung wurde mittels MALDI-TOF verarbeitet. Eine VITEK-Resistenzprüfung sowie eine Typisierung durch Next Generation Sequencing wurde bei allen nachgewiesenen E. faecium durchgeführt.
Resultate
Insgesamt wurden 472 Proben analysiert. In einem der Zimmer konnten 8 Abklatsche zum Zeitpunkt b) nicht abgenommen werden. Die Anzahl positiver VRE-Proben betrug zu den Zeitpunkten a) 32 von 160, b) 4 von 152 und c) 0 von 160. Der exakte Test nach Fisher zeigte beim Vergleich der Ergebnisse der Zeitpunkte a) und c) $p < 0.0001$, respektive b) und c) $p = 0.055$.
In 55% (11/20) der Zimmer vor SD und in 36% (4/11) nach SD wurde VRE nachgewiesen. In Zimmern, die nach SD VRE-positiv waren, wurde VRE nach UV-C-Desinfektion zu keinem Zeitpunkt festgestellt.
Schlussfolgerungen
Die SD mit einem Kombinationspräparat aus quartären Ammoniumverbindungen mit Aldehyd und Glutaraldehyd ist unzureichend, um VRE vollständig zu eliminieren. Eine zusätzliche Desinfektion mit UV-C scheint eine zuverlässige Methode zu sein, um die Sicherheit für die Patienten zu erhöhen.

P14

Two Years of Viral Metagenomics in a Tertiary Diagnostics Unit: Evaluation of the First 35 Cases

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Background
Metagenomic sequencing can capture the full spectrum of viral pathogens in a clinical specimen and has the potential to become a rapid, all-in-one solution for virus diagnostics. To date, clinical application is still in an early phase as current workflows are technical demanding and methodological limitations remain. Here, we evaluated the impact of viral metagenomics for cases analyzed over two years in a tertiary diagnostics unit.
Methods
Virome analysis was performed upon request by the treating clinician in 35 cases, where the etiology of infection remained unknown after routine diagnostic testing or the initial differential diagnosis was very broad. Clinical specimens were analyzed by high-throughput metagenomic sequencing in separate reactions for DNA and RNA viruses. Results obtained by metagenomic analyses were compared to the results and the workload of conventional routine testing.
Results
Over two years, 55 specimens from 35 patients were tested by virus metagenomic sequencing. The main sample types were cerebrospinal fluid (29%), blood (26%) and throat swabs (11%). In the majority of the cases inflammatory central nervous system disorders like meningitis or meningoencephalitis were investigated (43%), followed by pathologies of the peri- and myocard (17%). 40% of the patients were immunocompromised. In parallel to metagenomic sequencing, conventional virus diagnostic tests were performed (mean 26 individual tests/patient). Metagenomic sequencing detected viruses in 12 cases (34%). These included viruses that were confirmed by routine diagnostics but in several cases also revealed virus infections that were not included or found in the performed routine diagnostic tests (e.g. Tick-borne encephalitis virus, Human immunodeficiency virus 1 or JC Virus).
Conclusions
Two years' experience of metagenomic sequencing in a tertiary diagnostics unit demonstrated several advantages of an untargeted approach for virus diagnostics, highlighting the potential as first-line diagnostic tool.

P15

Identifying the essentialome of Theileria-induced transformation

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Vetsuisse Faculty

Intracellular single-celled parasites belonging to the phylum of Apicomplexa are amongst the most prevalent and morbidity-causing pathogens worldwide. A striking example is Theileria, which affects millions of cattle in developing countries and has a substantial economic impact. The most medically important species are T. annulata and T. parva, which cause leukoproliferative diseases called Tropical Theileriosis and East Coast Fever, respectively. Theileria is unique in biology as it is the only eukaryotic cell known to fully transform its eukaryotic host cell. We hypothesize that there are host cell-derived factors that are required for parasite-induced transformation but dispensable for the host. To address this we generated a bovine genome-wide CRISPR/Cas9 library containing 85,155 gRNAs, targeting 21,039 protein-coding genes (4 gRNAs per gene). We will perform genome wide CRISPR/Cas9 drop out screens in Theileria-infected bovine cells and their non-infected controls to identify essential genes. We will compare the essentialome of BL20 cells (B cells derived from a calf with sporadic bovine leukosis) with TBL20 cells (BL20 infected with T. annulata). The BL20/TBL20 model is an ideal system to investigate changes induced by Theileria, as the two cell lines share the same host cell background. We have already performed a pilot screen in Cas9-expressing TaC12 cells, an adherent, macrophage-like cell line infected with T. annulata which we have studied extensively in the context of host-parasite interactions. To assess the effective representation of our bovine sgRNA library, genomic DNA was isolated from TaC12 cells 7 days after transduction with the lentiviral pool, the sgRNA cassette was amplified by PCR, and the abundance of sgRNAs was quantified by Illumina sequencing. We detected 99.96% of all sgRNAs with an average read count of 500, representing an excellent library representation at the start of our experiment. Cells were then maintained in culture with a minimal coverage of 500 for 4 weeks, and DNA harvested at multiple time points. By comparing the expression of sgRNAs at day 0 and following 12 passages, we expect to see a depletion of perturbations that lead to reduced cell fitness, allowing us to identify essential genes. Essential genes that are identified only in infected cells will then be validated using a small scale targeted sgRNA library, followed by gene ontology analysis to extract critical biochemical pathways, and identification of protein interaction networks. We expect that by identifying the essentialome of Theileria induced transformation, we may be able to develop targeted therapeutic strategies to kill the parasite while leaving the host intact. Moreover, such knowledge may be useful to genetically modify animals and generate livestock that are completely resistant to Theileria infection in the future.

P16

Pediatric Emergency Front of the Neck Access: Assessing a New Learning Approach on an infant-sized rabbit model

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Background: A pediatric “cannot intubate, cannot ventilate” situation is uncommon, but associated with poor outcome. Several airway algorithms suggest emergency tracheal access. Little evidence and agreement exists on how to perform emergency front of the neck access (eFONA) in children < 8 years. Seldinger techniques are inappropriate for this situation. Rapid sequence tracheotomy (RST) has been proposed instead. We investigated the learning curves, success- and injury rate of RST of clinicians performing simulated pediatric eFONA in a rabbit model.
Methods: Fifty physicians from 5 medical specialties (10 pediatric intensivists, 10 pediatric emergency physicians, 10 pediatric surgeons, 10 pediatric anesthesiologists, 10 emergency response physicians) performed 10 RST on rabbit cadavers each after watching an instructional video. We analyzed their learning curves relative to performance time and concurring injuries.
Results: With an overall success rate of 94%, RST performance time decreased from 107 sec (SD 45) to 55 sec (SD 17) over 10 attempts. The learning curve was steep between the first and the fourth attempt with an 11% decrease in performance time (95% CI: 9 - 13%, $p < 0.001$) per attempt and then flattened to a 4% (95% CI: 3 - 5%, $p < 0.001$) decrease per attempt between the fourth and the tenth attempt. Age, years of clinical experience and sex showed a significant effect on the learning curve, whereas medical specialty and adult eFONA experience did not. The 58% (95% CI: 44 - 72%) probability for severe injury during the first attempt decreased to 14% (95% CI: 8-20%) as of the second attempt. Male sex increased overall probability for minor injuries significantly ($p < 0.001$).
Conclusions: Irrespective of medical specialty pediatric clinicians acquired the eFONA technique within 4 attempts and were able to establish an airway in < 1 minute when performing RST on a pediatric airway simulator. Steady skill improvement was observed yielding a 94% tracheal tube placement success rate. Despite this apparent success, no reduction in minor injuries over the 10 attempts was observed. The complication rate (severe injuries and failure) remained high at around 20% following an initial precipitous decline after the first attempt. Injury rates and learning curve were not influenced the providers’ experience and medical specialty. Video-instruction followed by 10 RST attempts enables swift skill acquisition of this advanced invasive technique.

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P17

Impact of beta-glucan test on management of intensive care unit patients at risk of invasive candidiasis

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Background: Invasive candidiasis (IC) is a life-threatening complication in intensive care unit (ICU) patients. 1,3-beta-D-glucan (BG) can be detected in serum during IC. Some studies support the use of BG for early IC diagnosis. However, the real utility of BG results on patients' management is not well established. This prospective study aimed to assess the impact of BG results on therapeutic decisions.
Materials/methods: After introduction of the BG test (FungitellTM) in our institution, a screening of all BG test requests was performed over two periods of 6 months in ICU. During the second period, an intervention of infectious diseases specialists was performed (weekly evaluation and distribution of pocket cards with indications for testing and interventional algorithm). The performance of BG for the detection of IC was assessed, as well as the impact of BG results on antifungal drug prescriptions.
Results: A total of 82 patients had ≥1 BG test and 17(20%) of them had a diagnosis of IC. Sensitivity, specificity, positive and negative predictive values of one and two consecutive positive BG tests (≥80 pg/ml) were: 58%, 71%, 34%, 87%, and 61%, 69%, 42%, 83%, respectively. BG results influenced therapeutic decisions in 46/82 (56%) cases. Overall, it was estimated that BG had a positive impact in 31 (37%) cases (28 interruptions of empiric antifungal therapy with no subsequent IC and 3 preemptive antifungal treatments for subsequently confirmed IC) and could have served positively in 13 (16%) more cases. In 14 (17%) cases, antifungal therapy was started on the basis of a positive BG with no further evidence of IC. Major failure of the test (false negative results with real or potential therapeutic consequences) was noted in 3 (3.5%) cases. No differences were observed in terms of performance or impact of BG testing between the two periods.
Conclusions: BG testing was useful for guiding therapeutic decisions in ICU in about half of cases and was estimated to have a positive impact on antifungal prescription in 37% cases. However, efforts to optimize the use of the test on targeted high-risk patients and to propose an interventional algorithm had no significant impact.

P18

End-of-life decisions may influence ICU mortality and hospital lengths of stay

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Context & Objectives
More than 70 % of ICU deaths occur after an End-Of-Life (EOL) decision consisting in withholding or withdrawing of life-sustaining therapy (LST). EOL decision-making varies greatly within Europe. Switzerland is separated into distinct cultural regions defined by languages related to the neighbouring countries. The three linguistic regions are the French (FR), the German (GR) and the Italian speaking region.
To determine the differences in EOL decisions between the FR and GR, and their influence on ICU and hospital length-of-stay (LOS) and mortality. As secondary objectives, we evaluated whether the type and timing of EOL decision had an influence on outcome issues.
Material & Methods
Patients admitted to ICU and who had treatment limitations over a 6 month period were included as part of the ETHICUS 2 study. Seven Swiss ICUs (3 in FR, 4 in GR) allowed us to compare two cultural regions. Patients were followed from admission until discharge from the ICU, death, or 2 months after the decision to limit the therapy.
Results
During this study 1'115 patients were included across the 2 regions of Switzerland. ICU and hospital mortality differed significantly between FR and GR (33 vs 63 %, $p < 0.0001$, 48 vs 75 %, $p < 0.0001$ respectively), whereas mortality after ICU was similar in both groups. ICU LOS was similar in both groups. First EOL decision was made earlier in FR than in GR (0.79 ± 0.24 vs 1.92 ± 0.28 days, $p < 0.01$ respectively), whereas time to ICU discharge after first EOL limitation was similar in both groups. Time from first EOL decision to death was considerably longer in FR (10.6 ± 1.01 vs 2.27 ± 0.23, $p < 0.0001$ respectively). FR took decisions in multiple steps compared to GR (40 vs 24 %, $p < 0.013$), and GR withdrew LST as a single decision that impacted shortly on survival. Post-ICU LOS was longer in FR compared to GR (12.16 ± 0.76 vs 3.2 ± 0.34 days, $p < 0.0001$ respectively).
Conclusions
Mortality was significantly higher in GR. EOL decisions were made later in GR ICUs but with more withdrawals that were associated with more deaths. ICU LOS was similar in both regions but hospital LOS after ICU and total hospital LOS was significantly shorter in GR. Depending on the way EOL decision is made, the hospital LOS and the outcome may be impacted.

Additional information:
The authors acknowledge the assistance of Alexander Avidan and Charlie Sprung, International coordinator of Ethicus II study / Ethics Section ESICM.

P19

Variability among Modalities, Practices, Indications, Requests of Hematic products and blood Samplings in Swiss Intensive Care Units (Swiss VAMPIRES)

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Background and goals: Blood loss, anaemia and transfusion of blood products potentially damage critically ill patients and are associated with high costs. The aim of the present study is to gather information on the degree of implementation of Patient Blood Management (PBM) initiatives in Swiss hospitals, to study the processes related to iatrogenic anaemia and to assess the transfusion criteria applied in Swiss intensive care units (Swiss ICU).
Material and Methods: Anonymous online survey between October 16, 2018 and March 13, 2019 addressing all ordinary member physicians of the Swiss Society for Intensive Care Medicine (MD) and registered ICU nurses among all certified adult Swiss ICUs (invitation sent to the head nurses with a request to expand it to their co-workers). For both professional categories there was a specific questionnaire regarding the availability of initiatives, protocols, standard operating procedures and habits in their clinical practice around anaemia, blood sampling and transfusions.
Results: 115 MD and 624 nurses from regional, cantonal, university or private clinics in 29, 36, 20 and 15%, and 21, 30, 40 and 9%, respectively. The most noteworthy points for MD are: 1) PBM implementation as institutional initiative according to 42.5% with, in 78%, timely pre-operative detection and correction of anaemia as part of the program; 2) single blood unit transfusion policy as institutional guideline for 27%; 3) no need to justify the prescription of blood products to the managers of the hospital blood banks for 71%; 4) widespread availability of standard operating procedures about anaemia (75%); 5) use of restrictive transfusion thresholds in accordance with international guidelines [1]; 6) widespread absence of documentation of daily blood loss due to blood sampling. The most relevant information provided by nurses is: 1) at least 50% of respondents declare to sample between one and five blood tests per patient per eight-hour work-shift depending on clinical stability and therapies applied; 2) morning blood tests decided by the intensivist during the round in 47% with significant regional differences ($p < 0.01$); 3) autonomy regarding blood gas analysis for 49%.
Conclusion: Based on our survey some principles of PBM have been introduced in Swiss hospitals and Swiss ICUs, but many other measures still need to be implemented. Blood is taken from patients several times a day and the decision to sample blood is often delegated to nurses.

Additional information:
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P20

Delirium In ICU Patients With Malignancy: Patient Characteristics and Resource Utilization

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Background & Objectives: Knowledge on delirium in oncological intensive care unit (ICU) patients is scarce. The aim was to assess the frequency of delirium and its impact on resource utilizations in ICU patients with malignancy.
Material & Methods: This retrospective, single-center longitudinal cohort study included all patients with malignancy admitted to ICUs of a University Hospital during one year. Delirium was diagnosed by an Intensive Care Delirium Screening Checklist score ≥ 4. Group comparisons were made with Fisher's exact and Mann-Whitney U tests. Multivariate analysis was performed with Cox regression with hazard ratios < 1 indicating longer length of stay (LOS), and multiple linear regression. Results are given as number (percentage) and median (interquartile range).
Results: Of the 488 ICU patients with malignancy, 176/488 (36%) developed delirium during their ICU stay. Delirium was particularly frequent in patients with hepatic (13/21 [62%]) and lung malignancies (29/65 [45%]) as well as lymphomas (7/15 [47%]). Delirious patients had higher age (66 [55-72] vs 61 [51-69] years, p = 0.001), Charlson Comorbidity Index (4 [2-8] vs. 4 [2-8]), p = 0.034) and SAPS II (41 [27-68] vs 24 [17-32], p < 0.001), and more often a sepsis (26/176 [15%] vs 6/312 [1.9%], p < 0.001) and a shock (30/176 [6.1%] vs 6/312 [1.9%], p < 0.001). Multivariate analysis showed that delirium was independently associated with longer LOS in ICU (HR [95% CI] 0.295 [0.234-0.371], p < 0.001) and hospital (HR [95% CI] 0.619 [0.500-0.765], p < 0.001), as well as higher ICU nursing workload measured with the Nine Equivalents of Nursing Manpower Use Score (B [95% CI] 1.917 [1.665-2.206], p < 0.001) and ICU (B [95% CI] 2.077 [1.811-2.382], p < 0.001) and total costs per case (B [95% CI] 1.442 [1.301-1.597], p < 0.001).
Conclusions: In oncological ICU patients, delirium was a frequent complication independently associated with high resource utilizations.

P21

Accuracy of automated P0.1 measurements performed by ICU ventilators

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Background: Occlusion pressure at 100 ms (P0.1), defined as the negative pressure measured during an occlusion 100 ms after breath initiation, is correlated with respiratory effort and respiratory drive intensity. Automated P0.1 measurement is available on modern ventilators but their reliability has not been studied. This bench study objective was to assess the accuracy of the different ventilator automated P0.1 measurements.
Material and methods: To simulate spontaneous ventilation, one chamber of a two-chamber Michigan test lung was connected to a driving ventilator set in volume controlled ventilation. The other chamber was connected to the tested ventilator by a double limb circuit (with active humidifier). Pressure and flow transducers were inserted between the test lung and the ventilator circuit for measurements. Five commercialized ventilators (Evita XL®, Dräger, Servo-U®, Getinge, PB 980®, Covidien, Engstrom Carestation®, GE and Elisa 800®, Lowenstein Medical) were tested in pressure support mode. Each ventilator was assessed for three levels of inspiratory effort (P0.1ref of 2.5, 5 and 10 cmH20). Automated P0.1 measurements displayed on the ventilator screen (P0.1vent) were recorded five times at each effort level. Impact of circuit length on P0.1 measurement accuracy was also assessed for tubes of 195, 360 and 690 cm.
Results: Analysis of airway pressure-time and flow-time curves showed that all the tested ventilators except the Servo-U® ventilator performed an occlusion of at least 100 ms to measure P0.1. Overall, variations of P0.1vent correlated well with variations of P0.1ref. P0.1Vent underestimated P0.1ref for absolute values except for the Löwenstein® ventilator at P0.1ref 2.5 cmH2O and for the Servo-u® ventilator at P0.1ref 10 cmH2O. Correlation between P0.1vent and P0.1ref assessed with the Bland-Altman method gave a mean bias of 1.3 cmH20 (limits of agreement: 1 and -3.7 cmH20). The circuit's length affected P0.1 measurements' values. A longer tube was associated with lower measured P0.1 values.
Conclusion: P0.1vent relative changes are well correlated to P0.1ref changes in all the tested ventilators. Accuracy of absolute values of P0.1vent varies according to the ventilator model. Overall, P0.1vent underestimates P0.1ref. The length of the circuit partially explains P0.1vent underestimation. Our results suggest that unique P0.1 threshold values could be of limited interest to help in decision making in clinical practice.

P22

Voriconazole and liposomal Amphotericin B adsorption by the Cytosorb-Adsorber: Pharmacokinetic modelling of a case

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Introduction
Cytokine Adsorption as offered by the Cytosorb device (Cytosorbents Inc.) is an adjunctive treatment in septic shock thought to counteract the overshooting of cytokines involved in the cytokine storm. However, little is known about the adsorption of antifungals and certain antibiotics, an expensive and indispensable cornerstone of sepsis therapy, by the Cytosorb device.
Case
We present the case of a 53 year old patient suffering an ARDS on grounds of an Influenza A infection complicated by invasive pulmonary aspergillosis and septic shock.
In light of the severity of the pulmonary aspergillosis a dual antifungal therapy with 2 x 200mg/d Voriconazole (Vfend) and 400mg/d liposomal Amphotericin B (Ambisome), with a rate of 200mg/h, was established. Additionally and due to the septic shock with elevated Interleukin-6 levels and high vasopressor reqirements, a Cytosorb therapy was initiated. The Cytosorb device was connected in series to a CRRT device. The filtration rate was 120ml/min and CRRT as well as Cytosorb filter were exchanged every 24 hours for three days.
Voriconazole and Ambisome treatment were started 9 and 3 days prior to initiation of Cytosorb treatment, and the patient was already on hemodiafiltration for 20 hours.
Methods
Plasma levels of Voriconazole and Ambisome were measured before initiation of the Cytosorb therapy and every 24 hours from that time point on for 3 days. A pharmacokinetic model, one- and two-compartmental respectively, for both Voriconazole and Ambisome was generated using the R library RxODE [1] and literature on the pharmacokinetic characteristics of both antifungals [2-5]. The Cytosorb influence on the antifungals was modeled in the case of Voriconazole by an exponential and in the case of Ambisome by a sigmoid elimination model fitting the measured antifungal levels.
Results
The effect of the Cytosorb on antifungal levels in blood, calculated as the proportion of antifungal concentration with adsorber to the modeled concentration without adsorber after 3 days of Cytosorb therapy, was 51.6% for Ambisome and 36.7% for Voriconazole. At a modeled steady state, the proportions were 73.8% for Ambisome and 36.7% for Voriconazole.
Conclusion
The use of the Cytosorb device may lead to adsorption of fundamental therapeutic elements as Voriconazole and Amphotericin B, decreasing systemic concentrations of the delivered substances, as well as maximally achievable steady state concentrations.

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P23

Nasal high flow oxygen used between NIV treatments in hypercapnic respiratory failure (COPD exacerbation) can be associated with decrease in respiratory rate, PaCO2 and minute ventilation

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Background
In stable COPD (chronic obstructive pulmonary diasese) patients, nasal high flow oxygen (NHF) use can be associated with reduction in respiratory rate (RR) and minute ventilation (MV). In these patients, PaCO2 remains stable or decreases under NHF 1, 2. This suggests a possible dead space reduction related to a washout effect of NHF. The aim of this study was to assess the physiological effects of NHF in hypercapnic patients with acute COPD exacerbation.
Methods
Crossover study in hypercapnic patients suffering from acute COPD exacerbation and treated with intermittent non-invasive ventilation (NIV). NHF or standard oxygenotherapy (STAND O2) were randomly administered during 1 hour between NIV treatments. RR, tidal volumes (VT) and MV variations were recorded during the last 10 minutes of each study period using respiratory inductive plethysmography. Blood gas analysis was performed at the end of each period. Corrected MV (corMV = MV x PaCO2/40) was computed for each period. Visual analogic dyspnea score (VAS) was assessed by the patient after 30 and 60 minutes. VAS values were averaged for each period. Results are given as median [IQR]. Wilcoxon tests were used to compare data between STAND O2 and NHF.
Results
Twelve patients were included and data could be recorded in 10 patients (8 Males/2 females, 63 [60-78] years old, SAPS II 30 [24-38]. Median PaCO2 at inclusion was 58 [54-66] mmHg. Respiratory rate was lower (22 [20-23] vs 25 [23-27] breath/minute, p = 0.049) during NHF than during STAND O2. PaCO2 was also lower during NHF (48.7 [46.4 - 58.1] vs 50.7 [48.4 - 57.5] mmHg, p = 0.0488). PaCO2 decreased during NHF in 9/10 patients. MV decreased in the majority of the patients. Corrected MV decreased in 9/10 patients. The percentages of variation of VT, MV and corMV were respectively, + 2.9 [-18.6 – 9.7] % (p=1.0), -16.2 [-30.9 - 0.4] % (p 0.049) and -18.7 [-48.5 - -1.66] %(p 0.02). Dyspnea score were the same between the 2 modalities.
Conclusions
In case of acute COPD exacerbation, using NHF between NIV treatments was associated with PaCO2 and RR decrease in the majority of patients. MV concomitantly decreased or was nearly stable suggesting a deadspace volume reduction related to a washout effect of NHF. Corrected MV decreased in all the patients except one. These results suggest that NHF could be used to deliver oxygen between NIV treatments to COPD patients suffering from acute exacerbation and could contribute reducing PaCO2.

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P24

Ethische Fallbesprechungen auf der Intensivstation – Erfahrungen aus der regelmässigen Durchführung während 8 Jahren

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Hintergrund:
Komplexe Patientensituationen benötigen nicht ausschliesslich medizinisches und pflegerisches Wissen und Entscheidungen, sondern es stellen sich auch vielfältige ethische Fragen. Seit mehreren Jahren werden auf der ehemaligen Operativen Intensivstation des Universitätsspitals Basel (OIB) regelmässig ethische Fallbesprechungen (eFB) nach der Methode METAP durchgeführt [1,2]. Die Indikation für eine eFB ist in den allermeisten Fällen eine Überprüfung der aktuellen Behandlungsstrategie und des Patientenwillens bei längerer intensivmedizinischer Behandlung.
Die Studie untersucht, welche Ergebnisse die eFB erbrachten, und wieviele der besprochenen Patienten auf der OIB, resp. im Spital verstarben oder austreten, resp. verlegt werden konnten.
Methode:
Für die eFB ist ein Zeitfenster im Wochenprogramm reserviert. Im Voraus wird festgelegt, wer jeweils verantwortlich ist für die Organisation (Einladung der Beteiligten), inhaltliche Vorbereitung, Moderation und Dokumentation der eFB.
Alle eFB, die zwischen dem 1.1.2011 und dem 31.12.2018 stattfanden, wurden nach einem Kategoriensystems ausgewertet.
Resultate:
Im Untersuchungszeitraum fanden 268 eFB bei 240 Patienten statt. Zwei Drittel der Patienten (159) waren Männer. Das Durchschnittalter betrug 69.3 (34-91) Jahre, der durchschnittliche SAPS-II Wert 58.21 (15-105) Punkte. Eine Fallbesprechung dauerte im Durchschnitt 40 Minuten und es nahmen rund 7 Personen daran teil.
Die 268 eFB ergaben folgende Ergebnisse: 46 mal (17.2%) aktuelle Therapie weiter, Komplikationen werden behandelt; 68 mal (25.4%) aktuelle Therapie weiter, der Patientenwille muss weiter ermittelt werden; 55 mal (20.4%) aktuelle Therapie weiter, Komplikationen werden erst nach Evaluation behandelt; 77 mal (28.7%) aktuelle Therapie weiter mit Einschränkungen (z.B. DNR); 15 mal (5.6%) Umstellung auf palliative, resp. End-of-Life Therapie. 7 Protokolle konnten nicht eindeutig zugeordnet werden.
103 der besprochenen Patienten (42.9%) verstarben auf der Intensivstation, 23 (9.6%) nach Verlegung auf die Abteilung. 5 Patienten (2.1%) wurden in ein Hospiz verlegt, 48 (20.0%) in ein anderes Spital. 59 (24.6%) konnten in eine rehabilitative Einrichtung austreten, 2 nach Hause.
Schlussfolgerungen:
Ethische Fallbesprechungen werden auf einer Intensivstation regelmässig durchgeführt, wenn die Rahmenbedingungen gegeben sind. In mehr als der Hälfte der eFB wurden Patienten besprochen, die im Verlauf des Spitalaufenthaltes verstarben.

Zusatzinformationen:
1 Albisser H. et al. Bioethica Forum 2014:7:27-36
2 Meyer-Zehnder B. et al. Anaesthesist 2014:63:477-487

P25

Establishing a procedure for organ donation after cardiac death in the ICU

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The swiss law on transplantation enables organ donation after cardiac death (DCD) following therapeutic withdrawal in the ICU. Having successfully implemented DCD-protocols in the transplant centers, the PLDO network decided to extend this approach, starting with Fribourg hospital. On the basis of SWISSPOD data 2017 for the 19-bed ICU, the annual number of potential DCD-donors was estimated at 6.

Our approach

All senior ICU physicians and nurses accepted the project. Strong support was obtained from the college of chief physicians, the directory board, the administrative council and the Department of Health of Fribourg. The protocol already applied in the transplant centers was adapted to local requirements by an interdisciplinary and interprofessional group including all main actors of the hospital and the network. After validation by senior staffs of the ICU, operating theater, anesthesia and PLDO network, the procedure was presented to the involved teams during two exchange conferences. Two full-scale simulations were held, with the participation of all teams including transplant surgeons. Essential information obtained during these sessions contributed to refine the final procedure. Further small-group simulations were held in the ICU. After official announcement, the program started in October 2018, with systematic screening for DCD-eligibility for lung, kidney, pancreas and liver donation after each decision of therapeutic withdrawal.

Results

Between the first 6 months, we identified 6 potential donors. Family consent for DCD was obtained for 3: their mean age was 68 (64-72 years), reason for therapeutic withdrawal was respiratory failure for 2 patients and neurological failure for 1. The mean duration of hypoperfusion (first drop of MAP < 50 mmHg till circulatory arrest) was 13 min (10-18 min), mean time from circulatory arrest till beginning of cold perfusion was 13 min (13-14 min), total warm ischemia time was 26 min (24-31 min). All 6 organs allocated could be explanted: kidneys + liver; kidneys; liver. At three months' follow-up, all patients are doing well.

Conclusion

Establishment of a DCD-program is feasible in a non-transplant center, with achievement of acceptable warm ischemia time and organ quality. The key to success is a strong support by all involved parties and a multidisciplinary, interprofessional approach. Personal engagement and support by the network are fundamental, as dedicated resources for transplant activity are limited.

P26

Esophageal pressure measurement can help managing ventilation during venovenous ECMO : a case report

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BACKGROUND : Optimal ventilator settings during venovenous extra-corporeal membrane oxygenation (ECMO) remain controversial. Ultra-protective tidal volumes (VT < 4 mL/kg predicted body weight - PBW) and plateau pressure (Pplat) < 25-30 cmH2O are common targets [1]. Driving pressure (ΔP = Pplat - total PEEP) should also be kept < 14 cmH2O [2,3]. Esophageal pressure (Pes, pleural pressure surrogate) measurement can be used to further optimize ventilation targeting transpulmonary pressure (PL) at end-inspiration < 18 cmH2O (lung stress) and PL at end-expiration > 0 cmH2O (alveolar collapse prevention).
CASE REPORT : A 32-years old patient with pneumococcal pneumonia and severe acute respiratory distress syndrome (ARDS) was started on ECMO due to refractory hypoxemia and very low compliance (Pplat > 45 cmH2O with VT < 4 mL/kg PBW).
At day 1 of ECMO, ventilator settings were: volume assist control (VAC), VT 100 mL (1.4 mL/kg PBW), PEEP 5 cmH2O. Pplat was 30 cmH2O and respiratory system compliance (Crs) was 4 mL/cmH2O.
On day 3, an esophageal probe was inserted. VAC settings were unchanged. Pplat = 20.9 cmH2O, no intrinsic PEEP, ΔP = 15.6 cmH2O, end-inspiratory PL = 20.6 cmH2O. Due to high ΔP and PL, ventilator was set to BIPAP mode (bi-level positive airway pressure, high pressure 15 cmH2O for 0.8s, low pressure 5 cmH2O for 1.6s), resulting in average VT of 64 mL.
On day 9, Pes was used to optimize PEEP setting. Increase in PEEP from 5 to 13 cmH2O was needed to have end-expiratory PL > 0 [5]. Crs improved immediately afterwards from 6.1 to 10.3 mL/cmH2O.
On subsequent days, patient's status progressively improved with Crs at 29 mL/cmH2O on day 13.
ECMO was weaned on day 14 and pressure support ventilation (PSV) was started (pressure support 10 cmH2O, PEEP 12 cmH2O). At this point, end-inspiratory PL was 10.9 cmH2O (safe). No asynchronies were observed.
On day 21, patient was eupneic with low pressure support. Maximal Pes swings were 6 cmH2O (indirect information on inspiratory effort intensity). Patient was extubated after successful spontaneous breathing T-tube trial and transferred to the ward 2 days later.
CONCLUSION : Pes monitoring can be useful in ECMO patients along the entire course of illness. It allows detecting injurious ventilation despite theoretical ultra-protective ventilation settings and adapting ventilation accordingly. It also helps optimizing PEEP titration and detecting risk of patient-self inflicted lung injury [5] during weaning.

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P27

Mortalität von Patientinnen und Patienten 5 Jahre nach einer verlängerten Behandlung auf einer chirurgischen Intensivstation

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Hintergrund und Ziele:
Eine Langzeitbehandlung auf einer Intensivstation bedeutet für Patientinnen und Patienten und deren Angehörige eine grosse physische, psychische und soziale Belastung. Aber auch das Behandlungsteam kann an seine Grenzen stossen, und die Kosten einer langen Intensivtherapie sind beträchtlich.
Die Studie untersucht, wie gross die Mortalität von Patienten ist, die länger als 7 Tage ununterbrochen auf der ehemaligen Operativen Intensivbehandlung des Universitätsspitals Basel (OIB) behandelt wurden und wie sich die Überlebenden gegenüber den Verstorbenen bezüglich verschiedener Parameter unterscheiden. Es gibt in der Schweiz nur wenige Untersuchungen zu dieser Fragestellung.
Material und Methoden:
Es handelt sich um eine retrospektive Auswertung von bereits vorliegenden Patientendaten und die Überprüfung, ob die untersuchten Patienten noch während des Spitalaufenthalts oder zu einem späteren Zeitpunkt verstorben sind (Stichtag 31. Juli 2017). Eingeschlossen wurden alle Patientinnen und Patienten, die zwischen dem 1. Januar 2011 und dem 31. Dezember 2012 während mindestens 7 Tagen ununterbrochen auf der OIB behandelt wurden.
Resultate
Im Untersuchungszeitraum wurden 250 Patienten mindestens 7 Tage auf der OIB behandelt. 3 Patienten konnten nicht nachverfolgt werden. Das Durchschnittalter betrug 62.59 Jahre und rund zwei Drittel der Patienten waren Männer. 52 (21.1%) Patienten verstarben auf der OIB, 25 (10.1%) nach Verlegung auf die Abteilung. 71 Patienten verstarben im weiteren Verlauf. Bis zum Stichtag überlebten 99 Patienten (40.08%). Insgesamt verstarben 108 (43.72%) Patienten innerhalb eines Jahres nach Beginn der Intensivbehandlung. Diese Patienten waren im Durchschnitt älter (69.05 vs. 57.58 Jahre), hatten einen höheren Charlson Comorbidity Index (2.31 vs. 1.22), einen längeren OIB-Aufenthalt (18.98 vs. 14.43 Tg.) und einen höheren SAPS-II (52.17 vs. 45.64). Sie entwickelten häufiger eine Pneumonie (50.9% vs. 29.5%), einen septischen Schock (51.9% vs. 20.1%), eine akute Niereninsuffizienz (38.0% vs. 23.7%) oder eine Critical Illness Polyneuropathie (16.7% vs. 2.9%).
Schlussfolgerungen
Patienten, die im Untersuchungszeitraum länger als 7 Tage intensivmedizinisch behandelt werden mussten, haben eine hohe Langzeitmortalität.

P28

Umsetzung eines Advanced Practice Family Nurse–geleiteten Betreuungspfads auf der Intensivstation: Erste Erfahrungen

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Hintergrund und Ziele:
Angehörige kritisch erkrankter Personen sind emotional stark belastet und haben einen hohen Unterstützungsbedarf. Ein Drittel der Angehörigen entwickeln ein Post-Intensive Care Syndrom-Family (PICS-F). Um dem steigenden Betreuungsbedarf von Angehörigen gerecht zu werden und um die familiale Belastung zu senken, wurde im Rahmen einer Innovationsfinanzierung ein Advanced Practice Family Nurse (APN-F)-geleiteter Betreuungspfad auf einer chirurgischen Intensivstation des Universitätsspitals Zürich implementiert.
Methoden:
Die Entwicklung, Implementierung und Evaluation des APN-F-geleiteten Betreuungspfades erfolgte mittels partizipativem Ansatz. Basierend auf vorliegender Evidenz, einem systemischen Betreuungsansatz und klinischer Expertise wurde der Betreuungspfad mit dem interdisziplinären Behandlungsteam ausgearbeitet. Die Einführung der Rolle und die Umsetzung des Betreuungspfads erfolgte mittels Mini-Schulungen, täglicher Zusammenarbeit und regelmässigem Projekt-Huddeln.
Resultate:
Die im Betreuungspfad definierten Aufgaben der APN-F beinhalten eine proaktive Beziehungsaufnahme mit der Familie bei Eintritt, ein Assessment der familialen Situation und Bedürfnisse, regelmässige, niederschwellige pflegetherapeutische und interprofessionelle Gespräche mit der Familie im Verlauf sowie eine Nachsorge nach Verlegung oder Verlust. Erste Rückmeldungen von Familien zeigen, dass ihr Wohlbefinden durch die kontinuierliche Begleitung gesteigert wurde und sie Sicherheit empfinden. Sorgen und Ängste werden aufgenommen und die familiale Handlungsfähigkeit gestärkt. Das Behandlungsteam erlebt die Präsenz der APN-F als grosse Entlastung und Unterstützung im Praxisalltag. Das durch die APN-F generierte Wissen zum Familiensystem ermöglicht dem Behandlungsteam, gezielt auf die familialen Bedürfnisse einzugehen. Der Familien-Betreuungspfad und die aktive Zusammenarbeit zwischen APN-F, Intensivpflegenden und Ärzte/innen sowie weiteren Professionen konnte innerhalb der ersten sechs Umsetzungsmonate gefestigt werden. Die Ergebnisse der Evaluation werden wissenschaftliche Erkenntnisse zum Nutzen liefern.
Schlussfolgerungen:
Die spezialisierte Rolle einer APN-F auf der Intensivstation hat sich bewährt. Der interprofessionelle Familien-Betreuungspfad mit den entsprechenden Familieninterventionen hat sich als gut umsetzbar und unterstützend für Angehörige sowie Fachpersonen erwiesen.

P29

Evaluation du monitorage de la profondeur de la sédation par électroencéphalogramme quantitatif chez des patients ventilés mécaniquement: étude pilote

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Contexte & Objectifs.
L'EEG quantitatif simplifié (sq-EEG) est utilisé pour monitorer la profondeur de la sédation lors d'une anesthésie générale, toutefois son rôle et utilité potentielle en réanimation restent incertains. Nous évaluons ici l'utilité d'une nouvelle technologie de monitorage par sq-EEG chez des patients sédatés ventilés mécaniquement nécessitant un support par extra-corporeal membrane oxygenation (ECMO).
Population et méthode.
Etude pilote observationnelle (janvier 2017 - juillet 2018) effectuée chez des patients de réanimation ventilés mécaniquement et nécessitant un support par ECMO, ne présentant pas de lésion cérébrale préalable. Une sédation par propofol et/ou midazolam était appliquée selon un algorithme écrit, incluant une mesure du Richmond agitation sedation score (RASS). Un monitorage par sq-EEG (SedLine® Inc., Masimo, Irvine Californie, USA) était réalisé pendant 72 heures, permettant le calcul du Patient state index (PSI) via un algorithme automatisé. Le niveau de la sédation était défini comme très profond (PSI < 25) ou profond (PSI 25-50, correspondant au niveau d'une anesthésie générale).
Résultats.
24 patients ont été étudiés (âge moyen 53 ans [71% avec choc cardiogénique, 29% avec insuffisance respiratoire]), monitorés en moyenne 46 heures par sq-EEG, correspondant à 1'549 mesures de PSI par patient. Une association significative a été observée entre niveau de RASS (entre -4 et -5 ; n=404 heures) et l'indice PSI (p=0.0034). Au total (n=1269 h), le PSI médian au cours du monitorage était de 29 [IQR 18-43] : une sédation très profonde a été observée dans 35% du temps monitoré. De plus, le tracé de base du sq-EEG était supprimé (défini par un suppression ratio de > 10%) pendant 43% du temps. À n'importe quel temps du monitorage, plus de la moitié des patients étaient en sédation très profonde (PSI < 25 pendant minimum 3 heures consécutives; J1 58%, J2 61% et J3 50%, respectivement).
Conclusion.
Le monitorage par EEG simplifié quantitatif montre une bonne corrélation entre l'indice dérivé PSI et le RASS et démontrent un état de sur-sédation très fréquent et prolongé à la phase aiguë chez des patients critiques ventilés mécaniquement. Ces données pilotes soutiennent la pertinence d'études prospectives futures visant à évaluer l'utilité d'une sédation dirigée par l'indice PSI, dans le but de diminuer les complications liées à une sur-sédation.

P30

Nichts bleibt wie es war - Lagekontrollen von Magensonden

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Hintergrund und Ziele
Magensonden zur Prävention von Aspiration und zur Ernährung gehören auf Intensivstationen bei vielen Patienten/-innen zur Standardbehandlung. Ihre Einlage und die Verabreichung von Medikamenten und Ernährung via Sonde sind nicht ohne Risiken. Studien zeigen, dass traditionelle Methoden der Lagekontrolle Fehllagen nicht sicher identifizieren. In vielen Ausbildungen und Fachbüchern werden sie jedoch noch als sicher vermittelt. Daraus resultiert in der Praxis eine Gefährdung der Patienten/-innen.
Material und Methoden
Ein Fallbespiel veranschaulicht, wie eine Verkettung mehrerer „Unsorgfältigkeiten“ dazu führte, dass die Fehllage einer peri-operativ eingelegten Magensonde zu spät erkannt wurde, was für den betroffenen Patienten schwerwiegende gesundheitliche Folgen hatte.
Dieses Beispiel wurde an Morbiditäts- und Mortalitätskonferenzen und an Fortbildungsveranstaltungen der drei beteiligten Einheiten (chirurgische Fachdisziplin, Anästhesiologie und Intensivstation) präsentiert und diskutiert.
Die bestehenden evidenzbasierten Richtlinien und deren Umsetzung wurden besprochen.
Resultate
Die Diskussionen machten deutlich, dass nicht alle Pflegenden und Ärzte/-innen der drei Disziplinen

- wussten, dass die Lagekontrolle anhand typischem Geräusch („Blubbern“) epigastral nach Insufflieren von Luft unsicher ist und deshalb nicht ausreicht.
- die seit 2017 geltenden Richtlinien kannten und im Alltag anwendeten.

Zur sicheren Lagekontrolle gehört die Inspektion des Rachenraums und der Sonden-Markierung sowie bei Neueinlage die Aspiration von Magensaft und der Nachweis eines pH-Wertes von 5 oder tiefer. Des Weiteren beschreibt die Richtlinie das Vorgehen, wenn kein Aspirat gewonnen werden kann oder dessen pH > 5 ist.
Diskussion/Schlussfolgerungen
Auch scheinbar einfache Routineinterventionen wie die Einlage und Lagekontrolle von Magensonden können Patienten erheblich gefährden. Wie mehrfach wissenschaftlich gezeigt, reicht es nicht aus, belegte Fakten in verbindlichen Richtlinien festzuhalten und diese in Kraft zu setzen. Die Mitarbeitenden müssen wiederholt darüber informiert, daran erinnert und bei der Umsetzung im Alltag unterstützt werden. Wissensstand, Umsetzungsgrad und Prozesse müssen wiederholt überprüft werden, um sicherzustellen, dass sich nicht unbemerkt die alte Praxis wieder einschleicht. Dies ist umso wichtiger bei „unspektakulären“ Interventionen und Prozessänderungen, deren Umsetzung umständlicher erscheinen.

P31

Améliorer le sommeil des patients à l'aide d'un "Sleep bundle".

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Contexte & Objectifs : Les patients des soins intensifs (SI) souffrent de troubles de sommeil. Les bruits, la lumière omniprésente associée à l'état même du patient induisent des troubles du rythme circadiens déréglant l'horloge biologique. Cet état peut conduire à une diminution de leur immunité, à des états d'agitation et confusion, pouvant influencer leur état neurocognitif à moyen terme, et de même que la morbidité et mortalité. Le projet a pour but d'évaluer l'impact sur la qualité de sommeil des patients par l'implémentation d'une intervention multimodale Sleep bundle (SB). L'objectif secondaire est d'investiguer si ce SB diminue l'agitation, le délire, le nombre d'incidents. Il vise à offrir un ensemble de mesures organisationnelles et de prise en charge individuelle des patients.
Matériel & Méthode : L'étude s'est déroulée en 3 phases, de type before-after : phase I-avant SB, phase II-implémentation de SB, phase III-après SB. Le SB propose des moyens non pharmacologiques tels que bouchons d'oreille, masques pour les yeux, musique, massage minute avant la nuit. Parallèlement, les soignants ont été formés à limiter la lumière et le bruit durant la nuit, les visites médico-soignantes organisées dans les sas. Tous les patients restant >24h aux SI, avec un SAS 3-4 et CAMICU négatif ont été évalués quant à la qualité de leur sommeil via une échelle visuelle analogique validée (1) Richard Campbell Sleep Questionnaire. Un score de 0-33 indique un mauvais sommeil, de 34-66 un sommeil normal, 67–100 un sommeil optimal.
Résultats : Ont été inclus en phase I : 181 patients (10 sem), en phase II 68 (4 sem) et 149 en phase III (8 sem).
Scores de sommeil étaient de : en phase I 52(36-70) médiane (IQR), en phase II de 60 (48-80) et phase III de 60 (40-78). Les bruits mesurés étaient de 45 dbl en I, 46 en II et 46,5 en III. Les bouchons d'oreilles ont été acceptés à un taux de 12.3% en II, 12,2% en III ; les masques de sommeil à 13,7% en II, 13,9% en III, Le massage relaxant à 51,2% en II et 44,2% en III. Le taux de patients exprimant la douleur était de 8,5 et 4 %, présentant une agitation (SAS>4) de 36, 41 et 26%, un état confusionnel de 6,12 et 2% durant les phases I, II et III respectivement.
Conclusion : Le Sleep bundle a amélioré le sommeil des patients de SI. Les états d'agitation et confusion semblent diminuer en parallèle. Les mesures à entreprendre pour pérenniser cette amélioration obtenue par le SB sont en cours d'implémentation.

Additional information:
Richards, K. C., O'Sullivan, P. S., & Phillips, R. L. (2000). Measurement of sleep in critically ill patients. Journal of Nursing Measurement, 8(2), 131-144.

P33

Création d'un groupe de travail (GT) escarres: une plus-value?

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Contexte et Objectifs
Aux soins intensifs, l'équipement complexe et l'immobilité liés à la gravité des situations de soins rendent les patients plus vulnérables au développement d'escarres. Au vu des prévalences des escarres faites par l'Association Nationale pour le développement de la Qualité (ANQ), avec un pic à 64% en 2013, la nécessité et l'urgence d'impliquer les professionnels du terrain sont apparues. Pour ce faire, un GT a été mis en place.
Matériel et Méthode
Le GT, composé de soignants, se réunit une fois par mois. Il est soutenu par les cadres médico-soignants et est constitué de professionnels relais (PR) présents sur le terrain. Ils apportent un suivi direct aux équipes et aux patients. Grâce à un mini-audit de départ, 3 axes d'analyse sont établis: la prévention, les traitements et la documentation.
Au GT, les observations et discussions issues du terrain concernant les escarres sont ramenées et débattues. Ce brainstorming fait émerger des priorités de soins qui sont alors déclinées en actions. Les professionnels animent leurs séances de manière autonome et les cadres y interviennent régulièrement.
Résultats
Grâce aux PR, les stratégies implantées sont directement expliquées et démontrées aux équipes. Les PR favorisent la mise à jour des connaissances de leurs collègues ainsi que l'implémentation de nouveaux protocoles. Grâce aux savoirs acquis dans diverses formations nationales et internationales, ces intervenants sont sollicités par les équipes, et participent aux calculs des prévalences. Les compétences acquises amènent les PR à intervenir à leur tour lors de congrès grâce à leur expertise et leadership clinique en constante évolution.
Chez nos patients, dont 85% sont à risque de développement d'escarres, la prévalence annuelle des escarres est passée de 29% en 2017 à 11.5% en 2018. L'incidence sur le premier trimestre 2019 est de 7.9%.
Conclusion
La réappropriation du rôle infirmier dans la prévention est soulignée. Cette pratique, redevenue une démarche prioritaire, est désormais systématiquement intégrée dans les plans de soins. Les PR sont reconnus dans les équipes, ils sont régulièrement sollicités, et les traitements qu'ils initient sont suivis. La plus-value du GT n'est plus questionnée. Pérenniser ces bons résultats est le nouveau défi du GT qui poursuit son travail. L'acquisition de l'autonomie des équipes soignantes et la qualité des soins restent au cœur de ses actions.

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Einbezug von Angehörigen und Zertifikat angehörigenfreundliche Intensivstation

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Hintergrund und Ziele: Die Angehörigen spielen auf der Intensivstation eine zentrale Rolle und sind wichtige Ansprechpartner. Es ist von grosser Bedeutung, dass die Angehörigen in diesem Setting gut begleitet werden. In einer Diplomarbeit NDS Pflegeberatung wurde der Frage nachgegangen, mit welchen Möglichkeiten Angehörige auf einer interdisziplinären Intensivstation in das Alltagsgeschehen einbezogen werden können. Ziel war es, den Einbezug von Angehörigen zu ermöglichen.
Methode: Die Fragestellung wurde mittels theoriegestützter Intervention bearbeitet.
Resultate: Die Ergebnisse zeigen am Beispiel der Durchführung einer Handmassage durch Angehörige, dass der Bedarf an Einbezug der Angehörigen auf einer Intensivstation vorhanden ist und im Praxisalltag Platz finden kann. Der Einbezug wird von den Angehörigen sehr geschätzt und die Bedeutsamkeit des Einbezugs wird bestätigt. Wichtig ist hierbei, dass die Angehörigen die nötigen Informationen erhalten und während dem ganzen Einbezug Unterstützung von der Pflege erhalten.
Schlussfolgerungen: Der Einbezug und die Begleitung von Angehörigen sind der Intensivstation ein grosses Anliegen. Aufgrund der positiven Ergebnisse der theoriegestützten Intervention wurde ein Konzept zum Einbezug von Angehörigen auf der Intensivstation erarbeitet. Dabei wurden bestehende Angebote wie pflegerische Bezugspersonen, das tägliche aktive Angehörigentelefonat, die Begleitung zur Ausgangstüre der Intensivstation beim Kommen und Gehen der Angehörigen sowie das Führen des Intensivpflegetagebuchs integriert. Die positiven Erfahrungen im Rahmen dieses Gesamtkonzepts haben dazu geführt, das Zertifikat „Angehörigenfreundliche Intensivstation“ bei Pflege® e.V. zu beantragen. Der Antrag wurde geprüft und anfangs April 2019 wurde der positive Entscheid vergeben. Die Intensivstation am Spital Emmental ist somit die erste Intensivstation in der Schweiz, welche dieses Zertifikat erhält. Der Einbezug und die Begleitung von Angehörigen wurden dadurch auch von externer Stelle gewürdigt. Dieses Zertifikat bestätigt und motiviert, diesem Thema weiterhin eine hohe Bedeutung zu geben.

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Un objectif partagé fédère et engage le patient, ses proches et toute une équipe.

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Contexte et Objectifs : La prise en soin d'un patient brûlé est caractérisée par une réanimation intensive et des traitements chirurgicaux répétés. La durée moyenne de séjour prédictive en réanimation est calculée à 1 jour par %. Le travail en interprofessionnalité est coordonné 2 fois par semaine lors d'un colloque ou sont fixés des objectifs de soins.
Mais qu'en est-il du partenariat avec le patient et sa famille ?
Matériel et méthode : Le cas clinique de Monsieur Z., 39 ans, victime d'une explosion sur son lieu de travail. A son admission, 90% de la surface corporelle est brûlée et son pronostic vital est engagé. Sa compagne est alors enceinte de 7 mois du premier enfant du couple. Elle confie aux soignants qu'il est impératif pour elle que son conjoint soit à ses côtés lors de l'accouchement. Cette demande va constituer un véritable défi puisque la durée prévisionnelle en réanimation est estimée à 90 jours soit bien au-delà de la date prévisionnelle de l'accouchement. L'équipe médico-soignante s'engage à mettre en place toutes les ressources nécessaires pour atteindre cet objectif devenu prioritaire et partagé de tous. Ce challenge en tête, le patient, sa famille et chaque membre de l'équipe de réanimation sont investis dans les soins au quotidien, dans l'anticipation et l'organisation de différents scenarii envisageables pour rendre sa présence possible.
Résultats : Après 38 hydrothérapies, 16 chirurgies et 78 pansements en chambre, Monsieur Z. a pu assister physiquement à la naissance de son fils, 66 jours après l'accident. Cette réussite hors du commun a démontré que le travail conçu sous forme de décision partagée donne du sens et de la motivation à tous les participants. M Z présente des résultats extraordinaires, il n'a développé aucune complication lors du séjour. Après 10 mois d'hospitalisation et de rééducation Monsieur Z a pu rentrer à domicile. Cette perspective unique a aussi bénéficié aux soignants. Le partenariat avec d'autres services a permis de renforcer les liens inter professionnels, une certaine créativité dans une organisation inhabituelle à vue le jour.
Conclusion :Un tel défi a pu être relevé grâce à une mobilisation des ressources issu du soutien de chaque partenaire. Une considération commune des besoins et attentes du patient et de sa famille avec les différents professionnels de la santé permet de répondre aux attentes du patient.
Un objectif partagé par tous fédère et engage toute l'équipe et place le patient au centre.

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Familienbetreuung bei einem chronisch kritisch kranken Kind auf einer Pädiatrischen Intensivpflegestation: Beschreibung und Analyse eines Fallberichtes

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Hintergrund
Die stetige Zunahme chronisch kritisch kranker Kinder stellt das Behandlungsteam pädiatrischer Intensivpflegestationen vor neue und wachsende Herausforderungen. Es wird ein steigendes Bedürfnis enger und professioneller Begleitung und Betreuung der Familien beobachtet. Das Verlangen der Familien nach mehr Information, einem regelmässigen und umfangreichen Austausch mit dem behandelnden Team und einer höheren Teilnahme an therapeutischen Entscheidungen wird hervorgehoben.
Ziel
Ein umfangreiches Angebot zur Familienbetreuung von chronisch kritisch kranken Kindern auf einer pädiatrischen Intensivpflegestation an Hand eines Fallberichtes beschreiben und evaluieren.
Methode
Der Fall beschreibt das Familienbetreuungs-Angebot das auf einem Familienzentriertem Pflegemodell basiert in welchem die Eltern zusammen mit dem Kind im Fokus stehen. Es wurden therapeutische Gespräche, ein regelmässiger Austausch mit der Familie und eine umfangreiche Koordination der Versorgung von einer auf Master-Niveau ausgebildeten Pflegefachperson in Zusammenarbeit mit den Ärzten angeboten. Die Eltern wurden frühzeitig und eng in Entscheidungsfindungsprozesse involviert.
Interpretive description wurde als Methode zur Analyse des Fallberichtes gewählt.
Resultate
Eltern schätzen die hohe Verfügbarkeit der Familienbetreuung. Sie konnten so ihre Anliegen zeitnah anbringen. Es ermöglicht ebenfalls Krisensituationen, zB. akute klinische Veränderungen, Stresssituationen, zeitnah zu bearbeiten und zu klären. Therapeutische Massnahmen konnten frühzeitig durchgeführt werden mit einem besseren Verständnis und einer höheren Beteiligung der Eltern.
Das Behandlungsteam konnte seine Aufmerksamkeit stärker dem Kind widmen. Familienbetreuung fördert und unterstützt die interdisziplinäre Zusammenarbeit. Sie reduziert den Stress der Mitarbeiter beim Umgang mit der Familie in Krisensituationen
Schlussfolgerungen
Dieser Fall zeigt, wie das auf dem familienzentrierten Pflegemodell basierende Familienbetreuungs-Angebot den effizienten Informationsaustausch und die Teilnahme der Familie an therapeutischen Entscheidungen fördert. Es wurde eine erhöhte Zufriedenheit der Familien und des Behandlungsteams beobachtet, sowie eine Abnahme von Stresssituationen.
Die Evaluation hat gezeigt, dass die auf Master-Niveau ausgebildete Pflegefachperson durch ihre klinische Expertise, Kompetenz beim Austrittsmanagement und der Gesprächsführung die Aufgaben erfolgreich abdecken konnte.

P37

Impact de la fragilité sur le devenir du patient de soins intensifs.

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Contexte : La fragilité est un déclin des réserves physiologiques limitant la capacité de réponse à un évènement santé, entraînant un risque accru d'hospitalisation, dépendance et décès. Son impact aux soins intensifs (SI) est mal connu. L'objectif de cette étude était d'étudier la prévalence des patients fragiles aux SI, leurs caractéristiques, les facteurs de risque et leur devenir. Le but était de déterminer l'impact de la fragilité et de l'intégrer dans les stratégies de prise en charge.
Méthode : La première phase de cette étude rétrospective, descriptive corrélationnelle a consisté à récolter des données cliniques des patients admis aux SI. La fragilité a été évaluée, dans les 4 premiers jours, avec la Clinical Frailty Scale© (CFS). La seconde était consacrée au suivi à 28 jours concernant le devenir. L'analyse a permis de décrire cette population, son devenir et d'explorer les facteurs corrélés.
Résultats : 252 patients ont été inclus dont 96 (38,1%) avaient un diagnostic de fragilité, avec un score CFS ≥ 4. La fragilité était associée à un âge médian plus avancé (72 ans [IQR 63,5 ; 78] vs. 60 ans [IQR 49 ; 69] $p < 0,05$). Malgré une médiane d'âge plus avancée, toutes les catégories d'âge étaient représentées dans le groupe fragilité (27% < 65 ans, 34% 65–75 ans et 39% > 75 ans). Comparés aux non fragiles, les sujets fragiles présentaient souvent (74% des cas) au moins un antécédent d'hospitalisation dans les 12 derniers mois. Ils avaient un score médian SAPS II de 43 [IQR 32 ; 58,5] et Charlson de 5 [IQR 4 ; 7] significativement plus élevés ($p < 0,05$). Les patients fragiles avaient une mortalité plus élevée (21% vs. 8% $p < 0,05$), et étaient plus souvent hospitalisés ou institutionnalisés à 28 jours (43 vs. 28% $p < 0,05$). Alors que la fragilité était associée à des situations plus graves, les moyens thérapeutiques et la charge en soins étaient comparables. Elle était en revanche corrélée à une proportion plus grande de limitations du projet (9% vs. 3% $p < 0,05$) et de décisions de retrait thérapeutique (19% vs. 7% $p < 0,05$).
Conclusion : Dans ce collectif de réanimation générale, la fragilité était fréquente, sans restriction d'âge, et a un impact important sur le devenir clinique. Alors que l'intensité des soins ne semblait pas modifiée, un nombre plus élevé de retraits thérapeutiques est secondairement observé. Ces données suggèrent qu'une stratégie intégrant les critères de fragilité pourrait contribuer à optimiser la prise en charge.

Additional information:
Martinez-Sannier A, 2019, Unil-IUFRS. Le patient fragile aux soins intensifs : description, devenir et facteurs corrélés.

P38

Sterben auf der Intensivstation. Auch die Familienangehörige brauchen Unterstützung

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Cardiocentro ticino

Einführung
Der Verlust eines Angehörigen auf der Intensivstation kann tiefgründige Nachfolgen im Leben der Familienangehörigen und Freunde auslösen. Die Trauer löst bei den Angehörigen Symptome aus, die oft vom Pflegeteam ignoriert werden. Aus diesem Grund unterstützen wir seit über 10 Jahren die Familienangehörigen durch eine Arbeitsgruppe.
Das Ziel dieser Arbeitsanalyse besteht darin, die Motalität des Dienstes zu beschreiben und die Inhalte und Bedürfnisse , die während den Gesprächen mit den Angehörigen zum Vorschein kommen, darzulegen.
Methode
Retrospektive Studie mit Inhaltsanalyse der Protokolle und Datenerhebung der Begegnungen von Follow-up
Resultat
In 10 Jahen wurden 489 Sterbefälle erfasst. In 82 % (401) der Fälle wurden die Familienangehörigen mit Ziel einer Unterstützung kontaktiert. Nach einem, anfänglichen brieflichen und anschliessendem telefonischen Kontakt, haben 54 % der Angehörigen die Möglichkeit eines Treffen angenommen. Bei 46.8% der Fälle wurde ein telefonisches Interview durchgeführt. 53.2% der Angehörigen haben das Bedürfniss eines persönlichen Treffen mit den Pflegenden akzeptiert. Die Teilnehmer, die möglicherweise, die Einladung akzeptieren, sind die Kinder der Patienten. Die thematischen Bereiche die zum Vorschein gekommen sind, waren das Bedürfniss, das Erlebnis zu teilen (71,4%) und das Informationsbedarf (58,6%)
Schlussfolgerung
Diese Arbeit beweist die Wichtigkeit eines Meeting zwischen den Famileinangehörigen eines verstorbenen Patienten auf der Intensivpglegestation, und den Pflegenden. Diese Gelegenheit wurde von über 50% der Angehörigen geschätzt. Fehlende Informationen werden erfüllt. Für die Pflegenden ist dies, die Möglichkeit, eines Feedback über die Qualität der Pflege im End of life Stadium, zu erhalten

P39

Individuelle Arbeitszeitmodelle als personalerhaltende Massnahme

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Hintergrund / Fragestellungen
In der Schweiz ist zunehmend ein Fachpersonalmangel im Pflegebereich spürbar. Als eine Möglichkeit dem Mangel zu begegnen, werden individuelle Arbeitszeitmodelle, die die Arbeitsplatzzufriedenheit erhöhen, vorgeschlagen. Bisher wurde der Zusammenhang zwischen Arbeitszeitmodell und Arbeitszufriedenheit kaum untersucht. Daher wurde folgender Fragestellung nachgegangen: Welche Auswirkungen haben Arbeitszeitmodell auf die Arbeitszufriedenheit?
Methode
Zur Beantwortung der Forschungsfragen wurde eine Literaturrecherche und eine Fragebogenerhebung zur Arbeitszufriedenheit, zu Arbeitszeitmodellen und zur Dienstplanung durchgeführt. Die Befragung erfolgte auf einer schweizerischen universitären ICU und Intermediate Care Station. Zur Befragung wurde der Fragebogen der nationalen Studie (MatchRN) eingesetzt und mit Fragen zur Dienstdauer ergänzt. Die Datenanalyse erfolgte über deskriptive Verfahren.
Ergebnisse
Insgesamt nahmen 211 Pflegefachpersonen teil. Die Rücklaufquote belief sich auf 65 Prozent (n = 221). Das Durchschnittsalter betrug 36.9 Jahre (SD ± 9.9). Durchschnittlich hatten die Pflegefachpersonen 10 Dienstjahre (SD ± 8.8) und einen Beschäftigungsgrad von 80 Prozent (SD ± 22.9). 141 der befragten Pflegefachpersonen waren zufrieden, 40 eher weniger und 30 Personen antworteten nicht. Gründe der Zufriedenheit waren gute Anstellungsbedingungen, Entwicklungsmöglichkeiten, Berücksichtigung von Wünschen beim Dienstplan, Teamzugehörigkeit und moderner Arbeitsplatz. Gründe für die Unzufriedenheit waren hohe Arbeitsbelastung, fehlende Wertschätzung im inter-disziplinären Team, fehlendes Pflegefachpersonal, viele Schichtdienste und tiefer Lohn. 46 Prozent (n= 82) der antwortenden Pflegefachpersonen würden die Schichtform und Dauer nicht verändern, 54 Prozent (n = 96) würden dies aber gut heissen. Als bevorzugtes Arbeitszeitmodell wird eine Kombination von Tag- und Abendschicht genannt. Gefolgt von dem traditionellen drei Schichtenmodell und der Kombination Tag- und Nachtschicht. Die Hälfte der Pflegefachpersonen möchten auf ein Arbeitszeitmodell mit zwei der drei üblichen Schichten wechseln. Diese Arbeitszeitmodelle verlangen eine flexible Dienstplanung.
Schlussfolgerungen
Individuelle Arbeitszeitmodelle können für die Zufriedenheit am Arbeitsplatz bedeutsam sein. Dies setzt eine flexible Dienstplanung voraus, auf die Pflegefachpersonen einen Einfluss nehmen können.

P40

Standardizing lung protective mechanical ventilation on ECMO: Automatic, closed loop ventilation in patients with ARDS or cardiogenic shock

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Introduction
Extracorporeal membrane oxygenation (ECMO) has increasingly found its place in the treatment of severe acute respiratory failure, as well as severe circulatory collapse. Mechanical ventilation and ECMO are both technologies interacting on gas exchange. Nevertheless, besides a consensus paper [1], no evidence-based guidelines regarding protective lung ventilation on ECMO exist to date. Mechanical Ventilation with Intellivent-ASV, an algorithm driven, closed loop system, provides an opportunity to standardize ventilation on ECMO.
Objectives
To propose and validate lung protective ventilation with a closed loop ventilation mode in patients with ECMO due to ARDS or cardiogenic shock.
Methods
We retrospectively analyzed mechanically ventilated patients on ECMO for cardiogenic shock or ARDS admitted to the medical ICU of the University Hospital Zürich from March 2016 on until May 2018. All patients were initially ventilated with the dual positive airway pressure (DuoPAP) mode and were then switched to Intellivent-ASV+®. Every eight hours ECMO settings, ventilation parameters and blood gas analyses were collected. Driving pressure was calculated as the difference between peak pressure and PEEP.
Results
62 patients were included into the study, of which 43 had a cardiogenic shock and 19 had an ARDS, the ICU mortality for both groups was 27.4%, population characteristics were homogeneous. Patients of both groups were on average on ECMO for 11.6 days and ventilated for 9.9 days on Intellivent-ASV+®. After switch to Intellivent ASV, during the first 72 hours, at constant blood flow on ECMO, ASV-Intellivent mode decreased mean FiO2 by 25% while keeping PEEP constant. Regarding ventilation, keeping airflow on ECMO constant over time, Intellivent-ASV+® led to a significant decrease in mean peak (7%) and driving pressure (14%) ($p < 0.0001$), while tidal volumes stayed below 6 in both groups and pCO2 remained constant. On steady state after switch to Intellivent-ASV+® the driving pressure was 13.12 ± 0.67 kPa, despite significant differences in lung compliance 37.28 ± 3.75 ml/mbar (cardiogenic shock) versus 28.46 ± 5.26 ml/mbar (ARDS).
Conclusion
In this retrospective analysis we, for the first time, show that the automated mechanical ventilation algorithm Intellivent-ASV+® can safely ventilate patients with either ARDS or Cardiogenic Shock on ECMO.

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P41

Erfolgreiche Behandlung eines therapierefraktären kardiogenen Schocks nach Intoxikation mit Eibe (Taxus baccata) mittels ECLS: Zwei Fallberichte

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Hintergrund
Die europäische Eibe (Taxus baccata) ist auch in der Schweiz eine häufig vorkommende Pflanzenart. Die Taxus-Alkaloide sind kardio- und neurotoxische Natrium- und Calcium-Kanalblocker. Taxin B führt zu kardialen Reizleitungsstörungen und Einschränkungen der Kontraktilität bis hin zur Asystolie.
Die signifikante Zunahme der publizierten Fallberichte über die letzten Jahre könnte einen Trend zu häufigeren lebensbedrohlichen Intoxikationen darstellen.
Fallbericht 1
Beobachteter Kreislaufstillstand einer 35 jährigen Patientin. Initialer Rhythmus Kammerflimmern, ROSC nach 20min. Zuweisung in den Schockraum mit instabiler, therapierefraktärer Bradykardie. Sofortige Koronarangiographie bei unklarem Kreislaufstillstand mit stenosefreien Gefässen. Bei anhaltendem kardiogenem Schock Einlage einer va-ECMO (femo-femoral)
Fallbericht 2
Krampfereignis und Sturz einer 30 jährigen Patientin in psychiatrischer Klinik. Zuweisung mit Vigilanzminderung und Breitkomplextachykardie. Bei Eintreffen im Schockraum pulslose Brady-/Tachykardie. Mechanische Reanimation für 60min und Einlage einer va-ECMO (femo-femoral) unter Reanimation.
Verlauf
Bei beiden Patienten Verdacht auf Eibenintoxikation aufgrund typischer Breitkomplex-Brady-/Tachykardien sowie echokardiographisch schraubenartigen, ventrikulären Kontraktionen mit schwer eingeschränkter kardialer Pumpfunktion. Laborchemisch konnte in beiden Fällen Taxin B nachgewiesen werden.
Nach 24h Normalisierung des EKG und der kardialen Funktion in der Echokardiographie. Problemlose Reduktion und Ausbau der ECLS. Beide Patientinnen konnten das Spital ohne neurologische Ausfälle verlassen. Die Intoxikation geschah jeweils in suizidaler Absicht.
Schlussfolgerung
Für die Eibenvergiftung gibt es keine spezifische Therapie, experimentelle Ansätze, ohne Evidenz, mit Aktivkohle und Anti-Digoxin Fab Antikörpern sind beschrieben. Aufgrund der Reversibilität der Kardiotoxizität ist der Einsatz der ECLS als «bridge-to-recovery» die geeignetste Therapieoption. Bei jungen Patienten mit unklarem Herzkreislaufstillstand und niedriger Vortestwahrscheinlichkeit für ein kardiales Event, sollte frühzeitig bei typischen EKG und echokardiographischen Befunden an eine Eibenvergiftung gedacht und der immediate Einsatz einer Kreislaufunterstützung mit va-ECMO erwogen werden.

P42

Can an informative video about the anesthesia technique be an effective tool to treat preoperative anxiety in patients undergoing minor, elective, outpatient hand surgery procedures?

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Preoperative anxiety is a common problem with an impact on surgical outcome, anesthetic drug amount and patient's satisfaction. An important component of preoperative anxiety is worries related to anesthesia. Suitable patients information has been shown to reduce preoperative anxiety level. To assess the impact of an informative video anesthesia technique on patient's preoperative ambulatory hand surgery procedures.
Methods: This was a retrospective, single-centre, case-control clinical trial to assess the impact of an educational video illustrating all the passages of intravenous regional anesthesia. In our institution outpatient hand-surgery patients' treatment is standardized according to a detailed perioperative protocol. All the patients included in the study underwent a surgical pre-operative visit, during which they received detailed information about the surgical procedure but not the anesthetic technique. The VAS score (Visual Analogue Scale) is a valid instrument used for measuring anxiety. The primary outcome was the difference in preoperative anxiety levels and overall satisfaction levels between two groups measured on a visual analogue scale. Secondary outcomes were differences in in perioperative vital parameters that are usually affected by anxiety.
Results: 446 consecutive patients were retrospectively examined. Anxiety level measured on admission in the day-hospital clinic did not differ between the two groups (1.22 vs 1.02, p 0.417) and the Patient Education Video did not significantly change this level when the second assessment was performed (1.22 vs 1.29 , p 0.774). Systolic arterial pressure measured on admission in the day-hospital clinic was significantly higher in the video group (140 vs 129 mmHg, p 0.016), while other measured parameters like diastolic blood pressure, heart and respiratory rate did not differ between the two groups. In the video group, after the video was shown and patients were transferred to the OR, systolic and diastolic blood pressure as well as respiratory rate did not change significantly, while heart rate did significantly increase and was significantly higher. In the control group, measuring all parameters before and after the anesthesia all parameters did not change significantly.
Conclusion: Informative videos does not seem to significantly reduce preoperative anxiety but have the potential to increase patients' satisfaction in the ambulatory setting.

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P43

Prediction of mortality and multi-organ dysfunction in the ICU through MR-proADM: A prospective single-center experience

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Introduction
Early mortality and severity prognostication in the critically ill is a challenge in intensive care medicine. The conception of large, trial validated Scores, as the SAPS II or the SOFA Score, offered a tool to more efficiently tackle this task. Nevertheless, these Scores were not intended for individual patient assessment. It has been shown that MR-proADM on admission is a marker of poor outcome prediction in septic ICU patients [1].
Objectives
To propose MR-proADM as an admission prognostic biomarker for ICU and 28-day Mortality, as well as for therapy refractory multi-organ dysfunction during the course of the ICU stay.
Methods
Between January 2018 and February 2019 all patients admitted to the ICU were prospectively included. Blood samples for MR-proADM testing were obtained and the standard monitoring and laboratory analytics recorded on the moment of admission, the next 7 consecutive days and on the day of ICU-discharge.
Results
The study population comprising 475 patients presented with an age of 63 [52 - 72] years, a SOFA Score of 7 [4 - 10], a SAPS II of 43 [30 - 58] and a Charlson Comorbidity Score of 3 [1 - 5] at admission. In ICU Mortality was 17% and 28 day-Mortality 24%. Admission MR-proADM was 2.38 [1.34 - 5.17] nmol/l.
The AUROC of admission MR-proADM (0.73) in its prediction of ICU Mortality was comparable to those of the SAPS II (0.71) and SOFA Score (0.78) (both calculated for the initial 24h in ICU). Admission MR-proADM was more specific (Cut-Off: 5 nmol/l, LR+: 4.1) than SAPS II and SOFA regarding the prediction of persistence of multi-organ impairment (organ specific SOFA subscore > 2) after 7 days. The AUROCs for admission MR-proADM showed a good predictive capacity for Death or continued ICU-Stay (AUC: 0.72, Cut-Off : 6 nmol/l, LR+: 3.2) and for status at home (AUC: 0.7, Cut-Off : 1.3 nmol/l, LR+: 3.0) after 28 days. Daily measurement of MR-proADM during the subsequent ICU days did not improve the predictive power of admission MR-proADM, except MR-proADM levels at discharge, which presented an AUROC of 0.85 (Cut-Off: 4.9 nmol/l, LR+: 10.7) for the prediction of 28-day mortality.
Conclusion
We, for the first time show, that in a general medical ICU population, admission MR-proADM is a sensitive and specific prognostic marker for sustained ICU dependency by day 7 and 28-day mortality and hence a triage tool to identify those patients with prolonged ICU dependency and poor outcome.

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P44

Prediction of hypotensive events in a medical ICU population by use of the Hypotension Probability Index

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Introduction
Hypotension is an independent predictor of mortality in the critically ill. The maintenance of an appropriate arterial pressure to ensure optimal tissue and organ perfusion is therefore indispensable. Nevertheless blood pressure correction is always a causative response to a hypotensive event, as the events itself are difficult to predict. The Acumen Hypotension Probability Index has shown to be able to predict hypotension in an operative setting [1, 2].
Objectives
To assess the potential of the Hypotension Probability Index in the prediction of hypotensive events in an ICU population.
Methods
We retrospectively analyzed the data on 9 patients being monitored with the Acumen Hypotensive Probabilty Index (HPI, Edwards Lifesciences) during their stay in the Medical ICU of the University Hospital Zurich. Hemodynamic data recorded by the HPI device as well as routine clinical parameters were collected. Hypotensive events were defined as a mean arerial pressure (MAP) under 65mmHg for an interval of at least 1 minute.
Results
The studied patients (67% male, age 69 [62 - 73] years), presented with a SAPS II of 58 [43 - 67] and a SOFA of 10 [10 – 13] at admission. Median length of stay in ICU was 16 [8 – 20] days and ICU mortality amounted to 22%. Four patients had a septic shock, three a cardiogenic shock, one severe heart failure and one sepsis.
In total 46338 time points in intervals of 20 seconds were analyzed. The median number of hypotensive events per patient was 14 [9 – 33], lasting 3.3 [2 – 8] minutes with a MAP of 62 [60 – 63] mmHg. The median length of non-hypotensive events was 8.3 [2 – 36] minutes with a MAP of 75 [70 – 83] mmHg.
The HPI interval between 90 – 100% showed the highest incidence over time agglutinating 31.2% of all time points. The area under the ROC curve for HPI predicting a hypotensive event one, 5, 10 and 15 minutes into the future were 0.86, 0.79, 0.75 and 0.73 respectively.
Conclusion
The Acumen Hypotension Probability Index, in this small ICU sample population, showed potential in the prediction of future hypotensive events. Nevertheless, the boundary conditions employed by the HPI algorithm (Hypotension: ≤ 65 mmHg; Normotension: ≥ 75 mmHg) do not reflect the variable blood pressure range 55 – 70 mmHg targeted in most ICU patients.

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P45

An unexpected killer – A fulminant Pulmonary Aspergillosis on the grounds of an Influenza infection: A Case Report

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Introduction
Invasive pulmonary aspergillosis is a life-threatening disease, which has been for a longer time associated to immunocompromised patients. Over the last years Influenza infection has also been increasingly described as risk factor for aspergillus superinfections [1-3].
The Case
We present the case of a 53-year-old patient being admitted to the ER of a regional hospital because of acute progredient dyspnea and fever over the course of days. The patient had a past medical history of Hodgkin/ B-Cell Lymphoma, autologous stem cell transplantation, suboptimal treated diabetes, as well as prolonged exposure to inhalative steroids.
Blood analytics showed a leukocytosis with distinctly elevated CRP and elevated PCT levels. Antibiotic therapy was initiated and NIV support was offered. The clinical picture deranged over the next 9 days into an ARDS, leading to an escalation of the antibiotic therapy, the intubation of the patient and the initiation of a high dose steroid pulse therapy. Due to progredient hypercapnic and hypoxemic respiratory failure and a pneumomediastinum (barotrauma), the patient was transferred to a tertiary hospital.
At admission, the clinical picture of an Influenza A ARDS in combination with a septic shock on the grounds of a bacterial superinfection presented itself. The inspection of a CT-scan performed 9 days before revealed confluent, halo surrounded infiltrates over all lung segments and air crescent sign like lesions. Pulmonary aspergillosis was postulated and empirical treatment with Voriconazole initiated. Sputum probes and BAL cultures were later found positive for aspergillus fumigatus (Galactomanan Index: 21.0). The ensuing global respiratory failure, which couldn't be bridged with neither inhalative NO, nor extracorporeal low-flow decarboxylation therapy, led to an ECMO implantation. Considering the uncontrollable aspergillosis and persevering fulminant septic shock, antifungal therapy was expanded by liposomal Amphotericin B and a Cytosorb therapy was initiated. Under maximal therapy over days, finally complicated by acute right heart failure the decision to withdraw therapy was taken.
Conclusion
Invasive pulmonary aspergillosis can be a severe complication of Influenza, early therapy is imperative. Patients with severe Influenza pneumonias requiring critical care should therefore be routinely screened for pulmonary aspergillosis and CT scans closely evaluated for fungal invasion inferring lesions.

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P46

Old enemies should never be forgotten: A case of pulmonary Tuberculosis

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Introduction
Over the last century tuberculosis transitioned from being the major and most death causing infectious disease in the western world to a rare disease almost thought to be eradicated. Nevertheless, in the last two decades a worldwide relapse coupled with the upcoming of multidrug resistant strains has also increased the prevalence in Europe.
The Case
We present the case of a 65-year-old patient treated by his family doctor over the course of two weeks for a non-resolving flu-like infection. The patient was on on-going immunomodulatory treatment with Humira for M. Crohn since 5 months, no relevant travel history was known.
In light of the progredient respiratory insufficiency, with dyspnea at rest and elevated inflammatory parameters, the patient was stationary admitted to a regional hospital, where antibiotic therapy was expanded. Further, an unclear hepatopathy with elevated enzymes and bilirubin, 4-quadrant ascites, as well as a light splenomegaly and mediastinal lymphatic adenopathy were diagnosed. Over the next 7 days the respiratory situation deranged into a global respiratory failure and progressive shock, ultimately leading to intubation and referral to a tertiary care hospital.
At admission, a severe ARDS and septic shock with multi-organ failure (MOF) presented itself. Bedside radiology showed faint reticulonodular infiltrates over all lung segments and CT-scans revealed multiple, nodular infiltrates combined with septal thickening and ground-glass opacities. In conjunction with the clinical history, a tuberculosis or atypical mycobacteriosis was postulated and empirical treatment with Azithromycin, Ethambutol and Rifabutin initiated. Following the confirmation of mycobacteria tuberculosis in sputum PCRs, the antibiotic therapy was modified to a classic, 4-agent, tuberculostatic therapy.
The clinical situation disarrayed into the full picture of a Landouzy sepsis with MOF, aggravated by an immune reconstitution syndrome, for which a pulse steroid therapy was initiated.
After a 4 month, long hospital stay the patient was transferred to stationary rehabilitation.
Conclusion
Tuberculosis, even though rarely appearing in the western world, is a challenging and deadly disease to be aware of. Especially in patients with a recent history of immunosuppression, careful assessment of the clinical and radiologic picture for tuberculosis signs when encountering a severe pneumonia, not responsive to standard antibiotic therapy, is encouraged.

P47

Epidemiology and Outcomes of Patients Requiring Renal Replacement Therapy for Acute Kidney Injury in the ICU

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Context and Aims
Renal replacement therapy (RRT) is commonly applied in the intensive care unit (ICU) for patients with severe acute kidney injury (AKI). Throughout the world, RRT is associated with large heterogeneity in terms of patients' characteristics, therapy modalities and outcomes. We sought to describe the epidemiology and outcomes of patients requiring RRT for AKI in our ICU.
Methods
We identified patients who received RRT for AKI in our institution between January 2013 and December 2017. For each patient, we extracted, from our electronic chart records, baseline characteristics (age, sex, admission diagnoses…), physiological disturbances at time of therapy initiation, therapy parameters (modality, anticoagulation and duration) and outcomes (survival and time between last RRT and discharge).
Results
During the study period, 9157 patients were admitted to the ICU including 885 (9.7%) who received RRT. After exclusion of patients who declined consent for data reutilization (103, 11.6%) and those with chronic RRT (119, 13.4%), 663 were included in our analyses. 478 (72.1%) were men, median age 66.9 years (IQR 18.7), most common admission diagnoses were sepsis (200, 30.2%), cardiac arrest (62, 9.4%) and acute heart failure (61, 9.2%). Median diuresis in the 24 hours before RRT initiation was 0.16 ml/kg/h (IQR 0.38). Worst values recorded in the 72 hours preceding RRT were: highest creatinine 265 µmol/l (IQR 200), highest urea 18.3 mmol/l (IQR 17.5) and highest potassium 5.3 mmol/l (SD 0.9). Highest pH was above 7.25 mmol/l in 454 (68.5%) patients and lactate above 3 mmol/l in 406 (61.2%). 189 patients (28.5%) received nephrotoxic agents (vancomycin in 77.2% and an aminoglycoside in 22.2% of cases) and 87 (13.1%) intravenous contrast-CT in the 72 hours before RRT initiation. RRT consisted in continuous veno-venous hemofiltration (CVVH) with heparin anticoagulation in 328 patients (49.5%), continuous veno-venous hemodialysis (CVVHD) with regional citrate anticoagulation in 140 patients (21.1%), a combination of both in 165 patients (24.9%) and other in 29 (4.4%). Median therapy duration was 2.0 days (IQR 4.2) in CVVH mode and 4.3 (IQR 8.1) in CVVHD mode. Finally, among the 663 patients, 377 (56.9%) were discharged alive from ICU. Of those, 112 (29.8%) were still receiving RRT within 24 hours of ICU discharge.
Conclusions
RRT is frequently used in our institution and is associated with high in-hospital mortality and a high rate of dialysis dependence.

P48

Bridging the Shunt: A case-report on two variants of post infarction VSD bridging to operation

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Introduction
Even in the post-thrombolytic era, ischemic ventricular septum defects (VSD) remain a deadly complication of under 1% of all acute myocardial infarctions (AMI). Cardiogenic shock and insufficient myocardial scaring time before surgical repair are the greatest predictors of mortality. Treatment with an intra-aortic balloon pump was despite limited efficacy, for years, the only left-ventricular (LV) support device available. New devices for LV-support are available today, but experience is limited. We present two cases of post AMI VSD; one treated with a va-ECMO and the other with an LV Impella®.
Cases description
A 56-year old and a 60-year old patient were transferred to the University Hospital Zurich after the diagnosis of post-AMI VSD. Both had a history of an acute coronary event, untreated over several days, complicated by cardiogenic shock. Culprit lesions were the RCA and the RIVA respectively. Accordingly, VSDs were located at the heart apex in the first patient and inferobasal in the second one. An IABP was implanted for transfer in both cases. To bridge for surgical repair of the VSD in the first patient an Impella CP® and in the second a femorofemoral va-ECMO were implanted. Hemodynamic monitoring after device insertion showed a decrease in pulmonary arterial pressures (PAP), pulmonary arterial occlusion pressure (PAOP) and left-right shunt fraction with Impella, whereas in contrast PAP, PAOP and left-right shunt fraction increased with ECMO. Accordingly, lung edema resolved in the first patient and worsened in the second due to hyperperfusion induced, capillary stress failure associated, alveolar hemorrhage.
While waiting for surgical repair the first patient developed myocardial rupture and acute pericardial tamponade followed by cardiac arrest and the second needed intubation and mechanical ventilation because of acute lung injury.
Discussion
A well-performing mechanical cardiac assist device and time to operation are crucial to decrease pre- and post-operative mortality of post-AMI VSD patients. Therefore, waiting time to operation has to be carefully weighed against deterioration of patient general condition and mechanical assist device associated complications. Today no clear recommendation can be made regarding the choice of the extracorporeal cardiac assist device to support the heart until surgical VSD repair.

P49

L’oxygénation à haut débit génère-t-elle une hyperinflation chez le patient trachéotomisé ? Étude préliminaire sur banc d'essai.

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CHUV

Contexte :
L’oxygénation à haut débit (OHD) par interface nasale est de plus en plus utilisée, en particulier en cas d'insuffisance respiratoire hypoxémique. Une interface spécifique (système ouvert) d’OHD est disponible pour le patient trachéotomisé. Dans cette situation, le risque d’hyperinflation (entrave à l’expiration par administration continue de haut débit) existe mais n’a pas été étudié de façon systématique. L’objectif de cette étude est d’analyser si l’OHD sur trachéotomie peut causer une hyperinflation significative.
Matériel & Méthode :
Étude sur banc d'essai. Modèle utilisé : poumon test à 2 compartiments (Michigan testlung, compliance 110 ml/cmH2O) connecté d'un côté à un ventilateur driver pour simuler des efforts patient et de l’autre à un générateur d’OHD (Servo U, Getinge) via une trachée artificielle munie d'une canule de trachéotomie (Shiley DCT 6, ballonnet gonflé) ; résistance du montage 17 cmH2O/Ls-1. Condition testées : deux efforts patient, normal (P0.1 = 2 cmH2O) et élevé (P0.1 = 7.5 cmH2O) ; débit OHD de 10 à 60 L/min. Protocole : enregistrement débit et pression au niveau trachéal ; mesure des volumes courants expirés (Vte, aire sous la courbe de débit) sur 5 cycles respiratoires ; réalisation d’une apnée en fin d’expiration (équilibre du système - débit nul) ; débranchement de l’OHD pour mesure du volume piégé dans le 2e compartiment (volume d’hyperinflation, Vh).
Résultats :
Dans notre modèle, pour un débit d’OHD de 60 L/min, un Vh a été objectivé aussi bien en effort normal qu’élevé. Ceci traduit la présence d’une rétention gazeuse dans ces situations. L’importance de cette rétention doit encore être déterminée. Ceci nécessite une amélioration de notre modèle puisque la présence de fuites au niveau de la trachée modélisée pourrait avoir entrainé une sous-estimation des volumes piégés.
Conclusion :
Notre étude préliminaire a permis de démontrer que lors de l’administration d’OHD à débit élevé sur une canule de trachéotomie ballonnet gonflé au moyen de l’interface dédiée, un phénomène de rétention gazeuse peut exister. La quantification de l’importance de ce phénomène, donc de son éventuelle relevance clinique, nécessite une amélioration de notre modèle expérimental.

P50

A case of ethylene glycol poisoning – lession learned!

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Background In case of a severe lactic acidosis (LA) life-threatening causes as distributive and any other kind of shock or tissue ischemia have to be ruled out immediately. Then, remaining differential diagnoses for LA must be considered. Important in this context is the finding that certain point of care (POC) blood gas analyzers (BGA) can not distinguish between lactate (L) and ethylene glycol (EG)1. EG poisoning is characterized by central nervous system depression, severe metabolic acidosis, cardiopulmonary complications, acute renal failure, and even death. Metabolic acidosis is mainly caused by the EG metabolite glyoxylic acid (GA). The conversion of GA to oxalic acid leads to proximal tubular necrosis and renal failure. With this case report we want to point to the "lactate gap" between POC BGA and laboratory analyzers as a clue to the diagnosis of EG poisoning in the context of an unexplained severe hyperlactatemia with concomitant anion gap metabolic acidosis and renal failure2. CASE We cared for a 35 year old woman presenting with confusion, marked lactatemia and an anion gap metabolic acidosis in a POC BGA, a high osmol gap and acute-on-chronic renal failure. There were no signs of shock, tissue ischemia or liver failure. Testing for carbon monoxide, cyanide or salicylate were negative. After suffering respiratory failure and a generalized seizure she was mechanically ventilated and treated with hemodialysis. After a prolonged weaning phase due to central nervous depression she was extubated. Still unclear about the origin of the patients' L we found oxalate crystals in her urine. After multiple inquiries, the patient admitted to having taken wiper fluid containing EG over days before entering the hospital to attempt suicide. Discussion Certain POC BGA can not distinguish between EG and L. The calculation of the "lactate gap" between POC BGA and laboratory analyzers can be used to discriminate between real hyperlactatemia and false hyperlactatemia in EG poisoning. Nevertheless, a lactate determination only by means of different enzyme reactions may be helpful, since the interference between ethylene glycol and lactate depends on the assay3. Another clue to this diagnosis is the finding of oxalate crystals in the urine. To consider all relevant differential diagnosis in case of an anion gap metabolic acidosis, we suggest the mnemonic GOLD MARK4, which includes EG as well.

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Extubation lors du retrait thérapeutique aux soins intensifs adultes : Perceptions du personnel médico-soignant

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Contexte et Objectifs: Après l'extubation du patient lors d'un retrait thérapeutique aux soins intensifs (SI), des râles agoniques peuvent survenir. Bien que les études montrent que la grande majorité des soignants est affectée par le bruit des râles agoniques, aucune n'a exploré les causes à l'origine du malaise des soignants. Le but de cette étude était d'explorer les perceptions du personnel des SI associées à l'extubation, les causes du malaise des soignants face aux râles agoniques.
Méthode: Une première série de questions ont été élaborées par AP et BR. Celles-ci ont été proposées et soumis à un groupe multidisciplinaire de 12 collaborateurs des SI afin d'évaluer le caractère approprié, la compréhensibilité et l'intérêt des questions. Du 15 janvier au 15 mars 2019, 207 médecins, infirmiers et aide soignants des SI ont été invités à répondre à un questionnaire online.
Résultats: Le taux de réponse global était de 73,8%, dont 23% de médecins, 69% d'infirmiers, et 16.4% d'aides-soignants. L'extubation est un geste mal vécu pour 43.9% des soignants. 14,6% d'entre eux pensent que c'est un geste violent, cela équivaut à étouffer le patient pour 6% et c'est une forme d'euthanasie active pour 7,3% du personnel (23% des chefs de clinique le pensent). Bien que la majorité du personnel médico-soignant (87,3%) pense que le râle agonique survenant après l'extubation n'est pas un signe de souffrance pour le patient, 59% veulent le traiter pour le confort du patient, 94.7% d'entre eux veulent traiter le râle pour le confort de la famille, mais également pour leur propre confort (63.8%). Pour 27.7% du personnel c'est un signe que le patient s'étouffe. Les difficultés liées aux râles agoniques sont liées à la difficulté à évaluer le confort/inconfort du patient (78,6%), le manque de connaissance sur la gestion des râles agoniques (83%) et le rappel de notre finitude (52%).
Conclusion : Les résultats de cette étude montrent que le personnel médico-soignant est affecté par les râles agoniques survenant après l'extubation du patient mourant. Bien que les soignants pensent en majorité que ce symptôme n'est pas douloureux pour le patient, ils sont influencés par la détresse de la famille et leur propre inconfort et traitent les râles agoniques. Il semble important de pouvoir effectuer des formations complémentaires sur l'éthique de fin de vie, la gestion des râles agoniques et de développer des moyens afin d''aider le personnel à mieux évaluer le confort du patient.

P52

Implication des infirmières et apports pour la pratique professionnelle d'un programme dédié aux patients long séjour aux soins intensifs adultes

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Contexte : Les « patients long séjour » (PLS), en raison de leurs spécificités, bénéficient d'un programme de prise en charge dédié aux soins intensifs. Il comprend une évaluation spécialisée par une infirmière de pratique avancée, un bilan des interventions, un colloque interprofessionnel et utilise trois outils : une synthèse, un génogramme et une check-list des objectifs de soins. Une évaluation de l'adhésion des infirmières à ce programme et son apport pour la pratique professionnelle est réalisée après 2 ans de mise en œuvre.
Méthode : Les données sont recueillies par un questionnaire auto administré auprès de 182 infirmières de soins intensifs. L'évaluation porte sur les apports de la consultation infirmière et du colloque interprofessionnel en termes d'élaboration du projet thérapeutique, de coordination des soins et d'analyse de situation. Puis, elle s'intéresse à l'utilisation des outils par les infirmières au cours de la visite médicale, pour l'organisation quotidienne et pour le transfert du patient. Enfin, les bénéfices apportés pour la dynamique du service, la pratique professionnelle et le soutien aux proches sont investigués.
Résultats : Sur 182 questionnaires distribués, le taux de réponse était de 37%. 85% des infirmières utilisent au moins un des trois outils développés et mis en œuvre dans le cadre du programme PLS. Le document de synthèse est utilisé comme support pour définir le projet thérapeutique des patients par 82% des infirmières. Le génogramme est une ressource pour connaitre l'environnement socio-familial du patient pour 71% des infirmières. Enfin, la check-list contribue, pour 85% des infirmières, au suivi quotidien des objectifs de soins. La consultation hebdomadaire de l'infirmière spécialisée est perçue comme facilitant l'analyse des situations par 69% des infirmières. 100% des infirmières participent au colloque interprofessionnel hebdomadaire qui contribue à coordonner les soins pour 77% d'entre elles. Enfin le programme PLS facilite le suivi psycho-social des proches pour 78% des infirmières. De manière générale, 78% des infirmières disent être satisfaites du programme PLS et 72% se positionnent professionnellement dans les discussions interprofessionnelles.
Conclusion : Après deux ans de mise en œuvre, les infirmières de soins intensifs sont satisfaites du programme PLS. Elles ont largement adhéré aux outils développés dans ce cadre et rapportent qu'il contribue à la qualité des soins proposés à cette population.

P53

La fin de vie aux soins intensifs de pédiatrie...du côté des soignants

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Ce travail s'inspire d'un accompagnement vers la fin de vie d'un nouveau-né et de sa famille qui a été difficilement vécu par l'équipe soignante de l'unité de soins intensifs de pédiatrie de l'Hôpital Universitaire de Genève. Les situations de fin de vie sont fréquentes dans les unités de soins intensifs pédiatriques. Ce constat m'a amenée à me questionner sur les difficultés ressenties par les soignants lors de prise en charge d'enfant en fin de vie aux soins intensifs et sur leurs impacts sur les soignants, sur les enfants et leurs proches. Le but de ce questionnement étant de pouvoir répertorier les techniques utilisées par les soignants pour pallier à ces difficultés afin d'améliorer notre accompagnement lors de telles situations. J'ai choisi de m'intéresser à l'équipe soignante en général, car chaque professionnel en contact avec le patient en fin de vie peut être impliqué dans cette situation.
Cinq documents issus de Google Scholar, Lissa, PubMed et Cairn m'ont permis de nourrir ce travail. Je les ai confrontés à l'expérience du Pr Humbert, responsable de l'équipe des soins palliatifs pédiatriques de l'hôpital Sainte Justine à Montréal.
Cette recherche confirme les difficultés des soignants lors de prise en charge de patients en fin de vie aux soins intensifs de pédiatrie impactant directement la qualité de l'accompagnement de ces familles et la remise en question des soignants.
Le travail en équipe et le soutien cognitif et émotionnel sont très largement développés dans ces recherches. L'efficacité de la formation et la sensibilisation des équipes sont démontrées dans la littérature et confirmées par Pr Humbert. Ainsi, la formation des pairs et le retour sur nos pratiques par le biais d'ateliers ou de simulations pourraient permettre de les comprendre, les partager et de les améliorer. La présence d'un psychologue disponible aussi bien pour les patients que pour l'équipe apporterait un réel soutien. La sensibilisation par une signalétique symbolisant la spécificité de la prise en charge et un support écrit type « check-list » viendraient compléter ce soutien. Toutes ces propositions pourraient alors nous permettre d'optimiser l'accompagnement par les soignants des enfants en fin de vie aux soins intensifs de pédiatrie.

P54

Volumengabe in der Sepsis

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Volumengabe oder nicht? Trotz spezifischer Definition und Therapie der Sepsis, unter Anlehnung an die internationalen Empfehlungen, gestaltet sich das Volumenmanagement bei Patienten oftmals sehr schwierig. Sowohl zu viel Volumen als auch zu wenig, erhöhen die Mortalität der Patienten. Eine Erfassung des intravasalen Volumenstatus ist daher unerlässlich und kann anhand verschiedener Parameter erfolgen, wie beispielsweise durch hämodynamisches Monitoring, Laborwerte und die Klinik des Patienten.
Im Rahmen dieser Diplomarbeit wird die Fragestellung: «Welche Parameter sind zuverlässig, um zu entscheiden, ob in der Sepsis Volumen oder Katecholamine verabreicht werden sollen?», bearbeitet. Hierzu wurde eine Literaturrecherche in den Datenbanken Medline, PubMed und CINAHL durchgeführt.
Um den intravasalen Volumenstatus spezifisch zu bestimmen, wurden folgende Parameter analysiert: PICCO (Pulse Contour Cardiac Output), Pulmonalarterienkatheter, Laktatmessung, Rekapillarisierungszeit, Mottling-Score und Passive Leg Raising.
Die Literaturrecherche hat deutlich gezeigt, dass die einzelnen Parameter durch diverse Faktoren beeinflusst werden und deren Aussagekraft somit limitiert ist. Daraus lässt sich schliessen, dass sich die Volumentherapie nicht anhand eines einzelnen Parameters steuern lässt. Die ganzheitliche Betrachtung aller Parameter ist erforderlich für ein angepasstes Volumenmanagement in der Sepsis. Der Verlauf dieser Parameter ist wichtiger als der einzelne Wert.

P55

Fieber bei neurochirurgischen Patienten

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Die Regulation der Körpertemperatur ist eine lebenswichtige Körperfunktion und wird durch den Hypothalamus gesteuert. Abweichungen der normalen Körpertemperatur können wichtige Hinweise für Diagnostik und Einschätzung von Krankheiten sein. Störungen der Regulation können z.B. durch Gewebsdefekte, Bakterien, Viren oder Pilze auftreten. Daher ist eine der wichtigsten Abweichungen im Intensivstationsalltag das Fieber, mit welchem bei neurochirurgischen und viszeralchirurgischen Patienten unterschiedlich umgegangen wird. So werden bei neurochirurgischen Patienten umfangreiche medizin-technische und pflegerische Massnahmen bereits sehr früh ergriffen, was im Rahmen der Diplomarbeit zu folgenden Fragestellungen führte:

- Welche negativen Auswirkungen hat Fieber bei neurochirurgischen Patienten?
- Welche medizin-technischen und pflegerischen Massnahmen gibt es zur Fiebersenkung bei neurochirurgischen Patienten?

Bei der Behandlung von neurochirurgischen Intensivpatienten sind die neurochirurgischen Basismassnahmen sehr essentiell, wozu unter anderem auch der Erhalt der Normothermie gehört. Gerade bei Patienten mit Subarachnoidalblutung bewirkt Fieber vor allem einen erhöhten Metabolismus im Gehirn. Dieser wirkt erschwerend für das Vermeiden von Sekundärschäden, da optimale Verhältnisse für das Gehirn herrschen müssen, um die Blutung abzubauen und sich zu regenerieren. Aus diesen Gründen werden schon ab einer Körpertemperatur von 37.5 °C Massnahmen zur Fiebersenkung ergriffen. Bei viszeralchirurgischen Patienten hingegen handelt es sich bei einer Temperaturerhöhung meist um postoperatives Fieber, welches gemäss Studien auch bis 38.5 °C bei einem komplikationslosen Verlauf auftreten kann. Massnahmen zur Fiebersenkung ohne ärztliche Verordnung sind Wadenwickel und Coldpacks, welche auf grosse Gefässe gelegt werden, oder die fiebersenkende Waschung mit Aromaölen. Diese Methoden sind sowohl bei analgosedierten als auch bei wachen Patienten gut einzusetzen. Zusammen mit den Ärzten können Geräte wie der Coolgard, Arctic Sun oder EMCOOLS Brain.Pads diskutiert und zum fiebersenkenden Einsatz angeordnet werden. Je nach Massnahme sollte eine strenge Indikationsstellung gewährleistet sein. Pflegende sind fast jeden Tag mit dieser Angelegenheit in Berührung. Daher ist im Rahmen der Diplomarbeit eine Checkliste zur Temperatureinteilung sowie medizin-technische und pflegerische Massnahmen als Hilfestellung zur Vereinfachung und Verbesserung des Pflegealltags erstellt worden.

P56

Les alarmes sonores ont des impacts négatifs sur les infirmières des soins intensifs

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Introduction : Les nuisances sonores liées aux alarmes appartiennent à l'environnement sonore des soins intensifs et leur gestion fait partie du rôle propre de la profession infirmière. Cet outil de travail indispensable de nos jours dans un service de soins intensifs affecte négativement l'environnement de travail et la santé des infirmiers.

Question de recherche : Décrire les impacts physiques et psychiques des alarmes sonores sur les experts des soins intensifs et les interventions mises en place pour les réduire.

Méthode : Dans cette étude qualitative, un échantillon (n=7) d'infirmières expertes en soins intensifs ont répondu à des questions semi-dirigées et à un questionnaire lors d'entretiens.

Résultats : Les nuisances sonores dues aux alarmes sont une réalité et elles gênent souvent les infirmières. Elles provoquent principalement des symptômes psychiques comme l'irritation, l'agacement ou l'épuisement. Les notions de responsabilité et de sécurité augmentent généralement la sensibilité aux alarmes sonores. Une alarme qui sonne fréquemment énerve davantage les expertes. La nuit est le moment pendant lequel les alarmes dérangent le plus. Les soignantes décrivent de nombreuses actions pour réduire les alarmes.

Conclusions : La perception du bruit est très individuelle, inconstante et dépend de nombreux facteurs, dont la signification du son entendu. D'autres bruits plus ou moins influençables par les infirmiers contribuent aussi à augmenter les nuisances sonores et il est parfois difficile de différencier les deux types de sources. Le manque de sensibilisation au problème entraîne un manque d'intervention pour rendre l'environnement de travail plus calme.

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La place de l'humour aux soins intensifs adultes

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Contexte et objet de réflexion : J'ai toujours intégré l'humour dans ma relation avec le patient et j'ai voulu en comprendre le fonctionnement, les avantages et les inconvéniants.
A travers les hôpiclowns, l'humour est institutionnalisé en pédiatrie mais pas chez les adultes. J'ai voulu comprendre comment il est utilisé et comprendre ce qui en fait son utilité.
Finalement, ma question de recherche a été : Comment améliorer la relation soignant-soigné en utilisant l'humour aux soins intensifs adultes ?
Méthode de la recherche documentaire : Je suis passé par les banques de données RERO ; Google Scholar, Pubmed, Cairn, EM Premium, BDSP, Science Directe.
J'ai obtenu 18 articles dont 5 (4 français et 1 anglais) ont été utilisés dans la recherche documentaire, plus une thèse en anglais qui a constitué le sixième article.
J'ai également effectué des entretiens avec deux experts dans le domaine de l'humour.
Résultats :
Il y a des bénéfices tant pour le soignant que pour le soigné au niveau physique (cardiovasculaire, digestif…) et psychologique (coping, baisse du stress).
Les obstacles à l'introduction de l'humour sont les situations de fin de vie, les humours déplacés.
Ies facteurs favorisants sont la confiance en soi, l'expérience du soignant et sa prédisposition à l'humour.
Il y a une demande de formation de la part des professionnels et étudiants et les experts s'accordent à dire que cela est envisageable.
Propositions d'amélioration :
- Effectuer un état des lieux aux soins intensifs adultes sur l'utilisation de l'humour dans la relation soignant-soigné.
- Proposer une formation à l'humour dans le cadre de la formation spécialisée en soins intensifs adultes.
- Creation du groupe humour pour sensibiliser régulièrement les soignants de l'équipe et intervenir dans la formation continue.
- Tracabilité de la sensibilité du patient à l'humour dans le dossier informatisé.
- Envisager un partenariat avec les hôpiclowns pour un passage aux soins intensifs adultes.

Mots clefs : Humour, relation soignant-soigné, soins intensifs, communication, coping, caring, stress, distraction, communication positive

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La collaboration interdisciplinaire dans les décisions d'introduction des soins palliatifs aux soins intensifs de pédiatrie

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Les soins intensifs de pédiatrie sont confrontés à des situations de soins nécessitant une prise de décision interdisciplinaire d'introduction des soins palliatifs.
Ce travail de diplôme vise à comprendre comment améliorer cette prise de décision interdisciplinaire. Il détermine l'intérêt d'un consensus d'équipe ou d'un niveau de consensus dans l'orientation des soins à visée palliative.
Il permet de définir les freins et les moyens facilitants à l'instauration d'un processus décisionnel interdisciplinaire ainsi que ses étapes clés. Enfin, il démontre l'intérêt d'une anticipation de la prise de décision en équipe de transition des soins à visée palliative.
Matériel et méthode
J'ai sélectionné quatre articles issus des bases de données PubMed et Cairn que j'ai mis en parallèle avec l'avis d'un expert recueilli lors d'un entretien semi-dirigé. J'ai choisi de cibler la population des enfants hospitalisés aux soins intensifs de plus de 28 jours de vie puis d'ouvrir mon champ de recherche aux patients adultes hospitalisés aux soins intensifs au vu de peu de résultats spécifiques à la pédiatrie. Enfin, j'ai limité ma recherche aux articles de moins de quinze ans.
Résultats
La prise de décision en équipe pluridisciplinaire d'introduction de soins palliatifs aux soins intensifs de pédiatrie reste une notion complexe. Les résultats obtenus lors de l'élaboration de ce travail ont permis de mettre en exergue l'importance d'une communication et collaboration interdisciplinaire de qualité dans les prises de décision palliatives. L'élément probant relevé a été la nécessité d'instaurer un processus décisionnel interdisciplinaire formalisé et anticipé afin d'améliorer la qualité des soins pour le patient, sa famille mais aussi pour l'équipe médico-soignante.
Conclusion
Suite à l'élaboration de ce travail et aux résultats obtenus, plusieurs propositions d'améliorations ont été mises en évidence. D'abord, la création d'un modèle décisionnel interdisciplinaire formalisé et applicable aux soins intensifs de pédiatrie. Ensuite, favoriser l'amélioration de la communication interdisciplinaire éthique. Enfin, il est nécessaire de favoriser le soutien des soignants face aux situations décisionnelles.

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Study assessing the burden of influenza in nursing homes residents with influenza-like illness during 2016-2017 and 2017-2018 influenza season

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Influenza is a significant cause of morbidity and mortality in elderly. They are at high risk of complications after influenza virus infection. Data on the epidemiology of influenza within nursing homes (NH) are limited.
The purpose of this prospective study was to better describe the burden of influenza among residents of NH of canton of Vaud, Switzerland, with influenza-like illness during 2016-2017 and 2017-2018 influenza seasons.
First, we determined the proportion of influenza-like illness due to influenza in NH residents. We specifically assessed the impact of a positive influenza PCR on clinical features, morbidity and mortality, 30 and 90 days after diagnosis, as compared to a negative influenza PCR. Moreover, influenza vaccination rates of the residents and the healthcare workers within each nursing home were assessed at the end of each influenza season.
A PCR test was performed on 509 residents from 61 NH. 227 influenza virus infections were diagnosed; 181 influenza A and 46 influenza B. Compared to residents without influenza virus infection (IVI), residents with IVI were more often feverish with a high fever (69.1% and 88.5% respectively, $p < 0.0001$) are significantly more frequently hospitalized within 30 days after diagnosis (17.6 % vs 7.1%, $p= 0.0003$). Any cause mortality at 30 days was similar in both groups (12.8% vs 10.6%, $p=0.48$). Only 18.1% of IVI residents were treated with an antiviral and 60.4% of them received antibiotics. Influenza vaccination rates of the healthcare workers and residents were respectively 50% and 82%.
During influenza season, the feverish residents should be suspected to have influenza virus infection. Residents should be diagnosed (PCR) and treated with an antiviral where appropriate to limit the risk of hospitalization. Healthcare workers should be encouraged to be vaccinated against influenza in order to acquire a better herd immunity within the NH which will limit the spread of influenza.

Additional information:
We would like to thank acute care hospitals for their participation to help us conduct this study, and we are grateful to the infection prevention team for data collection.

P60

Whipple disease: a swiss cohort study.

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Background: The Institute of Microbiology of the University of Lausanne (IMUL) is a reference laboratory for T. whipplei diagnosis. Since 2001, the IMUL has used PCR assays targeting T. whipplei non-hypervariable regions of 16SrRNA, and in 2012 it provides quantitative real time PCR. Here we report our experience of a significant Whipple disease (WD) cohort, and evaluate impact of such molecular technique in WD diagnosis.
Materials/methods: We retrospectively collected all patients with a positive PCR for T. whipplei performed at IMUL between 2001 and 2016. Two ID specialists reviewed electronic medical records to determinate WD as defined, probable or carriers.
Results: From 2001 to 2016, 1153 samples were tested, 76 were positives for T. whipplei; among the 22 cases of WD, 15 were definite, 7 probable and 15 were carriers.
77% of WD cases were males, with a median age of 57.6 (6.6-76.1) years. Median time to diagnosis was 2.5 years, from 2.5 months to 13.3 years. 64% were immunosuppressed; weight loss (15/22), joints pain (16/22) and digestive tract disorder (15/22) are the most frequent clinical presentation. 41% had neurological manifestations, 32% had pulmonary involvement; lymphadenopathies were present in 32% of cases. We also reported uveitis (n=4), osteitis (n=1), fever of unknown origin (n=6), hepatitis (n=2), endophtalmitis (n=1) and cartilage inflammation (n=1).
Mediane qPCR value in tissue was 323’000 copies; the highest number of copies was observed in retroperitoneal lymphadenopathy (89’900'000 copies). Mediane qPCR value in faeces or saliva in WD cases was 88’425 (159-655’000’000) compare with 311 (144-1’034’800) for carriers. PCR screening in both saliva and stool has a high predictive positive value of 89%; we determinated also a 90% PPV above 32’200 copies in faeces.
Conclusions: WD is a male chronic opportunistic multisytemic disease, with frequent neurological and pulmonary involvement. Immunodeficiency is common and is also associated with more complex presentation. Positive T. whipplei PCR in both stool and saliva has a high positive predictive value. Patient with WD have a higher bacterial load in faeces compare to carriers. We observed an increasing number of cases that reflects heightened awareness and knowledge about WD. Systematic screening for WD using both stool and saliva specific PCR increased diagnosis rate.

P61

Treatment outcome monitoring of culture confirmed pulmonary tuberculosis in Switzerland 2016 - 2017

E Altpeter

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Treatment outcomes of tuberculosis (TB) became mandatory notifiable on January 1st, 2016 in Switzerland. This is the first report on treatment outcome monitoring (TOM) within the Swiss mandatory reporting system.
The purpose of TOM is to answer the following questions: Do we successfully treat TB in Switzerland? Do we treat patients correctly in order to prevent resistance? Do we control TB in Switzerland? Do we have potential to improve TB control? Do we reach the WHO target of 85% treatment success?
For this presentation, we restricted our analysis to culture confirmed pulmonary TB (cPTB) excluding cases resistant to isoniazid and rifampicin (MDR-TB). Overall treatment outcome of cPTB is successful in 75%. Regional differences exist. Results of treatment outcomes are similar in 2016 and 2017. TB-treatment is less successful in patients of foreign or unknown origin. It is more likely to be successful in women than in men. It is less likely successful in elderly patients. Switzerland does not (yet) reach the WHO target of an overall 85% treatment success. However, the inclusion or exclusion of undetermined outcomes in the calculations affects this result. If this category were excluded, Switzerland would reach the WHO-target.
Conclusion: Monitoring is important and shows that treatment is successful in about 75% of cPTB. There is potential to improve TOM in Switzerland by improving transmission of information between the different stakeholders in order to reduce the proportion of undetermined outcomes.

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Survey of nosocomial influenza in South-western Swiss hospitals during two seasonal epidemics

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Nosocomial influenza increases morbidity and mortality in hospitalised patients. No multicentre study analysed its impact in Swiss hospitals yet.
This study was conducted From November 1st to April 30th in 2016-2017 and 2017-2018 in 27 acute-care public hospitals in South-western Switzerland. It aimed at describing nosocomial cases of seasonal influenza.
During these 2 time-periods, every patient hospitalized for >72 hours that was positively screened by RT-PCR or antigen detection for influenza was retrospectively included in the survey. Policies to prevent influenza were collected in each participating hospital. Characteristics of patients included age, sex, and comorbidities. Included patients were followed-up until discharge or death. Complications and administration of anti-neuraminidases and/or antibiotics were registered.
The mean influenza vaccine coverage of healthcare workers (HCW) was 40%. 836 patients were included (98% with a type A influenza virus in 2016-2017; 77% with a type B virus in 2017-2018). Most patients (81%) had an unknown vaccine status. Overall, the incidence of nosocomial influenza was 0.3/100 admissions (0.35/1000 patient-days). The most frequent comorbidities were diabetes (21%), chronic respiratory diseases (18%), and malnutrition (17%). Fever (77%) and cough (66%) were the most frequent symptoms. 70% of patients received anti-neuraminidases, 28% received antibiotics. Infectious complications such as pneumonia were reported in 8%. Overall, the all-cause mortality was 6%.
The occurrence of nosocomial influenza underlines the importance of vaccinating patients and HCW, rapidly recognising community or hospital-acquired cases, and applying adequate additional measures to prevent dissemination, including the timely administration of anti-neuraminidases to avoid antibiotic use (and misuse).

P63

96 WEEK Efficacy and Safety of B/F/TAF in Treatment-Naïve Adults AND ADULTS ≥50 yrs

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Introduction: As the population living with HIV ages, identifying effective and safe regimens for older patients is of heightened importance. The single-tablet bictegravir, emtricitabine, tenofovir alafenamide (B/F/TAF) is a guidelines-recommended regimen that may benefit older patients due to its favorable adverse event (AE) profile and few drug interactions.
Methods: We conducted two randomized, double blind, phase 3 studies of B/F/TAF in treatment-naïve adults, Study 1489: B/F/TAF vs dolutegravir, abacavir, and lamivudine (DTG/ABC/3TC) and Study 1490: B/F/TAF vs DTG + F/TAF. A pre-specified pooled analysis assessed efficacy as the proportion with HIV-1 RNA < 50 c/mL (FDA Snapshot) and safety at Week (W) 96. Proteinuria and bone mineral density (BMD) were measured in Study 1489 only. We performed a post-hoc analysis in adults ≥ 50 yrs.
Results: 1274 were randomized and treated (634 B/F/TAF, 315 DTG/ABC/3TC, 325 DTG + F/TAF); 196 were age ≥ 50 yrs (96 B/F/TAF, 41 DTG/ABC/3TC, 59 DTG + F/TAF). Efficacy was high for all treatments and for age ≥ 50 subgroup (Table). Overall, the most common AEs were nausea (10% B/F/TAF, 24% DTG/ABC/3TC , 11% DTG + F/TAF [$p < 0.001$ B/F/TAF vs DTG/ABC/3TC]), diarrhea (17% B/F/TAF, 16% DTG/ABC/3TC, 16% DTG + F/TAF), and headache (15% B/F/TAF, 16% DTG/ABC/3TC, 15% DTG + F/TAF). Treatment-related AEs occurred in 24% B/F/TAF, 40% DTG/ABC/3TC ($p < 0.001$ B/F/TAF vs DTG/ABC/3TC), and 28% DTG + F/TAF. The most common treatment-related AE was nausea: 4% B/F/TAF, 17% DTG/ABC/3TC ($p < 0.001$ B/F/TAF vs DTG/ABC/3TC), and 5% DTG + F/TAF. Treatment related AEs in those age ≥ 50 yrs were similar to the full population: 23% B/F/TAF, 37% DTG/ABC/3TC, 29% DTG + F/TAF. Overall, AEs leading to study drug discontinuation were reported for 1% on B/F/TAF, 2% on DTG/ABC/3TC and 2% on DTG + F/TAF, and in age ≥ 50 yrs: 2% B/F/TAF, 5% DTG/ABC/3TC and 7% DTG + F/TAF. In Study 1489 mean % changes in hip and spine BMD, proteinuria, and renal biomarkers were similar. There were small changes from baseline in fasting lipids at W96 overall and no significant differences between treatments in participants ≥ 50 yrs.
Conclusions: Through two years of treatment B/F/TAF resulted in high rates of virologic suppression, was safe and well tolerated with fewer treatment-related AEs compared to other guidelines-recommended regimens similar results were found in adults ≥ 50 yrs. There were no clinically significant impacts on bone and renal safety or on fasting lipids.

P64

Switching to a single-tablet regimen bictegravir, emtricitabine, and tenofovir alafenamide (B/F/TAF) from dolutegravir (DTG) plus emtricitabine and either tenofovir alafenamide or tenofovir disoproxil fumarate (F/TAF or F/TDF)

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Background:
The single tablet regimen B/F/TAF, is a guideline-recommended treatment for HIV-1. We evaluated whether people receiving dolutegravir (DTG) plus F/TAF or F/TDF can safely and effectively switch to B/F/TAF.
Methods:
In this phase 3, double-blinded study, virologically suppressed adults taking DTG plus either F/TAF or F/TDF were randomized (1:1) to switch to B/F/TAF or DTG+F/TAF, once daily with matching placebo. Documented or suspected prior resistance to NRTIs (i.e., M184V, K65R and thymidine analogue mutations [TAMs]), NNRTIs and/or PIs was permitted; INSTI-resistance was exclusionary. Primary endpoint was the proportion with HIV-1 RNA ≥ 50 c/mL at Week (W) 48 (FDA snapshot). Noninferiority was assessed through 95% confidence intervals (CI) using a margin of 4%. Secondary endpoints were the proportion with HIV-1 RNA < 50 c/mL and change from baseline in CD4 counts at W48. Safety was assessed by adverse events (AEs) and laboratory results.
Results:
565 participants were randomized/treated (B/F/TAF n = 284, DTG + F/TAF n = 281): 14% women, 23% Black, median age 51 years (range 20-79), 24% had resistance to NRTIs including 5% with K65R or ≥3TAMs, and 14% with M184V/I with or without other mutations. At W48, 0.4% on B/F/TAF and 1.1% on DTG + F/TAF had HIV-1 RNA ≥50 c/mL demonstrating noninferiority. There was no treatment emergent resistance. No participant with NRTI-resistance had HIV-1 RNA ≥ 50 c/mL at W48. Overall, 93% on B/F/TAF and 91% on DTG+F/TAF had HIV-1 RNA ≤50 c/mL. Change in CD4 was similar between groups (p=0.23). The most common AEs were nasopharyngitis, diarrhea, and upper respiratory tract infection. Six (2%) in each group discontinued study drug due to AEs.
Conclusions:
At W48, switching to B/F/TAF was noninferior to DTG+F/TAF, with high rates of virologic suppression in both groups. The single-tablet regimen B/F/TAF is an effective option for people virologically suppressed on DTG+F/TDF or F/TAF, with or without NRTI resistance mutations including M184V, K65R and TAMs.

P65

Tenofovir Alafenamide vs Tenofovir DF in Women: Pooled Analysis of 7 Clinical Trials

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Background
Globally, the majority of people living with HIV are cis-women, who are underrepresented in clinical trials. Tenofovir alafenamide (TAF) has demonstrated an improved renal and bone safety profile relative to tenofovir disoproxil fumarate (TDF) in multiple randomized trials with similar efficacy. We pooled 7 studies to evaluate the efficacy and safety of TAF vs. TDF for ART initiation or switch in women.
Materials & Methods
Data from 779 cis-women in 7 randomized, double-blind clinical trials through W96 were analyzed. All participants who initiated or switched to TAF-based regimens (elvitegravir/Cobicistat/FTC/TAF, rilpivirine/FTC/TAF, FTC/TAF, or bictegravir/FTC/TAF) were compared with those who initiated or continued TDF-based regimens. Virologic suppression (VS; HIV-1 RNA < 50 c/mL) rates at W96 were determined by FDA snapshot analysis. Bone mineral density (BMD) and the renal tubular biomarkers urine beta-2-microglobulin (B2M) : creatinine (Cr) ratio and retinol binding protein (RBP) : Cr ratio are reported at W96. Differences were compared using Wilcoxon rank sum test.
Results
A total of 779 cis-women were enrolled (n = 429 TAF, n = 350 TDF). Participants were primarily women of color (67 % black or Hispanic/Latina; 45 % black and 25 % Hispanic/Latina). Treatment-naïve women (WTN) had a median age of 37 years with median HIV-RNA 4.47 log10 c/mL and CD4 365 cells/mm3. Women with VS (WVS) had a median age 47 years with median CD4 711 cells/mm3. Of WTN, 86 % (TAF) and 85 % (TDF) achieved VS (p = 0.71) at W96. VS was maintained in 86 % of WVS switching to TAF and 85 % continuing TDF (p = 0.99). Overall TAF and TDF were well-tolerated. Discontinuation due to adverse event/death was 0 % (TAF) vs. 1.6 % (TDF) in WTN and 1.3 % (TAF) vs. 2.2 % (TDF) in WVS. At W96 there was less impact on renal biomarkers in WTN initiating TAF- vs. TDF-based regimens (p < 0.001 for both), and decreases in BMD were smaller (p < 0.001 for both). Women switching from TDF to TAF experienced decreases in tubular proteinuria (p < 0.001 for both) and improvements in BMD (p < 0.001 for both) at W96.
Conclusions
Cis-women who initiated or switched to TAF had significantly improved bone and renal safety parameters compared to TDF, with similar rates of virologic suppression through W96. These pooled data from 7 studies demonstrate a safety advantage for initiating therapy with or switching to TAF compared to TDF in women.

P66

Self-perception of preparedness to prescribe antibiotics of Swiss medical students: results from a cross sectional survey in four Swiss universities in 2015

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Background
Previous studies have highlighted that medical students do not feel well prepared to prescribe antimicrobials. The ESCMID Study Group on Antimicrobial stewardshiP (ESGAP) conducted a survey among European medical students to assess self-reported preparedness about antimicrobial use and the perceived lack of education. The aim of our study was to focus on the perceptions of Swiss medical students emerged in that setting.
Methods
A cross-sectional web-based survey was conducted in 2015 as part of the ESGAP Student PREPARE project. Sixth-year medical students from 29 European countries, including Switzerland, were involved. The survey investigated self-reported preparedness on diagnosis and treatment of infections, availability and perceived usefulness of different teaching methods and the perceived need for further education on antibiotic use. Questions on preparedness were formulated using a 7 point Likert-type scale; responses were merged in 2 categories (1 - 3, not sufficiently prepared; 4 - 7, at least sufficiently prepared). “Preparedness scores” were created by calculating the percentage of students who felt sufficiently prepared on each topic.
Results
We received responses from 136 medical students from 4 of the 6 eligible medical school (Bern, Geneva, Lausanne and Zurich); the overall estimated response rate was 19 %. Overall, 62 % of Swiss students reported needing more education on antibiotics or at least on their prudent use. Teaching methods perceived as more useful were discussion of clinical cases (83.5 %), clinical rotation in infectious diseases (80.5 %) and small group teaching (78.3 %), but the latter 2 were unavailable for 37.9 % and 48.1 % of the students. Almost all the students felt sufficiently prepared to recognize clinical signs of infection (99.3 %), to interpret inflammation markers (94.9 %) and to have good knowledge of consequences of antibiotic misuse (95.5 %). Less than half of them felt prepared to select the right empirical treatment without using guidelines (33.8 %), to identify the need for combination therapy (39.7 %) or to select the shortest adequate treatment duration (39.3 %).
Conclusions
Most Swiss final year medical students feel they need more education on antimicrobials. High self-confidence reported in diagnostic issues may contrast with perceptions of physicians in clinical practice. Some of the teaching methods perceived as more useful are still not sufficiently available in Swiss medical schools.

Reference
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P67

Concordance between upper and lower airway microbiota in children with Cystic Fibrosis. A sub-study of the MUCOVIB project

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Background: The "Mucoviscidose, Respiratory Viruses and Intracellular Bacteria" (MUCOVIB) project addresses the impact of respiratory viruses on respiratory bacterial diversity changes overtime. This sub-study of the MUCOVIB project aims to evaluate the agreement in bacterial composition between throat swabs (TS) and expectorated sputa (EXP).
Methods: 20 pairs of EXP-TS samples collected during the same visit from 10 patients were analyzed as a sub-study of a prospective, longitudinal, multicenter cohort study of 61 children with CF included during follow-up visits or PE. Bacterial composition was studied by 16S rRNA amplicon-based metagenomics. The library was prepared following standard V3V4 Illumina protocol and sequenced on a MiSeq. Reads were trimmed with Cutadapt, quality filtered, corrected for sequencing errors and joined with DADA2 in R to generate amplicon sequence variants (ASVs). ASVs can be considered as error-corrected 100% OTUs. RDP in Qiime was used to assign sequences to taxonomical ranks based on the EzBioCloud reference database. Only sequences assigned to a defined bacterial phylum were kept for downstream analysis. Alpha-diversity indices (Shannon and Chao1) and beta-diversity distances (Jaccard, Bray-Curtis) were calculated by dedicated functions in R using vegan and phyloseq packages.
Results: Overall, TS and EXP composition did not differ significantly when considering ASVs presence/absence (ANOVA, F-value 0.19; P=0.67). From our findings, TS and EXP correlated significantly in richness (Chao1; R=0.77; P=0.00012) but poorly in combined richness and evenness (Shannon diversity index; R=0.59; P=0.0058). Same visit samples cluster more closely when considering ASVs presence/absence (Jaccard; $P < 0.005$) rather than their relative abundance. Finally, average Jaccard distance was lower between same visit samples compared to inter-visit samples of the same type (EXP).
Conclusions : We suggested a significant correlation between EXP and TS samples when considering an estimate of their number of species. The average beta diversity distance between samples was lower for TS and EXP samples from the same visit, compared with same samples from different visits, which was most significant when considering the identity of ASVs (Jaccard). Albeit, these findings suggested that information collected from a recent throat swabs is more valuable for antibiotic guidance than a sputa collected during a previous visit.

P68

Impact of the dual deletion of the mitochondrial sirtuins SIRT3 and SIRT5 on anti-microbial host defenses

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Background. The sirtuins SIRT3 and SIRT5 are the main mitochondrial lysine deacetylase and desuccinylase, respectively. SIRT3 and SIRT5 regulate metabolism and redox homeostasis and are associated with age-related metabolic, neurologic and oncologic diseases that stimulated the development of drugs targeting sirtuins. We have previously shown that single deficiency in either SIRT3 or SIRT5 had no impact on host defenses in a large panel of preclinical models of sepsis. However, SIRT3 and SIRT5 may compensate each other considering that they share subcellular location and targets.
Aim. To study the interactions between SIRT3 and SIRT5 using double knockout mice.
Material and methods. We generated a SIRT3/5 double knockout mouse line. Wild-type, SIRT3, SIRT5 and SIRT3/5 deficient mice were housed in SPF conditions. Bone marrow (BM), thymus and spleen were analyze by flow cytometry. Whole blood, BM-derived macrophages (BMDMs) and BM neutrophils were incubated with microbial products (LPS, CpG), Listeria monocytogenes or PMA to quantify the production of cytokines, reactive oxygen species (ROS) and neutrophil extracellular traps (NETs). Mice were infected i.v. with L. monocytogenes and monitored daily for morbidity and mortality parameters. Blood was collected to quantify cytokines and analyze cell populations.
Results. SIRT3/5 deficient mice developed without abnormalities. Hematopoiesis and immune cell development were largely unaffected in SIRT3/5 deficient mice. Whole blood and BMDMs from SIRT3/5 deficient mice produced increased levels of pro-inflammatory cytokines. SIRT3/5 deficient neutrophils displayed enhanced bactericidal responses linked to an increased production of ROS. SIRT3/5 deficient mice were somewhat protected from listeriosis attested by decreased bacterial blood counts and delayed morbidity.
Conclusion. Double deficiency in SIRT3 and SIRT5 has rather subtle impacts on immune cell development and anti-microbial host defenses, unseen in single deficient mice, indicating a certain degree of overlap between SIRT3 and SIRT5. These data support the assumption that therapies directed against mitochondrial sirtuins, at least SIRT3 and SIRT5, should not impair antibacterial host defenses.

Additional information:
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P69

Long-acting cabotegravir + rilpivirine for HIV maintenance: FLAIR Week 48 results

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Background: The 2-drug long-acting (LA) injectable regimen of the INSTI cabotegravir (CAB) and the NNRTI rilpivirine (RPV) is being developed to reduce dose frequency, pill taking, and drug exposure. FLAIR, a phase III, open-label, multicenter study, is investigating whether switching to monthly CAB+RPV is noninferior to dolutegravir (DTG)/abacavir (ABC)/lamivudine (3TC).
Material & Methods: ART-naive participants received induction therapy with oral DTG/ABC/3TC (current antiretroviral regimen [CAR]) for 20 weeks. Those with HIV-1 RNA < 50 copies/mL at 16 weeks were eligible to enter the maintenance phase and were randomly assigned (1:1) to continue CAR or switch to LA. Participants in the LA arm received an oral lead-in of CAB 30 mg + RPV 25 mg once daily for 4 weeks to assess tolerability before receiving CAB+RPV as IM monthly LA injectable therapy. The primary endpoint was VL ≥ 50 c/mL at Week 48 by the FDA Snapshot algorithm (noninferiority margin, 6%). Safety, tolerability, and confirmed virologic failure (CVF) were secondary endpoints.
Results: 566/629 participants who initiated induction therapy were randomly assigned to the LA or CAR arm (283/arm). The median age was 34 years; 22% were female and 74% were white. 6 participants in the LA arm (2.1%) and 7 in the CAR arm (2.5%) had HIV-1 RNA ≥ 50 copies/mL at Week 48, meeting noninferiority criteria for the primary endpoint and for the key secondary endpoint of HIV-1 RNA < 50 copies/mL (LA 93.6% vs CAR 93.3%). 4 LA recipients (1.4%) had CVF; 3 had mutations in the NNRTI + INSTI domains (K101E + G140R, E138K + Q148R, and E138E/A/K/T + Q148R, respectively); and 1 was not tested (oral only). The CAR arm had 3 CVFs with no resistance mutations selected. Adverse events (AEs) leading to withdrawal and serious AEs were infrequent in both arms. The most common drug-related AE was injection-site reaction (ISR; 82% of participants in the LA arm); the frequency decreased over time. 99% of ISRs were grade 1 or 2; the median duration was 3 days. Change in satisfaction with current treatment vs induction-phase treatment was significantly higher for the LA vs CAR arm after 48 weeks (HIVTSQc).
Conclusions: The regimen of monthly injections of CAB+RPV was noninferior to DTG/ABC/3TC at Week 48. The LA regimen was generally well tolerated with few CVFs. Overall, these results demonstrated the therapeutic potential of CAB+RPV injections, following short initial induction with oral DTG/ABC/3TC to achieve viral suppression.

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Determinants of the use of computerized decision support systems and adherence to guidelines by physicians for antibiotic prescription in hospitals: a qualitative descriptive study in three hospitals in Europe.

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Background: Computerized decision support systems (CDSSs) offer new perspectives for semi-automated antimicrobial stewardship interventions. Despite recent findings demonstrating the potential of local guidelines and CDSSs to improve healthcare, both are often poorly accepted by physicians. Before implementing a CDSS that helps physicians choose the appropriate antimicrobial treatment (i.e. the COMPASS tool(1)), we sought to gain an in-depth understanding of the barriers and facilitators to the use of antimicrobial guidelines and adoption of CDSS by in-hospital physicians.
Methods: We conducted a qualitative study using semi-structured interviews among in-hospital physicians in three public hospitals in Switzerland and France. We developed an interview guide with open-ended questions using a comprehensive checklist for determinants of healthcare professional practice(2). Physicians were recruited by convenience sampling and snowballing until data saturation was achieved. Interviews were recorded and transcribed verbatim. We analysed the data using Thematic Content Analysis with a mixed approach, a) identifying themes deductively from a framework and b) generating themes inductively from the data (grounded theory approach). Three researchers coded transcripts separately in English. Codes were then shared and discussed amongst the three centers to identify themes. We used Atlas.ti software to analyze the data. Approvals by local ethics committees were obtained. All participants signed a consent form and the data were de-identified.
Results: We interviewed 30 physicians (between 8 and 12 physicians per center). All were working in internal medicine or medical speciality departments with various level of seniority. The following themes emerged (a) CDSSs were seen as essential tools for our future health systems, (b) CDSSs were felt to potentially compromise physicians' thinking, autonomy and make them lose time (c) both CDSSs and guidelines in general were felt not to be able to replace physician's decision making in complex situations (d) CDSSs were felt to help making guidelines more accessible, (e) CDSSs uptake is influenced by software features and physician resistance to change.
Discussion: Understanding determinants of guidelines use and CDSSs adoption is key before implementing such intervention. Findings concerning physicians' views and experiences about guidelines and CDSSs can be used for designing new tools and hopefully increase their adoption.

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P71

Comparison of Dacron and porcine pericardium vascular grafts on growth and adherence of bacteria and yeast

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Background: Prosthetic vascular graft infection occurs in 1%-4% of the cases, with elevated rates of morbidity and mortality. Biologic allografts using tubulized bovine or porcine pericardium have been proposed as an alternative to synthetic grafts in patients with a high risk of infection. However, to which extend porcine pericardium affect infectivity remains largely unknown.
Aim: To compare the effects of Dacron® and porcine pericardium on planktonic growth and adherence of bacteria and yeast.
Methods: One cm2 of Dacron® polyester, silver-coated Dacron, porcine pericardium, sutured pericardium or stapled pericardium was incubated under shaking at 37°C in Muller Hinton medium containing 105 CFU Staphylococcus epidermidis, Staphylococcus aureus or Escherichia coli or in Sabouraud medium containing 105 CFU Candida albicans (n=8 per condition). Medium was used to enumerate planktonic microorganisms, while grafts were washed and sonicated to quantify adherent microorganisms.
Results: Silver-coated Dacron was bactericidal but not fungicidal, while Dacron had no effect on microbial growth. Pericardium limited planktonic growth of E.coli and C.albicans, but not that of S.aureus and S.epidermidis. Stapled pericardium was bactericidal for staphylococci and strongly reduced bacteria adherence to the grafts, while staples themselves were not microbicidal.
Conclusion: Porcine pericardium is at least as good as Dacron to control the growth of the microorganisms most frequently infecting prosthetic vascular grafts. Moreover, stapled pericardium was microbicidal against staphylococci similar to silver-coated Dacron. These results suggest that stapled pericardium might be a good option for rapid vascular grafting without increasing the risk of infectivity.

P72

Ceftaroline as potential treatment option for rifampicin- and methicillin-resistant Staphylococcus epidermidis in an experimental foreign-body infection model

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Methicillin-resistant Staphylococcus epidermidis (MRSE) represent an emerging cause of implant-associated infections (IAI) due to its ability to establish biofilms on foreign-body surfaces. Rifampicin (RIF) is the only antibiotic with proven activity against metabolically inactive staphylococci in IAI. If RIF-resistance occurs, curative treatment options are so far very limited. In this study, we evaluate the efficacy of new antibiotic combinations against RIF-resistant MRSE in a well-established mouse tissue cage infection model.Subcutaneously implanted Teflon cylinder in C57BL/6 mice were infected peri-operatively with a RIF-resistant or RIF-susceptible (R-RIF and S-RIF) clinical MRSE isolate with an inoculum of 108 cfu. 5-day treatment was initiated 2 days post-infection. Antibiotics were chosen according to in vitro susceptibility and were administered in human-equivalent doses. Regimens consisted either of ceftaroline, daptomycin, linezolid, fosfomycin, or combinations of ceftaroline plus daptomycin, ceftaroline plus fosfomycin, fosfomycin plus daptomycin, fosfomycin plus linezolid, rifampin plus daptomycin, or rifampin plus ceftaroline. Saline served as untreated control. Three days after end of treatment (on day 9), the outcome was measured as cure rate (number of eradicated infections per treatment group) and as difference in bacterial counts (deltalog10 CFU/mL) between saline and treatment groups. After 9 days, no spontaneous clearance in the untreated control group was observed. Untreated MRSE-R-RIF demonstrated significantly lower planktonic and adherent CFU/mL loads compared to MRSE-S-RIF. Monotherapy of ceftaroline, daptomycin or fosfomycin significantly reduced planktonic and adherent MRSE-R-RIF but not MRSE-S-RIF. The combination of fosfomycin and daptomycin achieved the highest reduction of adherent MRSE-R-RIF but only ceftaroline plus daptomycin significantly reduced planktonic and adherent bacteria in both strains. Rifampin plus ceftaroline significantly reduced adherent MRSE-R-RIF. Nevertheless, no treatment was able to cure MRSE-R-RIF or MRSE-S-RIF.A clinical MRSE-R-RIF isolate showed decreased in vivo fitness compared to MRSE-S-RIF. Ceftaroline alone and combined with daptomycin seems to be promising. However, none of the tested regimens were able to cure the MRSE-R-RIF or MRSE-S-RIF biofilm-associated infection. These findings highlight the urgent need for valid alternatives to rifampicin-containing treatments.

P73

Appropriateness of perioperative antimicrobial management in colon surgery: a retrospective cohort study over two years in a tertiary care centre in Switzerland

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Background: Indication, spectrum, dose, and timing are essential parts of surgical antibiotic prophylaxis (SAP) to prevent surgical site infections (SSIs). In the context of a quality improvement program, we assessed the appropriateness of perioperative antibiotic management.
Methods: Based on the national Swissnoso SSI surveillance database, we included all consecutive patients undergoing colon surgery in our tertiary care center in Eastern Switzerland between 10/2015 and 09/2017. Indication, spectrum, dose and timing of first and further intraoperative doses of SAP and management of preoperative antibiotic treatment were retrospectively analyzed. SAP with cefamandole/metronidazole or similar within 60 minutes before incision was regarded as correct. For patients already on antibiotic therapy, SAP was indicated in case of < 3 preoperative doses. An additional SAP dose was indicated if the duration of surgery was > 4 hours.
Results: We included 557 patients, whereof 458 (82%) received SAP without prior antibiotic therapy. In 435/458 (95%) the spectrum was adequate, in 402 (88%) timing and in 457 (99%) dosing was correct. In 4 patients (0.7%) no SAP was documented. SSI rate among patients with correct indication, spectrum, dose and timing (n = 382, 83%) was 12% compared to 15% in those with at least one incorrect parameter or missing SAP (P = 0.53).
A total of 95/557 patients (17%) received antibiotic therapy within 72h before surgery. Of these, 26 (27%) received no or insufficient prophylaxis despite having had < 3 preoperative doses; 21 (22%) received SAP without indication. SSI rate was 35% in patients with insufficient prophylaxis compared to 20% in those with adequate/unnecessary prophylaxis (P = 0.27).
Twenty-four of 107 (22%) patients with prolonged surgery did not receive an indicated second dose of SAP. Overtreatment was frequent: 34 (29%) had unnecessary additional SAP, and 49 (42%) higher doses than recommended (no weight-adaptation necessary).
Conclusions: Adherence to internal SAP guidelines was appropriate among most patients without preoperative antibiotic therapy. However, patients on preoperative therapy were often inappropriately managed, both due to lack/insufficient SAP and due to overtreatment. Efforts are necessary to educate healthcare personnel and to optimize work processes.

Additional information:
Data for the Swissnoso Surgical Site Infection Surveillance were collected at the Cantonal Hospital St. Gallen within Swissnoso.

P74

Extended-spectrum β-lactamase-producing Enterobacteriaceae in colorectal surgical site infections: is there a need for adjustment of surgical antibiotic prophylaxis in carriers?

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Background:
Surgical antibiotic prophylaxis (SAP) is a key prevention strategy against surgical site infections (SSI). Recent data suggest a reduction of colorectal SSI after adaptation of SAP in carriers of extended-spectrum β-lactamase (ESBL)-producing Enterobacteriaceae. We therefore aimed to estimate the potential impact of such an intervention by analyzing the spectrum of SSI-causing pathogens, which are not covered by SAP, in a cohort of colorectal surgery patients.
Materials/methods:
Based on the nationwide prospective Swissnoso SSI surveillance database and according to their definitions of SSI, we included patients undergoing elective or emergency colorectal surgery at our tertiary care hospital in Eastern Switzerland between 10/2015 and 09/2017. Patients with antibiotic treatment before surgery were excluded. For every patient with documented SSI, we retrospectively gathered data on antibiotic agents used for SAP and on pathogens discovered in microbiological samples.
Results:
A total of 732 patients were included. Eighty patients (11%) suffered an SSI, whereof most (98%) received cefamandole and metronidazole for SAP. Of those 80 patients, 45 were excluded because of missing microbiology results. In 26 (74%) of the remaining 35 patients, either all (n=12) or some of the detected pathogens (n=14) were not covered by SAP. We identified 3 patients (9%) with SSI caused by ESBL-E. coli. Other pathogens not covered by SAP were Hafnia alvei (1 patient), Enterobacter species (2 patients), Pseudomonas aeruginosa (6 patients), yeasts (polymicrobial in 5 patients), and enterococci (monomicrobial in 3 patients; polymicrobial in 16 patients). Two patients had negative microbiology results.
Conclusions:
Detection of ESBL-producing Enterobacteriaceae causing SSI was rare in this cohort. Preoperative screening of ESBL-carriage and adaptation of SAP in carriers could have potentially prevented 3 SSI. Given a number needed-to-screen of 244, this raises questions about the cost-effectiveness of this measure in a low-prevalence setting. A limitation of our study is the lack of microbiology results in some patients. However, lack of microbiology results suggests that these patients responded well to empirical treatment, which makes the presence of ESBL-producers unlikely. The broad spectrum of pathogens not covered by SAP underlines the limitations of current SAP regimens in the prevention of SSI in colorectal surgery.

P75

Hepatitis C elimination in the heroin substitution program “HAG” in the canton Aargau

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Background: In opioid substitution programs, chronic hepatitis C is highly prevalent and Directly observed therapy guarantees optimal adherence. Pangenotypic Direct-acting antivirals (DAA) achieve cure rates >95% after 8-12 weeks and make HCV-genotyping dispensable. However, to reach “HCV elimination by 2030”, screening- and treatment-uptake must be increased.
Aims: To improve HIV/HCV-screening, HCV-treatment-uptake and immunity against hepatitis A/B using minimally invasive point-of-care tests and a “test-and-treat/vaccinate” approach on site.
Methodology: Since 09/2018, every 4 weeks, an infectious disease specialist and a study nurse visit the heroin substitution program “HAG”, bringing along GeneXpert® IV and mobile Fibroscan® in a car. We offer HIV/HCV-antibody rapid tests (20min) and HCV-RNA quantification (60min) with capillary blood, non-invasive liver fibrosis assessement (Fibroscan®) (5-10min) and HCV-treatment prescription on site. Recommended venous blood draws for HAV/HBV-serology and HAV/HBV-vaccinations are performed by the staff of the “HAG”. Project performance is assessed by annual cross-sectional chart review.
Results: In 04/2018, “HAG” cared for 128 patients. Until 04/2019, the proportion never HIV/HCV-antibody screened has decreased from 21% (27) to 8% (10) and 17% (22) to 6% (8), respectively. Of the patients still in need of screening, 7 have already left the institution. The proportion of HCV-antibody-positives with unknown HCV-RNA decreased from 11% (6/53) to 2% (1/57). HCV-treatment-uptake increased from 60% (21/35) to 87% (34/39) and HCV-RNA-prevalence among the HCV-antibody-positives decreased from 38% (18/47) to 14% (8/56). So far, 14 non-cirrhotic patients without HIV started HCV-treatment on site (12 completed (all HCV-RNA negative at EOT, SVR: 9/9); 2 ongoing). “Non-compliance with appointments”, “waiting for new drugs/reimbursement restrictions” and “no further evaluation with HCV-RNA” were the most common reasons why patients were not treated earlier. HAV/HBV-vaccination accompanying HCV-treatment (Start, Week 4, SVR) was well accepted.
Conclusion/Prospects: Point-of-care tests using capillary blood and a “test-and-treat/vaccinate” approach on site remove crucial barriers to diagnosis and treatment, making hepatitis elimination in opioid substitution programs achievable.
To improve acceptance of hepatitis A/B-serology prior to vaccination, point-of-care tests using capillary blood will be evaluated in 2020.

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P76

Severe outcome in family transmission of typhoid fever

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Background: Salmonella enterica subspecies enterica serotype Typhi (S. Typhi) is the causative pathogen of typhoid fever. Asymptomatic S. Typhi carriage can lead to family transmission with severe outcome especially in young children that are at risk for more severe disease and complications.
Methods: A 5-member family was analyzed for S. Typhi infection after sibling 1 was diagnosed with typhoid fever. We used an extensive microbiological workup including microscopy and culturing of blood, stool, and cerebrospinal fluid specimens. Serological testing for S. Typhi immunoglobulin (Ig) M antibodies was performed using a novel immunochromographic lateral flow assay. Whole-genome sequencing (WGS) followed by comparative core genome multilocus sequence typing was performed on the S. Typhi isolates.
Results: Sibling 1 (9 months) was diagnosed with a S. Typhi meningitis and sibling 3 (8 years) was identified as asymptomatic S. Typhi carrier. Sibling 2 (2 years) was retrospectively diagnosed with typhoid fever by IgM serology at the time point of admission to the hospital. The mother reported a febrile gastroenteritis at the family's visit to Bangladesh 4 months ago, but parents were asymptomatic and culture-negative at disease presentation of their children. WGS analysis of the family S. Typhi isolates showed clonality and strongest homology with S. Typhi strains occurring in Bangladesh.
Conclusion: Evidence is provided that S. Typhi, acquired from a visit to Bangladesh, was transmitted within the family from one brother as asymptomatic shedder to his 9-month-old brother that manifested S. Typhi meningitis as a very rare but life-threatening presentation of typhoid fever.

P77

Long-acting cabotegravir + rilpivirine as maintenance therapy: ATLAS Week 48 results

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Background: ATLAS, a phase III, open-label, multicenter study, was designed to establish whether switching to monthly long-acting (LA) cabotegravir (CAB) + rilpivirine (RPV) LA is noninferior to continuing current 3-drug oral antiretroviral therapy in adults with virologically suppressed HIV-1 infection.

Material & Methods: Eligible participants had HIV-1 RNA < 50 copies/mL for ≥ 6 months without virologic failure on oral regimens comprising 2 NRTI + 1 INSTI, NNRTI or PI. Participants were randomly assigned (1:1) to continue current ART (CAR) or switch to the LA arm. The LA arm participants received oral CAB 30 mg + RPV 25 mg once daily for 4 weeks for safety monitoring, then single 3-mL loading doses of CAB LA 600 mg (200 mg/mL) and RPV LA 900 mg (300 mg/mL) by IM injection, followed by 2-mL IM injections every 4 ± 1 weeks of CAB LA 400 mg and RPV LA 600 mg. The primary endpoint was HIV-1 RNA ≥ 50 copies/mL at Week 48 using the FDA snapshot algorithm with a 6% noninferiority margin.

Results: 616 participants initiated treatment (308/arm; ITT-E). Median age was 42 years; 33% were female and 68% white. At Week 48, 5 participants (1.6%) in the LA arm and 3 (1.0%) in the CAR arm had HIV-1 RNA ≥ 50 copies/mL, meeting noninferiority criteria for the primary endpoint. Similarly, the LA arm was noninferior to CAR for the key secondary endpoint of HIV-1 RNA < 50 copies/mL (93% vs 95%). 3 LA and 4 CAR participants had confirmed virologic failure (CVF; HIV-1 RNA ≥200 copies/mL in consecutive samples). The LA CVFs included 1 with the NNRTI resistance-associated mutation (RAM) E138A, 1 with E138K + V108I (both having RAMs at position E138 in baseline DNA), and 1 with RT-E138E/K and IN-N155H. 4 CAR CVFs included 1 each of RAMs M184I, M184V + G190S, M230M/I, and 1 with no RAMs. In the LA arm, 231 participants (75%) had injection-site pain; 4 participants (1%) withdrew based on these events. Incidences of grade 3/4 and serious adverse events were similar across the LA and CAR arms; there was 1 death (CAR arm). After 44 weeks, participants in the LA arm reported significantly greater improvement from baseline in treatment satisfaction compared with those in the CAR arm (HIVTSQs).

Conclusions: The regimen of monthly injections of CAB LA + RPV LA was noninferior to continued 3-drug oral ART at Week 48. The LA regimen was generally well tolerated, with low rates of serious adverse events and drug- or injection-related withdrawals. Virologic failure was infrequent in both arms.

P78

Procalcitonin and lung ultrasonography point-of-care testing to decide on antibiotic prescription in patients with lower respiratory tract infection at primary care level: interim analysis of a pragmatic cluster randomized trial

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Context/Aims
Whilst 60% of outpatients with lower respiratory tract infection (LRTI) receive antibiotics, only 5-12% have community-acquired pneumonia (CAP) requiring this treatment. Overlapping clinical presentations within the spectrum of LRTI and the limited accuracy of chest X-ray make this diagnosis challenging.
Procalcitonin (PCT) is a sensitive tool to decide on antibiotic prescription in LRTI patients. Lung ultrasound (LUS) can detect lung consolidation in CAP, compensating for the insufficient specificity of PCT.
We aim to present the results of the interim analysis of a trial evaluating the use of an algorithm combining PCT and LUS(UltraPro) to decide on antibiotic prescription for LRTI at primary care level.
Materials/methods
Three-arm pragmatic cluster randomized open controlled trial. The three arms are PCT and LUS-guided therapy (UltraPro), PCT only-guided therapy and usual care. General practitioner (GP) is the unit of randomization. GPs screen consecutive adult patients with acute cough and include those with clinical pneumonia. Exclusion criteria are previous antibiotics for the current episode, working diagnosis of sinusitis or non-infectious disorders, severe underlying lung disease, severe immunosuppression, admission, pregnancy, inability to provide informed consent and unavailability of the GP. Patients fill in a 28 day-symptom diary and phone interviews take place on days 7 and 28. The primary outcome is the proportion of patients prescribed any antibiotic up to day 28. We report the following secondary outcomes: clinical failure by day 7 (death, hospital admission, no amelioration or worsening of relevant symptoms) and episode duration as defined by symptom score by day 28.
Results
42 GPs in South-Western Switzerland. Patient inclusion started in September 2018 and will last until March 2020. 1158 patients with acute cough screened of which 150 with clinical pneumonia included (target sample size 630). Mean age 50.7 years (SD 18.3), 55.5% female, 25.3% with a least one comorbidity. 9% of patients with PCT value above cut-off and 10% of patients in UltraPro arm having had a LUS (all with an infiltrate). At 28 days, 44.4% of patients in the usual care arm received antibiotics against 33.3% in the PCT arm and 22.6% in the UltraPro arm. No differences in rates of clinical failure.
Conclusion
It is safe to use the UltraPro algorithm in this context. Its use could potentially diminish inappropriate antibiotic prescription.

P79

Treatment of patients hospitalized for seasonal influenza with Oseltamivir has no benefit

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Background: The effect of treatment with oseltamivir in patients with seasonal influenza is unclear. Most available data are obtained from pandemic influenza or in the ambulatory setting.
Methods: We retrospectively reviewed medical records of two hospitals with different Influenza treatment policies. Hospital A had a liberal policy towards treatment with Oseltamivir, hospital B was rather reluctant. We compared the outcomes of patients treated in the two hospitals and the outcome of Oseltamivir vs. only symptomatic treatment.
Primary endpoints were length of stay and duration of fever. Secondary endpoints were in-hospital and 30 day mortality, secondary bacterial pneumonia , secondary transfer to ICU and 30 day rehospitalisation. Patients were stratified for gender, age, DM, coronary heart disease, congestive heart failure, oxygen saturation at admission, COPD, renal failure, immunosuppression, malignancy and Charlson comorbity Index. Patients directly admitted to ICU were excluded from the analysis. We compared Hospital A with Hospital B and Oseltamivir treated vs only symptomatic treated patients with students t-test and logistic regression.
Results : 333 patients were analysed. 79/333 patients had Influenza A, 252/333 Influenza B, 2 had combined A and B. 197 were admitted to Hospital A and 136 to Hospital B. Overall, 149/333 patients received Oseltamivir. Baseline characteristics of patients from Hospital A and Hospital B as well as Oseltamivir and only symptomatic treated patients were not different (p= n.s.). Significantly more patients in Hospital A received Oseltamivir (62 vs 18%; OR 7.67, CI 4.53-12.9, $p < 0.001$)
However, between the two hospitals no difference was seen neither in primary (LOS: 7.4 vs 7.8 days, p=0.45/ fever days 1.2 vs 1.2 days) nor in secondary endpoints. Also, in Oseltamivir vs only symptomatic treated patients, no differences in primary and secondary endpoints were observed.
Conclusion : In the studied Non-ICU population hospitalized with seasonal influenza, treatment with Oseltamivir did not result in improved outcome.

P80

Trained immunity protects mice from Escherichia coli peritonitis

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Background
The innate immune system is the first line of defense against infections. Contrary to a long believe, the innate immune system recalls a previous challenge to mount a robust response to a secondary heterologous challenge. This phenomenon, described more than 50 years ago in plants as systemic acquired resistance and 15 years ago in crustaceans and insects, was recently demonstrated to exist in mammals and was termed “trained immunity” (1-3). Trained immunity is typically induced using C.albicans β-glucans to prime the immune system. Trained immunity protects mice from systemic staphylococcal and Candida infections, but whether trained immunity protects from other infections remains unknown. Here we developed a mouse model to address the impact of trained immunity on bacterial peritonitis.
Aim
To assess the impact of trained immunity on host defenses against E. coli peritonitis.
Methods
Mice were trained with β-glucans (1 mg i.p. at days 7 and 3 prior to infection). Peritoneal lavage was performed to analyze cell populations by flow cytometry (n = 4-5). Mice (n = 12-13) were challenged with E.coli O18 (5x10e4 cfu i.p.) and bled 18h later to quantify bacteria and cytokines (Luminex). Weight and severity score were recorded twice daily.
Results
The peritoneal cavity of trained mice contained more leukocytes, PMNs and small peritoneal macrophages (109+/-32 vs 37+/-13, 24+/-21 vs 0.4+/-0.2 and 11+/-3.2 vs 0.6+/-0.2 x 10e5 cells/ml, mean+/-SD in trained vs non-trained mice, $P < 0.02$), similar numbers of T cells and B cells, and decreased numbers of large peritoneal macrophages (0.6+/-0.3 vs 12.7+/-3.6 x 10e5 cells/ml, $P = 0.016$). Upon infection with E.coli, trained mice displayed reduced severity scores ($P < 10e-4$), controlled E.coli dissemination into the blood (0+/-0 vs 6.7+/-9.2 x 10e7 cfu/ml, $P < 10e-3$) and survived better (Survival: 92% vs 23%, $P < 10e-3$) than control mice. Protection in trained mice was associated with strongly increased circulating levels of cytokines (5 to 325-fold more cytokines in trained mice, $P > 0.01$ for CCL3, CCL4, CXCL10, IL1β, IL6, IL10, IL17, IL22, IL23 and TNF).
Conclusions
Trained immunity protects mice from E.coli peritonitis by favoring the accumulation of neutrophils and bactericidal small peritoneal macrophages and the decrease of anti-inflammatory large peritoneal macrophages in the peritoneum. Our findings support the development of trained immunity based-therapeutic strategies against bacterial peritonitis.

Additional information:
1. Netea et al. Cell Host Microbe. 2009;9:355-61.
2. Netea et al. Science. 2016;352(6284):aaf1098.
3. Netea et al. Cell Host Microbe. 2019;25:13-26.

P81

Soluble CD74 (sCD74) and macrophage migration inhibitory factor (MIF) show distinct, highly specific, age-dependent profiles in healthy individuals

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Background and aim. CD74 encodes for the MHC-II-associated invariant chain. A portion of CD74 is expressed at the cell surface where it acts as a bona-fide receptor for the proinflammatory cytokine MIF. The binding of MIF to CD74 expressed by immune cells initiates proliferation, survival and inflammation. Cell surface CD74 shedding produces sCD74 which acts as a decoy receptor blocking MIF biological activity. Since MIF has age-dependent expression and rises in septic adult patients (1-3), the goal of the project was to develop an ELISA to address whether sCD74 blood levels parallel MIF levels in healthy subjects and increase in septic patients.
Methods. Recombinant sCD74 was produced in E.coli and purified by HPLC. An ELISA was setup using recombinant sCD74 as a standard (0.12-125 ng/ml) and commercial anti-CD74 polyclonal (coating) and monoclonal (detection) antibodies. sCD74 and MIF were quantified in the blood of preterm (24-36 weeks of gestation; n=10) and term (n=17) newborns, infants (1-12 months; n=7), children (1-16 y; n= 14) and adults (> 16 y; n=11).
Results. sCD74 levels were 8.5 ± 3.2, 10.3 ± 3.8, 19.1 ± 4.9, 16.5 ± 2.5, 11.6 ± 2.2 and 9.7 ± 4.1 ng/ml, while MIF levels were 53.6 ± 17.6, 89.6 ± 27.7, 8.5 ± 3.2, 6.7 ± 3.1, 6.0 ± 4.1 and 5.9 ± 4.3 ng/ml in preterm newborns, term newborns, infants, 1-5 years old children, 5-16 years old children and adults, respectively.
Conclusions. sCD74 levels are highest in infants and lowest in preterm newborns and adults, while MIF levels are highest in term newborns and similarly low in infants, children and adults. Thus, sCD74 and MIF have different developmental expression profiles. Low levels of sCD74 combined with high levels of MIF may help to counter balance the immunosuppressive environment of newborns and balance neonatal immune responses. The next step will be to quantify sCD74 and MIF in septic patients.

Additional information:
1. Roger et al. PNAS 2016;113:E997
2. Savva et al. PNAS 2016;113:3597
3. Roger et al. Front. Immunol 2017;8:26

P82

Innate lymphoid cells (ILCs) during S. pneumoniae pneumonia

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Background. ILCs arise from common lymphoid progenitors. Based on the cytokine they produce and the transcription factors that regulate their development and functions, ILCs are divided into ILC1, ILC2 and ILC3 that mirror CD4+ Th1, Th2 and Th17 cells, and natural killer (NK) cells that mirror CD8+ cytotoxic T cells (1). ILCs are enriched at mucosal surfaces and participate in tissue homeostasis and immune protection. In response to cytokines and alarmins released locally, ILCs produce cytokines that shape innate and adaptive immune responses. For example, we have recently identified IL-1 receptor 8 (IL-1R8) as a central checkpoint of NK cell maturation and effector functions (2). The role of ILCs during parasitic infections is well documented, but their role during bacterial infections is poorly characterized.
Aim. To characterize ILCs in a mouse model of Streptococcus pneumoniae pneumonia by analyzing: A) the number and proportion of ILC1/2/3, B) the impact of IL-1R8 genetic deletion on ILCs and host response.
Methods. IL-1R8+/+ and IL-1R8-/- mice (n=4-13) were injected i.n. with S.pneumoniae. Blood, BAL and lungs were collected after 0, 12 and 36 h to quantify: A) bacteria, B) immune cell populations, C) cytokines, and D) IL-1R8 expression.
Results. S.pneumoniae multiplied in lungs. The number of ILCs in lungs was stable during infection (3-5 ± 2-3 x 10e4 ILCs). The proportions of ILC1/2/3 (% of total ILCs, mean ± SD, t = 0, 12 and 36 h) were: A) ILC1: 92.2 ± 2.3, 88.8 ± 2.4, 94.5 ± 1.6, B) ILC2: 7.4 ± 2.0, 10.5 ± 2.7, 5.6 ± 1.5, and C) ILC3: 0.3 ± 0.2, 0.7 ± 0.9, 0.3 ± 0.2. The number of PMNs in BAL and lungs and, to a lesser degree, monocytes and macrophages in lungs raised gradually during infection. Blood collected at 36 h contained 2.7 ± 1.6 ng/ml CXCL1 (a chemokine attracting PMNs) while IFNg, IL-4, IL-5, IL-17A and IL-22 were not detected. IL-1R8 was expressed by lung ILCs. IL-1R8 knockout mice behaved like wild-type mice following S.pneumoniae infection in terms of bacterial burden, ILC1/2/3 counts, and inflammatory parameters.
Conclusions. The number and proportion of ILC1/2/3 during experimental pneumococcal sepsis are stable and do not seem to be influenced by IL-1R8 expression. Further work will analyze the impact of IL-1R8 on the function of ILCs (i.e. cytokine release) during infection, and whether blood ILCs are affected in patients developing sepsis.

Additional information:
1: Vivier et al. Cell. 2018;174:1054.
2: Molgora et al. Nature. 2017;551:110.

P83

Prevalence of Diabetes Mellitus and Association of Plasma Glucose with Rifampicin and Isoniazid Serum Concentrations Among TB/Hiv Co-Infected Patients in Uganda

F Wyrsch

Spital Oberengadin

Background/Objective
Strong efforts have been undertaken to curb tuberculosis (TB); however, these efforts may be undermined by the growing epidemic of diabetes mellitus (DM). The risk of developing TB, of TB treatment failure, relapse, and death increases 2-4 fold in patients with DM. On a global scale, up to 15% of TB cases might be attributable to DM. Our goal was to determine the prevalence of diabetes mellitus and impaired fasting glucose (IFG) in TB/HIV co-infected patients at a large tertiary TB/HIV-clinic in Uganda. Further, to investigate the association of fasting plasma glucose (FPG) with rifampicin and isoniazid serum concentrations.
Design
This is a subanalysis of data from the observational study entitled "Study on Outcomes related to TB and HIV drug concentrations" (Sekaggya et al., Clin Infect Dis., 2018). Participants were enrolled at the Infectious Diseases Institute, Kampala, Uganda. All participants were HIV-infected adults with newly diagnosed pulmonary TB. Data were obtained at week 2, 8 and 24 of TB treatment. The maximum serum drug concentration (Cmax) of rifampicin and isoniazid was estimated from the maximum value of the 1, 2 or 4-hour serum concentrations post dosing. Glucose was measured in a venous blood sample, DM was defined as fasting plasma glucose (FPG) ≥ 126 mg/dL and impaired fasting glucose (IFG) as a FPG of 100-125 mg/dL.
Results
A total of 107 patients were included in this analysis. FPG ≥ 126 mg/dL was found in 8/41 (19.5%) participants at week 2, in 3/63 (4.8%) at week 8, and in 3/89 (3.4%) at week 24. IFG was found in 23/41 (56.1%) at week 2, in 31/62 (50.0%) at week 8, and in 39/89 (43.8%) at week 24. The median FPG decreased significantly during TB treatment ($p < 0.01$). The estimated maximum rifampicin and isoniazid concentrations were inversely correlated to FPG in the adjusted linear regression model with logarithmic transformed variables ($p < 0.01$ and $p = 0.02$, respectively).
Conclusion
Our results confirm previous reports on a high prevalence of DM in the early phase of TB treatment and a gradual decrease of FPG during TB treatment. A high prevalence of IFG (44%) at the end of TB treatment was documented. Further studies are needed to determine the potential progression to overt DM and TB relapse in these patients with IFG.
Higher FPG levels were associated with lower Cmax of isoniazid and rifampicin, however, the magnitude of this association was small, and it is unclear if this is of clinical significance.

Additional information:
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P84

Evaluation of storage and extraction methods for salivary microbiota to discriminate individuals in forensics

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Background:
Salivary microbiota is described as different among individuals and stable over time. Analyzed by 16S rRNA metagenomics, it could constitute a footprint allowing to discriminate individuals in forensic settings. To validate this approach, we first designed an experiment to optimize preanalytical parameters and assess the effect of extraction kits, storage time and temperature.
Methods:
Saliva from two healthy donors was pooled. DNA of one fraction was directly extracted (D0) while the rest was stored at -20 or 4°C and extracted after 1 (D1) or 7 (D7) days. For each storage condition, 3 extraction kits (Macherey-Nagel NucleoSpin Soil, Molzym Ultra-Deep Microbiome, Qiagen QIAamp DNA Microbiome) were used on technical triplicates and one positive control (ATCC-2002 mock community). DNA library was prepared following the V3V4 16S rRNA Illumina protocol and sequenced on MiSeq. Human and bacterial DNA was quantified by qPCR.
Results:
Dominant genera and their relative abundance diverged between storage conditions and extraction kits. Storage at 4°C allowed Pseudomonas to grow, precluding the use of this storage condition. Bacteria of the Prevotella genus significantly decreased over time with the QIAamp Microbiome only. Interestingly, both the Ultra-Deep Microbiome and the QIAamp Microbiome include a step with an endonuclease to degrade exposed DNA but only the latter effectively depleted human DNA. Strains from the ATCC mock community were best recovered with the NucleoSpin Soil kit. Altogether these results suggest that the DNA of dying bacteria is exposed and potentially degraded by active endonucleases, thus unpredictably biasing microbiota assessment.
Conclusions:
Our results exemplify how preanalytical factors can have unpredictable effects and therefore must be tested ahead of studies. The results allowed to define a robust protocol currently applied on salivary samples collected at four timepoint over 13 months from 28 pairs of monozygotic twins.

P85

The Composition and Clinical Relevance of The Blood Virome in Febrile Tanzanian Pediatric Outpatients by Unbiased Next Generation Sequencing.

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BACKGROUND
Viruses are present in every human tissue with associations spanning from integral parts of the heritable human genome, to tolerated guests or unwelcome infections. Together, this diverse and changeable group of viruses comprise the human virome. The composition and role of the virome in human blood is largely unknown. We previously benchmarked a technique of unbiased next generation sequencing able to detect genetic traces of all vertebrate viruses. This retrospective cohort study investigates the potential clinical relevance of its extreme sensitivity by describing the composition and clinical associations of the blood virome in 803 febrile paediatric (2-59 months) Tanzanian outpatients.
RESULTS
We found 62 viruses (25 RNA, 37 DNA) across 20 families, including several viruses novel to human blood from the Astroviridae, Circoviridae, Genomoviridae, Parvoviridae and Papilloviridae families. At least 1 virus/sample was detected (median = 3; IQR = 1-8; range = 1-9). Most DNA viruses comprised ubiquitous commensal viruses (UCVs) of the Anelloviridae family; and 37% of samples (n = 298/803) had only UCVs detectable. Patients with >1 non-UCVs were 3.6 months younger than those with none (CI95 = 1.7-2.4; $p < 0.001$). Amongst numerous clinical associations, many aligned with known presentations. For example, children carrying classic gastroenteritis viruses were more likely to present with vomiting (Rotavirus: RR=2.0, p=0.001. Norovirus: RR = 5.4, p = 0.001); rhinoviruses were associated with pneumonia (RR = 2.8, p = 0.050); roseola viruses tended to present in younger children with fever only (RR = 1.4, p = 0.050); and HIV-1 was associated with higher severity (RR = 6.2, p = 0.019).
CONCLUSION
Thus, we present a highly diverse virome with a wealth of clinical associations, many of which aligned with expected presentations. However, the complexity of these findings blurs human comprehension, and we conclude that the use of such high-resolution data would require objective pattern detection algorithms for unbiased validation. Further the results still need to be complemented by conventional techniques before they could be used at a clinical level.

P86

Evaluation of the KROBS card game for teaching of microbiology to medical students.

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Background:
KROBS is a playful card game developed at the Institute of Microbiology of the CHUV with the help of professionals in game edition and game illustration. It features 20 pathogenic microbes classified according to their mode of transmission, with illustrations highlighting risks associated to infection and preventive measures. While originally targeting the general public, we are here evaluating the pedagogic potential for medical students of this game integrated in teaching sessions.
Methods:
Three one-hour teaching sessions based on KROBS were organized for 2nd year medical students of the Lausanne University during Fall 2018. Students played in groups of 4 to 5. For each group, a teacher instructed beforehand quickly exposed the rules, challenged the students with questions and provided them with insights on the microbes in play. To assess learning, a multiple-choice questionnaire containing 48 theoretical questions covered by KROBS (n = 28) or not (n = 20) was submitted to all students (over 200) before and after these sessions. A qualitative questionnaire on the learning experience was submitted too.
Results:
Progress in answers correctness was calculated for each student who answered twice to the questionnaire. Students progressed significantly more in their answers to the questions covered by KROBS than for the ones not covered by the game (32.1 ± 14.1% vs 10.6 ± 8%; $p < 0.001$). Interestingly, this progress was only observed for students who attended 2 or 3 sessions, highlighting the specific effect of playing with the Krobs game during the interactive teaching sessions. On the opposite, visit of the KROBS website did not appear to impact much the knowledge of students. In qualitative assessment, students were highly positive in their evaluations with over 80% of positive answers regarding the game-play and whether they had fun.
Conclusions:
Our results highlight the interest of game-based teaching in microbiology, where students must learn a large number of microbes' names and various concepts. Therefore, a specific version of a similar game specifically dedicated to medical students with the 50 more important microbes should be developed.

P87

Managing Influenza in a nursing home: Insights from the 2019 Delémont Outbreak

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Introduction:
Influenza virus is a major threat to elderly patients with significant morbidity and mortality. Due decreased immunity of elderly patients and its propensity to propagate, the virus readily causes outbreaks in health care settings. To address this threat, current prevention strategies rely on vaccination of both patients and caregivers and in the setting of an outbreak, droplet precautions and prophylaxis with oseltamivir.
Purpose:
Here, we report on the recent outbreak in one of the nursing homes within our healthcare network composed of 4 secondary centers and 2 nursing homes.
Results:
In a retirement home facility embedded into the hospital network of the canton of the Jura with 102 patients, we experienced an outbreak of 17 cases of influenza A diagnosed by PCR on nasopharyngeal swab (13 cases H1N1, 1 case of H3N2 and 3 cases with no subtype available), 11 of which were documented on day one. A preemptive therapy strategy was implemented with all patients in direct contact with influenza-positive patients being put on therapeutic rather than preventive regimen. 6 more patients developed symptoms and were confirmed positive on day 2 with no new cases as of day 3. Vaccination rate among the patients was 61% but 85% amongst patients positive for Influenza. Amongst personnel, vaccination rate was 37.5%. On day 1, prophylaxis was offered to all personnel and taken up by 21 of 80 collaborator (26.5%) and personnel protection with mask carriage was made mandatory for all workers in contact with patients. After 9 days, all quarantine measures were lifted after all patients had defervesced for over 72h and had clinical improvements. Of the seventeen patients, none was transferred for further care to the affiliated hospital. Two patients were diagnosed on a clinical basis with a bacterial superinfection and treated with amoxicillin/clavulanate and one patient died due to termination of care as per patient advanced directives.
Conclusions:
In a setting with limited medical resources such as a nursing home, the preemptive use of therapeutic oseltamivir combined with a strict isolation rapidly enabled the control of an influenza outbreak. No transmission to personnel occurred.

P88

Hospital-based surveillance of influenza in Switzerland – a pilot study

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Introduction
Until 2018, the national reporting system for influenza in Switzerland was twofold with: 1) voluntary reports of influenza-like illness (ILI) by selected primary care clinicians. 2) weekly reports of laboratory-confirmed cases. No national surveillance system existed for hospitals. With support from the Federal Office of Public Health (FOPH), we developed a pilot study for hospital-based influenza cases in Switzerland.
Methods
Three university hospitals and three cantonal hospitals participated. Data collection followed WHO recommendations using a standardised questionnaire that included demographic data, information on the influenza episode and optional information about the patient's health. Data were directly entered into a secure web-based REDCap database at the participating sites. Data quality checks and descriptive analyses were done weekly, and results were reported back to the sites.
Results
From 01.11.2018 to 26.02.2019, 1260 cases of influenza were announced. Three hospitals declared 68.8% of cases (site 1 - 35.5%; site 2 - 16.1; and site 3 - 17.2%). The Influenza epidemic started during the week 2018-47 in Western Switzerland, and three to four weeks later in other sites. Most patients were old adults (66.7% over age 65). The majority of cases (98.1%) was due to Influenza A; Influenza B was reported in 36 infants. Most cases were diagnosed in medicine (51.6%) and geriatrics (11.5%). The proportion of nosocomial cases was 30% during the beginning of the season, and decreased to 20% in recent weeks, with substantial variation between sites.
Conclusions
Our pilot system allowed us to get a better understanding of the morbidity and spread of severe influenza cases in Switzerland. Simplification of the questionnaire, direct import of existing data, automated analyses, and additional tools for epidemic management will help to reduce the workload and ensure that all data are entered in time. Inclusion of other hospitals is needed.

P89

Bacterial colonization of handheld devices in a tertiary care setting: a hygiene intervention study

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Background & aim: Tablet computers are increasingly being used in hospital patient care and are often colonized with important human pathogens, while the impact of disinfection interventions remains controversial. Our aim was to examine the change in colonizing bacteria on tablet computers before and after the introduction of a mandatory twice daily tablet disinfection intervention.
Method: In a prospective hygiene intervention study we consecutively sampled tablet computers exclusively used in a high-resource general internal medicine tertiary care setting with high routine hygiene measures. Microbial identification was performed by conventional culture, and the association of bacterial colonization with the intervention was investigated using logistic regression.
Results: In a total of 168 samples we identified colonizing bacteria in 149 (89%) of samples. While the most commonly identified species were normal skin bacteria, Staphylococcus aureus found in 18 (11%) of samples was the most frequent potential pathogen. We did not detect any enterococci or Enterobacteriaceae. The disinfection intervention was associated with substantially less overall bacterial colonization (odds ratio 0.16; 95%-CI 0.04-0.56), while specific colonization with Staphylococcus aureus was only slightly decreased (odds ratio 0.46; 95%-CI 0.16-1.29).
Conclusion: Our results indicate that a twice daily disinfection can still substantially reduce bacterial colonization of in-hospital tablet computers used in a high-resource and high hygiene setting.

P90

100% cotrimoxazole resistance in Escherichia coli isolates from urine samples among HIV-infected patients at a clinic in Kampala, Uganda

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Introduction: Antimicrobial drug resistance (AMR) is one of the top ten threats to global health according to the World Health Organization. Urinary tract infections (UTIs) belong to the most common bacterial infections and are one of the main reasons for the prescription of antibiotics. Sub-Saharan African region which has a high burden of infectious diseases is particularly vulnerable to the threat of antimicrobial resistance. Furthermore, there is poor surveillance of AMR in this region.
Methods: A cross-sectional study was conducted as part of routine surveillance at an outpatient HIV-clinic in Kampala, Uganda. In total, 200 patients aged 18 years and above showing symptoms suggestive of UTI were included in the study. Midstream urine samples were analyzed, and urine cultures were subjected to antibiotic sensitivity testing.
Results: Out of the 200 patients, 123 (62%) were female. The median age was 40.1 years for females and 43.9 years for males. Only 32 (16%) showed bacterial growth. Escherichia coli was the most commonly isolated uropathogen (72%), followed by Klebsiella pneumoniae (9%). The sensitivity of E. coli towards ampicillin and cotrimoxazole was 0%; towards ciprofloxacin and ceftriaxone was at 56% and 65% respectively; towards gentamicin 90.9%; towards nitrofurantoin and imipenem was 100%.
Conclusion: Most isolated uropathogens showed complete resistance to ampicillin and cotrimoxazole, as well as low sensitivity to ciprofloxacin and ceftriaxone. Sensitivity was high towards nitrofurantoin, imipenem and gentamicin. These findings concur with the Uganda treatment guidelines which recommend nitrofurantoin as the drug of choice for the treatment of uncomplicated UTIs. It is noteworthy that the majority of cultures showed no bacterial growth. This is a concern and further studies are needed to address the reasons behind the low rate of bacterial growth on urine culture.

P91

Influenza - associated aspergillosis in critically ill patients in two Swiss centers during the 2017/2018 influenza season

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Background: Influenza infection was recently reported as an independent risk factor for invasive aspergillosis (IA) which is associated with high mortality. We aimed to describe prognostic factors for influenza associated IA (IAA) and prognostic factors for poor outcome in critically-ill influenza patients.
Methods: All adult patients with confirmed influenza admitted to ICU at two Swiss tertiary care centers during the 2017/18 influenza season were retrospectively evaluated regarding prognostic factors for IAA, death and poor outcome. IAA was defined by clinical, mycological und radiological criteria (1,2): a galactomannan of ≥ 0.5 ODI in serum and/or ≥ 1.0 in bronchoalveolar lavage or histopathological or cultural evidence in respiratory specimen of Aspergillus spp., any radiological infiltrate and a compatible clinical presentation. Poor outcome was defined as a composite of either hospital mortality of any cause, ICU length of stay (LOS) or intubation for > 7 days or requirement for extracorporeal membrane oxygenation (ECMO).
Results: Of 81 patients with influenza in the ICU, 9 (11%) were diagnosed with IAA (median age 58 vs. 68 years [p=0.21]; female 33% vs. 49% [p=0.49]; 5 of 38 patients [13%] with influenza A infection in patients with vs. those without IAA, respectively). All 9 patients with IAA had poor outcome compared to 26 (36%) patients without IAA ($p < 0.001$). Median ICU LOS and mortality were 17 (IQR 16) vs. 3 days (IQR 8.45, $p < 0.01$) and 3/9 (33%) vs. 13/72 (18%; p=0.37) in patients with and without IAA, respectively. Patients with IAA had significantly longer durations of antibiotic therapy, vasoactive support and mechanical ventilation. Aspergillus was the most common respiratory co-pathogen (9/40, 22%) followed by classical bacterial co-pathogens including Streptococcus pneumoniae, Streptococcus pyogenes and Staphylococcus aureus. IAA was independently associated with vasoactive support but not classical risk factors such as chronic respiratory diseases or immunosuppression.
Conclusions: Aspergillus is a relatively frequent superinfection in critically ill influenza patients. IAA was associated with poor outcome, higher mortality and longer duration of supportive therapies in critically ill patients with influenza. Given the absence of classical risk factors for aspergillosis, greater awareness is necessary and lower threshold for diagnostic testing for IAA should be considered in ICU patients, particularly those with vasoactive support.

Additional information:
1 Schauwvlieghe AFAD, et al. Lancet Respir Med. 2018:6:782.
2 Blot SI, et al. Am J Respir Crit Care Med. 2012:186:56.

P92

Accuracy of ICD-10 coding for sepsis and organ dysfunctions in children with blood culture-proven sepsis in Switzerland, results from the prospective Swiss Pediatric Sepsis Study

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Background:
The recent resolution on sepsis by the World Health Organization urges member states to better characterize the burden of sepsis. Sepsis coding based on the International Statistical Classification of Diseases and Related Health Problems (ICD-10) is widely used, however, there is a lack of paediatric data assessing accuracy of ICD-10 sepsis coding. In addition, the recent change in sepsis definitions implies a need for reliable coding of organ dysfunctions. We analysed accuracy of sepsis diagnosis based on ICD-10 codes in a prospective cohort of children with sepsis.
Methods:
We performed a multicentre, prospective cohort study at ten paediatric hospitals in Switzerland from 01.09.2011 to 31.12.2015, recruiting children younger than 17 years with blood culture-proven sepsis. For this analyses, we excluded prematurely born neonates and infants less than 7 days old at sepsis onset. We used 2005 consensus definitions - based on prospectively collected clinical and laboratory data - as the reference standard to define sepsis and organ dysfunctions. ICD-10 codes were extracted from mandatory official hospital discharge data related to the sepsis episodes at 9 study sites.
Results:
Of 750 episodes with blood culture-proven sepsis recruited in the participating hospitals, 500 (67%) were classified as sepsis by ICD-10 codes. 339 (45%) had at least one organ dysfunction according to 2005 consensus criteria and 265 (35%) according to ICD-10 codes; the accuracy of ICD-10 codes for organ dysfunction was 70%, sensitivity 55%, and specificity 81%. In 175 (23%) episodes multi-organ dysfunction syndrome (MODS) was present as per 2005 consensus criteria and in 107 (14%) with ICD-10 codes; the accuracy of ICD-10 codes for MODS was 64%, sensitivity 39%, and specificity 93%. Sensitivity of ICD-10 codes was especially poor for central nervous system (5%), hepatic (6%), respiratory (26%), and hematological dysfunction (28%), and only fair for renal (45%) and cardiac dysfunction (49%).
Conclusion:
Compared to the reference standard, ICD-10 codes underestimated incidence of sepsis, organ dysfunctions, and MODS and did not reliably depict organ dysfunctions in children with blood culture-proven sepsis.

P93

Fallbericht: Drei Fälle von Legionärskrankheit im Zusammenhang mit einer Autowaschanlage im Kanton Zürich

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Hintergrund und Ziele:
Im Kanton Zürich kam es 2018 zu drei Legionärskrankheitsfällen, die im Zusammenhang mit dem Besuch einer Autowaschanlage standen. Ziel dieser Beschreibung ist es, Prozesse rund um die Suche nach Infektionsquellen zu etablieren und zu verbessern und die diversen Stakeholder dafür zu sensibilisieren.
Material und Methoden:
Die Legionärskrankheit (LK) gehört in der Schweiz zu den meldepflichtigen Infektionskrankheiten. Sowohl die Laboratorien wie auch die behandelnden Ärzte müssen Legionellen-Infektionen dem Bundesamt für Gesundheit (BAG) und dem Kantonsärztlichen Dienst melden. Während der Kantonsärztliche Dienst zusammen mit dem Kantonalen Labor für die Massnahmen verantwortlich ist, liegt es in der Zuständigkeit des BAGs die erhobenen Daten auszuwerten und Häufungen im Hinblick auf die nationale Situation zu bewerten, die Koordination von Informationen sicherzustellen und Empfehlungen zur Ausbruchskontrolle und Prävention zu erlassen. Im Folgenden werden die Fälle und die Prozesse rund um die Quellenfindung beschrieben.
Resultate:
Die Expositionsabklärung von zwei kurz aufeinanderfolgenden LK-Fällen ergab, dass beide Personen während der Inkubationszeit die gleiche Auto-Waschanlage besucht hatten. Untersuchungen der Anlage ergaben, dass eine hohe Kontamination mit Legionella pneumophila der Serogruppe (Lp Sg) 3 vorlag. Später wurde ein dritter Fall gemeldet, der dieselbe Anlage ebenfalls während der Inkubationszeit benutzt hatte.
Alle Fälle wurden mittels Urin-Antigen-Test (UAT) diagnostiziert. Für eine Person war eine Sputumprobe verfügbar, die aber nicht weiter untersucht wurde.
Schlussfolgerungen:
Die Untersuchung hat gezeigt, dass Autowaschanlagen stark mit Legionellen kontaminiert sein können und dass die Anlage mit hoher Wahrscheinlichkeit die Infektionsquelle der drei Fälle war. Jedoch konnte im Wasser der Autowaschanlage nur Lp Sg 3 isoliert werden. Die Diagnose mittels UAT führt aber in der Regel zum Schluss, dass die Krankheit auf eine Lp Sg 1-Infektion zurückzuführen ist.
Diese Diskrepanz kann daraus resultieren, dass das positive Resultat des UAT durch eine Kreuzreaktion mit einem andern Lp Serotypen entstanden ist. Es könnte aber auch bedeuten, dass man aus dem Wasser der Autowaschanlage Lp Sg 1 nicht isolieren konnte, obwohl Lp Sg 1 vorhanden war. Schliesslich fehlt ein sicherer Beweis, dass die Autowaschanlage tatsächlich die Infektionsquelle war.
Liegt eine Sputum-Probe vor, soll sie wenn immer möglich, typisiert werden.

P94

Incidence and risk factors of neutropenic enterocolitis after myelosuppressive chemotherapy

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Background.
Neutropenic enterocolitis (NE) is a serious complication in patients receiving intensive chemotherapy for the treatment of onco-haematological diseases. Yet, the relative incidence of the disease and its risk factors among patients treated with different regimen is not well defined.
Methods.
The development of NE was analysed in 1223 neutropenic episodes from 692 onco-hematological patients receiving chemotherapy at the isolation Unit of CHUV who signed an informed consent (Swissethics 2017-01975). NE was defined by the presence abdominal signs and symptoms during neutropenic fever together with bowel wall thickening >4 mm in any segment by computed tomography or ultrasound. The incidence of NE and risk factors known at hospitalization baseline were analysed by using uni- and multivariate regression models according to the chemotherapy regimen, including those used for the induction of acute myeloblastic (AML) or lymphoblastic (ALL) leukemia and autologous hematopoietic cell transplantation (HCT).
Results.
A total of 72 episodes of radiologically-proven NE (5.9%) occurred; the percentage of NE was 16.3% for AML induction (e.g. HOVON-Sakk based protocol), 5.6% for autologous HCT using the BEAM protocol, 4.8% for ALL induction, 2.9% for AML salvage (e.g. CLAG or FLAG +/- idarubicin), 1.9% for autologous HCT using a non-BEAM protocol (e.g. melphalan) and 1.9% for the other types of chemotherapy (Figure 1). In the HCT population, the single independent risk factor for NE was BEAM versus non-BEAM HCT protocol (Odd Ratio=3.40, 95% confidence interval, CI 1.14-10.1, P=0.03). In AML patients, independent risk factors for NE included induction versus salvage chemotherapy (OR=3.87, CI 1.31-11.4, P=0.01), chemotherapy with amsacrine (OR=2.94, CI 1.40-6.21, P=0.005) and triple intrathecal chemotherapy (OR=2.03, CI 1.01-4.08, P=0.048).
Conclusions.
Susceptibility to NE is strongly influenced by the type of chemotherapy. Patients receiving salvage therapy for AML have a surprisingly low rate of NE, possible due to the concomitant use of G-CSF or an immunomodulaor effect of fludarabine or cladribine. Intrathecal chemotherapy has probably not a direct effect on NE but reflect the patients with high-risk AML quickly neutropenic or presenting a leukemic digestive infiltration.

P95

Cutibacterium avidum persists in the groin area despite surgical skin antisepsis: A potential risk factor for periprosthetic joint infections

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Aim: Periprosthetic joint infections (PJI) are increasing due to our elderly population with the need of a joint prosthesis. These infections are difficult to treat, because bacteria form biofilms within one day on the orthopedic implant surface. Notably, most of the current available antibiotics do not penetrate the biofilm or are not active against the sessile forms of bacteria. Therefore, prevention is key. In the current paradigm, bacteria from the skin surface or dermis - such as Staphylococcus aureus, coagulase-negative staphylococci, or Cutibacterium sp. – contaminate the periimplant tissue during surgery. Cutibacterium avidum, which has increasingly been reported in hip PJIs [1], colonizes the skin in the groin area in 32.3% [2]. We were wondering if standard skin antisepsis before hip arthroplasty is effective to eliminate C. avidum colonization in the surgical field.
Methods: In a single-center, prospective study, we preoperatively screened all patients undergoing a hip arthroplasty through a direct anterior approach for different skin bacteria in the groin area. Only in patients colonized with C. avidum, we intraoperatively searched for persistent bacterial growth during and after triple skin antisepsis with povidone-iodine/alcohol. For that, we collected skin scrapings after first and third antisepsis and biopsies from the dermis at the surgical incision, and evaluated bacterial growth and species. In addition, thin sections of the dermis biopsies were submitted to Fluorescence in situ Hybridization (FISH) using pan-bacteria probe EUB338.
Results: From October 2018 until April 2019, 60 patients (46.7% female) were screened. Patients were mainly colonized with coagulase-negative staphylococci (47, 78.3%), C. avidum (12, 20%), and Cutibacterium acnes (11, 18.3%). Intraoperative skin antisepsis of patients colonized with C. avidum was ineffective to eliminate any bacteria in 80% (8 out of 10) after the first and 40% (4 out of 10) after the third antisepsis. Focusing on C. avidum, antisepsis was ineffective in 40% (4 out of 10) and 20% (2 out of 10), respectively. Dermis biopsies were all culture negative but FISH showed positive ribosome-rich bacteria in 50%.
Conclusions: We show in our ongoing study that the commensal C. avidum resists the standard skin antisepsis resulting in a risk for intraoperatively acquired PJIs. Thus, new and more effective techniques to improve skin antisepsis are urgently needed.

Additional information:

1. Achermann Y et al. , Clin Infect Dis. 2018;66(1):54-63.
2. Böni L et al. , Clin Infect Dis. 2018;67(12):1878-1882

P96

Pre-clinical validation of Resistell's nano-motion Antibiotic Susceptibility Test on multiple strains with a focus on method's robustness and repeatability

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Rapid and accurate determination of microbial resistance to antibiotics is paramount to improve patient treatment and management. Resistell's antibiotic susceptibility test (AST) is based on microbial nanomotions of living versus dead cells in samples using atomic force microscopy cantilevers. Once an effective antibiotic is added, the vibration of cells attached to these cantilevers decrease. Resistell's method, is a unique growth-independent approach to determine drug susceptibility and takes minutes to hours. Conventional ASTs often take days. Here, we aimed to develop a robust and reproducible method using this nano-motion AST for several bacteria involved in bacteremia and sepsis: Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus and Enterococcus faecalis. In this study, nano-motion ASTs were performed on the pure strains (references strains and CHUV clinical isolates) grown on agar plates. Resistell's AST comprises the following steps: 1) preparation of the cell suspension 2) cell attachment to the sensor 3) signal acquisition in blank, growth medium, medium with addition of antibiotic and medium with killing agent 4) data analysis using Resistell's algorithm. Different steps of the process have been improved and validated, which enable reliable drug susceptibility tests as shown in figure 1. The example shows results using the improved protocol for E. coli strain ATCC25922. The same protocol is also used for K. pneumoniae, S. aureus and E. faecalis. Different strains, attachment methods, antibiotics and killing agents have been tested. The method is reproducible, has potential for clinical application in diagnostics and will be extended to other bacterial species and strains as well as other antibiotics.

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Surveillance for Clostridioides difficile infection (CDI): A diagnostic and epidemiologic challenge

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Background: Case definitions for CDI surveillance require (1) presence of diarrhea or evidence of megacolon or severe ileus and (2) a positive laboratory diagnostic test (LDT) result or evidence of pseudomembranes. However, LDTs are known for large differences in sensitivity and specificity and consensus regarding the best LDT is missing, hence influencing surveillance measures of CDI and thus comparability across institutions and countries. An increasing number of highly sensitive nucleic acid amplifications test (NAAT) kits are commercially available, which may detect not only patients suffering from CDI but also C. difficile carriers. We used a national survey to assess differences in testing algorithms currently being applied in Switzerland. We further aimed to estimate the proportion of stool samples positive for toxigenic C. difficile over a two-year period.
Materials/methods: We performed a questionnaire-based survey among all public and private microbiology laboratories participating in ANRESIS (www.anresis.ch), a national antibiotic resistance surveillance program. The selected laboratories are homogeneously distributed across Switzerland and represent at least 60% of all annual hospitalization days. The questionnaire referred to diagnostic algorithms in use for detection of toxigenic C. difficile and the number of stool samples collected in 2016 and 1017, as well as the proportion of specimens tested positive.
Results: Among all laboratories contacted, 90.5% (19/21) completed the survey. Substantial variability of methods used to detect toxigenic C. difficile was reported with five unique algorithms being followed across all 19 laboratories. Over the two-year study period, 68,848 specimens were tested and 8.9% were reported as being positive for toxigenic C. difficile. While 26% of laboratories used a NAAT only, 74% (14/19) of laboratories applied a 2- or 3-step testing algorithm: glutamate dehydrogenase antigen screening followed by NAAT in 50% (7/14) and in 50% with inclusion of an enzyme immunoassay (EIA) for detection of toxins A/B to increase the specificity as recommended by the new ESCMID diagnostic guideline.
Conclusions: Given the wide range of different diagnostic algorithms and performance characteristics of tests to detect toxigenic C. difficile, any surveillance program for CDI needs to consider testing methodologies for representation of the true burden of disease.

P98

Myeloid-derived suppressor cells (MDSCs) in endotoxemia

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Background. Myeloid-derived suppressor cells (MDSCs) are immature cells characterized by their immunosuppressive functions (1). MDSCs are subcategorized into polymorphonuclear MDSCs (PMN-MDSCs) and monocytic MDSCs (M-MDSCs). In cancer patients, blood MDSCs can represent more than 50% of all leukocytes and are considered as potential biomarkers and targets for adjunctive therapy. Preclinical studies revealed an important role of MDSCs in the pathogenesis of inflammatory and infectious diseases, but little is known in sepsis patients (2-3). Here we used human endotoxemia as a surrogate model of Gram-negative infections to study MDSCs.
Aim. To determine whether peripheral blood MDSCs subpopulations increase in healthy subjects infused with endotoxin.
Methods. Eight healthy subjects were infused i.v. with a bolus of E. coli O113:H10 endotoxin at a dose of 2 ng/kg. Blood was collected 0, 1, 2, 3, 4, 6, 8, 24 and 168 hours after infusion in lyophilized antibody staining DuraClone tubes (Beckman Coulter) to study MDSCs by flow cytometry. MDSCs were gated as CD3- CD19- CD56- CD11b+ CD33+ cells and divided into CD15+ CD16 low/inter PMN-MDSCs and CD14+ HLA-DR low/neg M-MDSCs.
Results. The median concentrations (x10e-3 cells/ml) of cells in blood collected 0, 1, 2, 3, 4, 6, 8, 24 and 168 hours after endotoxin infusion were: 1) neutrophilic granulocytes: 1602, 480, 1790, 2634, 4420, 5064, 5104, 3562 and 1846, 2) PMN-MDSCs: 22, 16, 365, 816, 1595, 2181, 2205, 90 and 34, and 3) M-MDSCs: 5.3, 0.2, 1.6, 2.4, 5.0, 11.0, 18.4, 10.1 and 2.7. Overall, PMN-MDSCs strongly increased 2h after endotoxin infusion, reached up to 43% of all granulocytes at 6-8h (100-fold increase versus baseline), and returned to baseline levels after 24h. M-MDSCs dropped 25-fold 1h after endotoxin infusion, quickly re-increased to reach 3.5 baseline values at 8h, and returned to baseline levels after 24h.
Conclusions. Blood counts of PMN-MDSCs rise substantially during endotoxemia. We are currently performing mass cytometry analyses to improve the immuno-phenotyping of MDSCs, and are extending our analyses to sepsis patients to define whether MDSCs may represent biomarkers for sepsis.

Additional information:
1. Veglia et al. Nat. Immunol. 2018;19:108-119
2. Venet & Monneret. Nat. Rev. Nephrol. 2018;14:121-137
3. Schrijver et al. Front. Immunol. 2019; Feb 27;10:327

P99

Skeletal muscle tuberculosis, a case report and a review of the literature

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Introduction: Mycobacterium tuberculosis (M. tb) mostly affects the lung. We describe here a rare case of a skeletal muscle tb and present a review of the literature.
Case presentation: A 31-year old woman from Uganda was referred because of cough, arm swelling and dysphagia. She had no prior medical history or contacts with patients (pt) with tb. An indolent, regular and mobile mass of the left triceps brachii was found. Lung CT showed a parenchymal consolidation, masses suggestive of granulomas, one cavitation and lymph node enlargement. MRI showed a contrast-enhanced mass in the triceps brachii. Sputum smear as well as a fine-needle aspiration (FNA) of the arm were positive for acid-fast bacilli (AFB) and M. tb PCR.
Isoniazid/pyridoxine (INH/Vit. B6), rifampicin (RIF) pyrazinamide (PZA), and ethambutol (EMB) were started. Culture of sputum and FNA became positive for M. tb. We stopped EMB after 4 weeks and PZA after 2 months since the strain was susceptible to all four drugs. We continued for another 7 months with INH and RIF. No relapse occurred 6 months after treatment.
Literature Review: We reviewed the English literature in PubMed and included microbiologically proven skeletal muscle tb infections.
Results: We found 105 cases of tb infection of the skeletal muscle, including ours. Median age was 40 [Interquartile range, 40–53]. 44% of pt were female. 8 of 29 pt with HIV testing information were positive (28%). 12 of 25 pt with available information were immunosuppressed (24%). 100% of M. tb PCR and 98% of culture of muscle probes were positive. AFB were found in 76% of cases. 52% of pt had isolated muscle infections. 14% and 10% had a coinfection of a distant resp. contiguous organ. Paraspinal and iliopsoas muscles were mostly affected (37%). 39 pt (37%) were treated with tb drugs and surgery (for diagnostic purpose) and 25 with drugs alone (24%). Therapeutic surgery was performed in 8 pt (8%).
Discussion: Incidence of muscle tb is very low and occurs in young people. It is mostly accompanied by involvement of a distal or contiguous organ but can occur isolated. Coinfection with HIV is frequent. Diagnosis and treatment recommendations are lacking. Diagnosis should be based on muscle probes for M. tb PCR and/or culture. Tb drugs remain the cornerstone for skeletal tb. The role of surgery is unknown and surgery should be reserved for diagnostic purposes if FNA is not feasible, large abscesses, compressions of adjacent structures or bone instability.

P100

Quantifying cellular fitness of methicillin susceptible and resistant Staphylococcus aureus strains: a high-throughput method

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Background: To evaluate changes in cellular fitness of bacteria after acquisition of antimicrobial resistance, a scalable high-throughput method to analyze bacterial growth on agar is desirable. For this purpose we aimed to adapt a quantitative fitness analysis (QFA) method established for yeast cultures to bacterial use.
Method: In QFA, bacterial cultures are spotted in a predefined array on agar plates and photographed sequentially while growing in neighborly competition. These time-lapse images are analyzed using a purpose-built open-source software to derive image density values for each culture spot. Fitness, defined as the product of maximum doubling rate and maximum doubling potential, is calculated from parameters of a generalized logistic growth model fitted to optical density values of each culture. For QFA adaptation and validation, we used Staphylococcus aureus methicillin resistant (MRSA) JE2 and methicillin susceptible (MSSA) Cowan strains, as well as an invasive clinical isolate CI1149 (MSSA). Image density values were matched to colony-forming unit (CFU) counts for image segmentation validation using linear regression after log-transformation.
Results: Overall, QFA permitted the construction of growth curves from semisolid agar plates and fitting of a generalized logistic model in all strains of S. aureus. Image density values showed a strong correlation with the total CFU count per spotted culture ($p < 0.001$). Fitness was derived for 60 culture spots (20 per strain) with mean (SD) fitness ranging from 1366 (430) for Cowan to 1754 (364) for JE2 and 1871 (341) for CI1149. Linear regression suggested a substantial higher fitness of JE2 ($p = 0.002$) and CI1149 ($p < 0.001$) than Cowan (reference).
Conclusion: QFA is a viable method to analyze fitness of S. aureus and can detect substantial fitness differences between an MSSA Cowan strain, MRSA JE2 and MSSA CI1149 strain. QFA is likely to be applicable to bacteria of other species and may help to predict epidemiological persistence of antimicrobial resistant bacterial pathogens.

P101

Vaccine injection in the deltoid zone: needle length and anatomical risks. An observational transverse study and a cadaveric study.

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Context and Objectives:
Intramuscular injection into the deltoid muscle is one of the safest and most used techniques to administer vaccines. However, iatrogenic axillary nerve lesions following intramuscular injections have been reported in the literature.
The objective of the study was to determine the location of the product injected through an intramuscular injection into the deltoid muscle using standard vaccination procedure, in regard to the position of the deltoid branch of the axillary nerve and to the tissue thickness of the deltoid area in an adult population.
Material and Methods:
This study had two components. An anatomical study to investigate the location of methylene blue injected using standard procedures in 40 cadaveric shoulders. A clinical study carried out in 150 volunteers injected with an influenza vaccine to perform morphological measurements, namely Middle Upper Arm Circumference (MUAC) and tissue thickness in the deltoid region, by ultrasonography for the latter.
Results & Discussion:
The anatomical study showed that the injection needle and product were in the direct proximity of the axillary nerve when an intramuscular vaccination was performed into the deltoid muscle with a 30mm needle.
In the volunteer population, the measurement of the tissue thickness showed that the use of a 30 mm needle would lead to up to 73 % of over penetration, and that of a standard 25 mm vaccination needle would lead to up to 38 % of over penetration. This, as shown through the anatomical study, can put the deltoid branch of the axillary nerve at risk.
In the volunteer population, the Middle Upper Arm Circumference (MUAC) had a strong correlation to the total tissue thickness at the injection point ($r= 0,667$; $p < 0,001$). This relationship allowed to use the MUAC to predict total tissue thickness. By using the MUAC as an extra measurement for the choice of needle, the risk of over penetration could be reduced to 7%.
Conclusion:
This study shows that standard vaccination procedures can lead to over penetration when using a standard 25 or 30 mm needle, therefore putting the deltoid branch at risk. Better selection of needle length using the Middle Upper Arm Circumference as a surrogate of tissue thickness would probably be a safer procedure in order to prevent adverse event following immunization (AEFI).

P102

The Effects of Corticosteroids on The Respiratory Microbiome, A Systematic Review

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Background: Since its discovery the respiratory microbiome has been implicated in the pathogenesis of multiple pulmonary diseases. Several studies have investigated the effects of corticosteroid (CS) treatments on this microbiota habitat. We are in the preliminary stages of a systematic review of studies investigating this question.
Methods: This systematic review will be conducted according to PRISMA guidelines. Embase, Medline and Cochrane Central Register of Controlled Trials (CENTRAL) databases will be systematically searched for all observational or controlled studies comparing the microbiome parameters of patients receiving CS with those not receiving CS. The primary outcome of interest are changes in the diversity, composition and burden of the respiratory microbiome as assessed by culture-independent molecular techniques. Potential confounders such as birth mode, antibiotic treatment, probiotics, diet and comorbidities will be included as secondary outcomes.
Results Preliminary searches found 6 eligible studies. These studies are highly heterogeneous. 3 studies compared COPD patients receiving CS to patients under standard care and 3 studies compared asthmatic patients treated with CS to placebo or healthy controls. 3 studies investigated only inhaled CS (ICS) and 3 studied oral ± inhaled CS. 2 studies found significantly higher bacterial burdens after CS. The microbiota diversity was significantly increased in 3 of the studies. Significant changes in the microbiota composition were documented in the following 3 studies: One study found significant reductions in S. pneumoniae, N. meningitidis, E. faecium and E. faecalis after fluticasone propionate (FP) treatment. In another study COPD patients treated with FP for a year had a significant increase in Firmicutes and decrease in Proteobacteria phyla, as well as a significantly increased relative abundance in S. pneumoniae and H. influenzae. A third study found a significant decrease in relative abundance of Bacteroidetes and Fusobacteria and a significant increase in Proteobacteriacae phyla in CS-treated asthma patients.
Conclusions: There is a relative paucity of data on the effect of CS on the respiratory microbiome with considerable heterogeneity between studies. However, it appears that CS treatment has significant effects on the respiratory microbiome.

P103

Early versus late onset vascular graft infections: microbiological spectrum and implications on antimicrobial therapy

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Background: Vascular graft infections (VGI) can either present early (< 4 months) or late (> 4 months) after vascular surgery. We aimed to determine differences in clinical presentation, microbiological spectrum, antimicrobial treatment and outcome in relation to timing and the location of VGI.
Methods: Patients with VGI from January, 2002 to December, 2018 were prospectively included. Diagnosis of VGI was assured by the use of the Management of Aortic Graft Infection Collaboration [MAGIC] criteria. Patients were stratified in groups according to their location of infection (aortothoracic, aortoiliac or infrainguinal) and the timing of infection (early or late onset). Statistical analysis included demographics, clinical characteristics, microbiology and Kaplan Meier survival analyses.
Results: Characterization of VGI according to timing and location of infection showed significant differences in terms of patient characteristics, material used during graft operation and procedure-related risk factors, assumed route of infection, isolated microorganisms and time to heal. Risk of infection was higher in patients with infrainguinal location of infection (20.4/100 PY [95% CI 12.7-32.8]) compared to aortoiliac location (3.7/100 PY [95% CI 2.3 -5.9). Time to antibiotic stop by location was shortest in infrainguinal location (2.7 months [IQR 1.6-7.7]) compared to aortothoracic infection. Patients with aortothoracic and aortoiliac location of infection needed longer antibiotic treatment (median 18.1 months [IQR 4.3-24] vs. 12.8 months [IQR 3.9-24]).
Conclusion: Aortothoracic, aortoiliac and infraginguinal VGI are distinct clinical entities that inform risk factors, management and treatment duration.

P104

Intravenous immunoglobulins administration is the single factor associated with positive (1,3)-B-D-glucan in a prospective cohort of oncohaematological patients

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Introduction : (1,3)-B-D-glucan (BDG) is an essential component of the cell wall of most fungi. BDG measurement in serum may help early detection of invasive fungal infections (IFIs) in neutropenic patients with hematologic malignancies. Yet, its usefulness is limited by a lack of specificity and false-positive results. The aim of the study was to assess the causes of positive BDG measurements in neutropenic patients with hematologic malignancies.
Methods : the study was conducted in a prospective cohort of patients with hematologic malignancies of the Lausanne University Hospital. Serum BDG (Fungitell®) was measured twice weekly as part of a preemptive strategy in patients with an anticipated neutropenia of more than 10 days, or in case of clinical suspicion of IFI. Fluconazole prophylaxis was given for the prevention of yeast infections. Posaconazole prophylaxis was used in patients with a history of allogenic hematopoietic stem cell transplant who were receiving any immunosuppressive treatment. Data were analyzed retrospectively using an electronic medical database. IFIs were classified as proven/probable/possible according to EORTC-MSG definitions. We analyzed the association between positive BDG (> 80 pg/ml) and exposure to previously reported causes of positive results : IFIs, intravenous immunoglobulins (IVIG), antibiotics, bacteremia, and hemodialysis, considering a window period from 10 days before the first positive BDG until 5 days after the last positive BDG for each hospital stay.
Results : a total of 1126 BDG measurements were performed in 158 patients over a 20-months period. Thirty-two (3%) measurements in 23 (15%) patients were positive. The vast majority of positive BDG were false-positive (94%) as probable/proven IFIs were present in only 2 patients (6%). The only factor significantly associated with positive BDG in both uni- and multivariate regression models was recent IVIG administration ($p < 0.001$). BDG values peaked 48h after administration of IVIG and remained elevated for up to 7 days. No association was noted between positive BDG and IFIs, antibiotics, or bacteremia. No patient underwent hemodialysis. No patient was diagnosed with an invasive yeast infection nor a Pneumocystis jirovecii pneumonia.
Conclusion : recent IVIG administration was the only factor significantly associated with positive BDG in the studied population. Positive BDG was a poor predictor of invasive fungal infection in this study.

P105

Durable efficacy of dolutegravir (DTG) plus lamivudine (3TC) in antiretroviral treatment-naïve adults with HIV-1 infection - 96-week results from the GEMINI studies

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Background:
Compared with 3-drug regimens, two-drug regimens (2DR) have the potential to reduce cumulative drug exposure during life-long antiretroviral therapy in HIV-1 infected patients. In GEMINI-1&2 (ClinicalTrials.gov: NCT02831673/NCT02831764), the efficacy of the 2DR of DTG+3TC was non-inferior to DTG+TDF/FTC at week 48 in treatment-naïve adults.
Methods:
GEMINI-1&2 are identical double-blind, multicentre Phase III studies. Participants with HIV-1 RNA ≤ 500,000c/mL at screening were randomised 1:1 (stratified by plasma HIV-1 RNA and CD4+ cell count) to once-daily treatment with DTG+3TC or DTG+TDF/FTC. The primary endpoint was the proportion of participants with plasma HIV-1 RNA < 50c/mL at week 48 (Snapshot algorithm). We present efficacy and safety data from prespecified 96-week secondary analyses. Estimates and confidence intervals were based on a stratified analysis using Cochran-Mantel-Haenszel weights.
Results:
714 and 719 adults were randomised and treated in GEMINI-1&2, respectively. At baseline, 20% had HIV-1 RNA > 100,000c/mL, 8% had CD4+ < 200cells/mm^3. At week 96, DTG+3TC was non-inferior to DTG+TDF/FTC in both GEMINI-1&2 and in the pooled analysis using a 10% non-inferiority margin (snapshot responders: 86% (DTG+3TC, pooled analysis) vs 90% (DTG+TDF/FTC, pooled analysis); adjusted treatment difference (95% CI) -3.4 (-6.7, 0.0)). Response rates in participants with baseline HIV-1 RNA > 100,000c/mL were high and similar between arms. Consistent with week 48 outcomes, response remained lower in DTG+3TC participants with CD4+ < 200cells/mm^3. Across both studies, 11 participants on DTG+3TC and 7 on DTG+TDF/FTC met protocol-defined virologic withdrawal criteria through week 96; none had treatment-emergent INI or NRTI resistance mutations. Overall rates of AEs were similar, with low rates of withdrawals due to AEs in both arms. Numerically, more drug-related AEs were reported with DTG+TDF/FTC. Post-baseline changes in markers of bone and renal function favoured DTG+3TC through week 96.
Conclusions:
DTG+3TC remains non-inferior to DTG+TDF/FTC in treatment-naïve adults at week 96, with no increased risk of virologic failure and no treatment-emergent resistance. Both regimens were well tolerated; biomarkers of bone turnover and renal function significantly favoured DTG+3TC. The results demonstrate durable efficacy and potency of DTG+3TC, further supporting it as a compelling option for HIV treatment. GEMINI-1&2 continue until week 148.

P106

A buyers' club to improve access to hepatitis C and HIV treatment for vulnerable populations

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Context
The Hepatitis C prevalence among Swiss population is 0.4%-0.5%. The prevalence is higher among vulnerable populations such as migrants, intravenous drug users and people living in prison (PLP). Health care systems are struggling to finance costly therapies through public funding for uninsured patients, such as direct antiviral agent despite their unprecedented high cure rate.
Material & Method
A personal importation scheme is based on the legal right for patients to import any drug into Switzerland, for personal use. A buyers' club, which is a structure that aims to help patients to import generic medicines safely, was started in October 2018 at HUG. To measure the impact of this original initiative, we compared the real cost of imported generics with their corresponding Swiss prices. Quality and efficacy are also primary outcomes.
Results
From October 2018 until April 2019, 7 PLP and 7 migrants patients were treated for HCV, 7 for HIV and 1 patient was co-infected. The total HCV imported generic costs were CHF 15'525 corresponding to CHF 477'225 Swiss prices. The HIV imported generic costs were CHF 4'163 corresponding to CHF 41'624. Personal importation scheme allows to import generics at 4% of the Swiss corresponding costs. 2 HCV patient are already cured. HPLC-UV analysis demonstrate that all generics meet good standards of quality.
Conclusion
We implemented a personal importation scheme, and the use of a buyers' club as a strategy for improving universal access to hepatitis C and HIV medicines to vulnerable populations, such as uninsured patients with minimal disruption of the conventional, patent-based model of care. This model could be expanded to other diseases and settings.

Additional information:
Vernaz N., et al. Swiss Med Wkly 2018;148:w14649.

P107

Prevalence of liver cirrhosis in persons with chronic hepatitis B infection in sub-Sahara Africa: a systematic review of the literature

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Background: Chronic hepatitis B virus (HBV) infection affects approximately 10% of the general population in sub-Saharan Africa (SSA) and is the first cause of hepatocellular carcinoma. Knowledge on the prevalence of HBV-related liver cirrhosis, an indication for immediate antiviral therapy, is limited. We performed a systematic review of the literature to evaluate the prevalence of significant liver fibrosis and cirrhosis in HBV-infected individuals in SSA.
Methods: We searched Medline and Embase for original publications from SSA, in which liver fibrosis was assessed systematically in at least 20 treatment-naïve HBV-infected individuals. We excluded studies which selected participants based on the presence of liver disease. We considered all types of liver fibrosis assessments, including liver biopsy, transient elastography (TE) and serological scores. Liver cirrhosis was defined as a liver stiffness measurement (LSM) ≥ 9.5 kPa from TE or an APRI ≥ 2.0, whereas significant fibrosis was considered if LSM ≥ 7.0 kPa or APRI ≥1.5. Our results are presented separately for HIV/HBV-coinfected and HBV-monoinfected individuals.
Results: Of 1,105 publications obtained through the literature search, 13 met our inclusion criteria. These studies reported fibrosis prevalence estimates among 18 different cohorts from 10 countries in SSA. Of 3’596 individuals with chronic HBV infection included in the analyses, 640 (18%) were co-infected with HIV. The mean age of participants ranged from 29 to 38 years across studies. Thirteen cohorts were recruited at outpatient clinics, two were community-based, two study populations were prisoners and one consisted of blood donors. In total, 3,112 (87%) individuals completed at least one type of fibrosis assessment, of whom 2,351 (76%) had a LSM performed. The prevalence of liver cirrhosis among HBV-monoinfected individuals ranged from < 1% in small studies from West Africa to 17% in a large hospital-based cohort including over 1,000 patients in Ethiopia. Among HIV/HBV-coinfected participants, the estimate ranged from 4% in Mozambique to 23% in Nigeria. Up to 23% of HBV-monoinfected and 17% of HIV/HBV-coinfected individuals had LSM values corresponding to significant fibrosis.
Conclusion: Throughout SSA, a significant proportion of HBV-infected individuals presents for care with liver cirrhosis. Our results highlight the need for liver fibrosis assessment in all HBV-infected persons, in order to optimize their management.

P108

A Molecular Epidemiology Method to Screen for HIV-1 Superinfection in the Swiss HIV Cohort Study

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BACKGROUND: HIV-1 superinfection (SI) is the infection of an already HIV-infected individuals by another HIV-1 virus. SI has been associated with viral recombination, immune escape and disease progression and remains challenging to identify for various reasons: 1. The similarity to a co-infection. 2. The difficulty to prove within subtypes SI due to viral similarity. 3. The within host competition between the first and SI virus. 4. The low sampling frequencies and the systematic screens of large populations still missing due to lack of needed longitudinal samples in untreated patients. We thus aim to develop a molecular epidemiology method to screen for SI in longitudinal cohorts. We use the well characterized, longitudinal Swiss HIV Cohort Study (SHCS, > 19,000 HIV infected individuals) to establish our workflow.
METHOD: 22,243 HIV-1 pol Sanger sequences of longitudinal time points from 12,080 patients were used for phylogenetic reconstruction. Two criteria were applied to patients having ≥ 2 longitudinal sequences to select for SI: 1. a phylogenetic cluster diversity of at least 20 patients for each individual patient's cluster and 2. a genetic distance ≥ 5 % between each focal patient's sequences. The time of SI for each patient was estimated around the time point with the highest maximum pairwise patristic distance. For 15 most likely SI patients, ≥ 3 longitudinal plasma samples around the supposed SI window were chosen. HIV-1 near full-length genome was amplified, and next generation sequenced (NGS).
RESULTS: Of 4,775 HIV-infected individuals with ≥ 2 sequences, 325 potential HIV-1 SI were identified. For 15 patients, the longitudinal NGS and Sanger sequences were used to build an HIV-1 pol gene phylogeny. The NGS sequences co-localized with the Sanger sequences of the same focal patient. The genetic distance between patient' NGS sequences was > 5 % for 13 patients, confirming our first Sanger sequences analysis. Thus 13 SI cases out of 15 first sequenced were confirmed by our method.
CONCLUSION: This molecular epidemiology approach is the largest screen for SI and sets the ground to further characterize HIV-1 SI in our cohort. 173 plasma samples from 46 potential SI were additionally ordered for HIV-1 near full-length NGS. The NGS will allow to study recombination and within patient viral diversity during SI. Finally, with our well documented cohort registries; the epidemiological profiles, risk behaviours and incidence for SI can be assessed.

P109

Prosthetic joint infections: A 10 year retrospective analysis on germ classification and relapses with standardized treatment

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Background: Despite efforts to reduce prosthetic joint infections, this complication still occurs in 0.5 to 5 % of all primary implantations. Although standardized treatment regimes for prosthetic infections exist, data of success rates are rather scare. We present a 10 years single centre retrospective analysis of prosthetic hip, knee and shoulder infections.
Methods: We retrospectively analysed data on prosthetic joint infections. Relapse was defined as recurrence of an infection with the same germ, occurring after termination of standardized antibiotic treatment, during a two year follow up. If no data in hospital charts were present, contact with the family doctor and/or patient was sought.
Results: A total of 100 infections were identified between 2003 and 2013. Most frequent bacteria found were coagulase-negative Staphylococcus (39/100 cases; 39 %, CI30-49%) and Staphylococcus aureus (37/100; 42 %, CI38-47%). Relapses were seen in 5/100 infections. In 1/5 infections replacement of the prosthesis would have been mandatory, but was omitted due to major anaesthetic risk. While this patient received long term antibiotic treatment, 4/5 patients were retreated successfully.
Conclusion: Although prosthetic joint infection is an important complication, almost all patients can be treated successfully

P110

Top-Down-MALDI-TOF-MS reveals identity of a presumed antibiotic resistance specific peak for Vancomycin-resistant Enterococcus (VRE)

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MALDI-TOF-MS is routinely used in clinical diagnostics for species identification of bacteria and other microbes. The masses of different proteins, mostly of ribosomal nature, yield a specific pattern of protein peaks. Comparison of this fingerprint spectrum with a database of spectra leads then to the identification of the microbe. Current approaches aim to find markers for specific features of bacteria, namely antibiotic resistances or virulence factors. In many cases, the presence or absence of markers can be correlated to specific features; however, the identity of the protein peak cannot be established. We work on the unambiguous identification of such markers and shed light on the relation of peak and phenotype.
We use a state-of-the-art MALDI-TOF-MS/MS to sequence and identify antibiotic resistance proteins and virulence factors of Enterococcus faecium. Therefore, we precipitate proteins using a trichloroacetic acid/acetone protocol and analyze the protein precipitate by protein sequencing.
We here describe the identification of a peak at 5090.5 m/z in vancomycin-resistant Enterococcus faecium that has been published as indicative of vancomycin resistance via vanB and elaborate on its function and involvement in vancomycin resistance.
Careful analysis of the expression profile of a bacterial strain under several growth conditions is necessary to unambiguously define features that can be used to subtype and characterize a bacterial species via MALDI-TOF-MS. Furthermore, the identity of a protein peak should be established before transfer of the results to a clinical setting.

Additional information:
Griffin PM. et al. JCM 2012:50:2918

P111

High prevalence of Hepatitis B virus infection in pregnant, South-South migrating African women: the need for routine screening, vaccination and follow up

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Introduction: HBV infection is a major global health challenge and estimated to affect 257 million people globally. The highest prevalence is in Western Pacific (6.2%) and Africa (6.1%); 4.1% of the general population in Uganda are estimated to have chronic HBV infection. There is limited literature on the prevalence of HBV infection among pregnant women in Uganda; one study reported 12% prevalence of HBV infection among pregnant women in mid-Northern Uganda. Routine screening at antenatal clinics for HBV infection is not the practice despite high risk of mother to child transmission. Uganda, located in East Africa with a total population of 34.8 million people, is estimated to host approximately 1.2 million refugees, with nearly two thirds of the refugees originating from South Sudan.
Methods: We conducted a survey among pregnant women aged 15-49 years attending antenatal clinics within Bidibidi refugee settlement located in northwestern Uganda. This settlement hosts approximately 225,000 refugees, the majority of whom are women and children.
Results: In total, 200 pregnant women were screened for the hepatitis B Surface Antigen (HBsAg) and the Hepatitis B Core Antibody (HBcAB). The median age of the participants was 27 years old, the majority of the women were married (96%), were mainly housewives (85%) and from the Nuer tribe of South Sudan (84%). We found a 15.5% overall prevalence of hepatitis B (31/200).
Conclusion: These findings suggest a higher reported prevalence of HBV infection among pregnant women who migrated from South Sudan in comparison to the prevalence in the host general population. Therefore, routine screening of pregnant women for HBV would represent a first step towards the prevention of Hepatitis B mother to child transmission. Furthermore, sensitization of the HBV infected mothers and health workers is imperative, to ensure that children born to infected mothers are provided with Hepatitis B vaccine within 24 hours of giving birth, as opposed to 6 weeks of age. Lastly, there is a need for further studies to understand the best practices for tackling HBV infection among pregnant women through innovative and feasible approaches.

P112

Dolosigranulum pigrum cooperation and competition influences human nasal microbiota

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Background:
Multiple epidemiologic nasal passage microbiota studies identify the generally harmless bacterium Dolosigranulum pigrum as a candidate beneficial bacterium based on its positive association with health, including negative associations with colonization by pathobionts Staphylococcus aureus and Streptococcus pneumoniae.
Methods:
We used a multi-pronged strategy (Analysis of composition of microbiota (ANCOM) on species-level bacterial microbiota datasets from children and adults, in vitro co-culture assays, lactic-acid determination and whole genome sequencing with comparative genomics of 10 D. pigrum isolates) to gain new insights into D. pigrum's functions and interactions in the nasal microbiota.
Results:
We detected in vivo systems-level and in vitro phenotypic cooperation with commensal Corynebacterium species. D. pigrum's average genome size of 1.86 Mb and predicted auxotrophies indicate it must rely on its human host and co-colonizing bacteria bacterial neighbors for key nutrients. In in vitro interaction assays, D. pigrum alone inhibited S. aureus growth; however, D. pigrum plus a nasal Corynebacterium were needed to inhibit S. pneumoniae growth. D. pigrum produced L-lactic-acid but at levels insufficient to inhibit either S. aureus or S. pneumoniae. However, the genomes of 11 D. pigrum strains revealed a diversity of biosynthetic gene clusters including bacteriocins, microcins and lanthipeptides.
Conclusions:
Here, we validated in vivo correlations from human bacterial microbiota studies with functional assays and demonstrated positive association between the commensals D. pigrum and Corynebacterium spp. and antagonism against the pathobionts S. aureus and S. pneumoniae pointing to previously unrecognized means of niche competition. Our results increase the understanding of D. pigrum's physiology and the mechanisms underlying the positive associations between D. pigrum and a healthy nasal microbiota.

P113

Severe thiamine deficiency due to adverse effects of antibiotic therapy – a case report

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Background:
Gastrointestinal side-effects of antibiotic therapy are very common and mostly tolerated due to the limited time of therapy. Long-term antibiotic therapy can lead to prolonged loss of appetite and induce potentially life-threatening complications that the clinician must not miss.
Case presentation:
A 73-year-old male was diagnosed with a pyogenic liver-abcess and bacteremia with Escherichia coli. Antibiotic therapy was initiated with Ceftriaxone and Metronidazol. From a infectiological point of view the course was favourable. Complications arose, however, due to persistent nausea, loss of appetite and loss of interest in daily activities, which led twice to a change of antibiotic therapy, once to Clindamycin, and once to Ertapenem, unfortunately without any effect on gastrointestinal function. Due to persistent nausea and very limited food intake, the patient lost about 22kg of his body weight. After 2.5 months of antibiotic therapy the patient presented to the emergency room with a one-week history of worsening dizziness, gait imbalance and blurred vision on lateral gaze. On clinical examination he showed marked symmetric gaze-evoked and spontaneous nystagmus, a sway on Romberg and his gait was mildly broad-based and ataxic. Based on his clinical presentation including subtle signs of encephalopathy and a history of nutritional deprivation, he was diagnosed with suspected thiamine deficiency and high-dose parenteral thiamine treatment was started. An MRI of the brain obtained the same day showed contrast-enhancement of the mamillarian bodies. Within 12 hours after thiamine replacement his symptoms had markedly improved and n follow-up he showed further improvement, although mild asymmetric nystagmus persisted.
Conclusions:
With thiamine storage being sufficient only for up to 18 days, this case of prolonged very low food intake due to antibiotic-related nausea emphasizes the need to assess supplementation to avoid clinically manifest deficiencies. While ocular motor abnormalities are frequent and characteristic early signs of thiamine deficiency, the classic triad is seen in only 16% of patients. Thus, in the context of nutritional deprivation, ocular motor abnormalities should prompt further diagnostic workup and immediate empirical parenteral thiamine supplementation to avoid more advanced and potentially irreversible signs of Wernicke’s disease including ophthalmoplegia and encephalopathy.

P114

Use of the rapid molecular assay BioFire FilmArray Meningitis/Encephalitis for diagnosis of CNS infections: a one-year review

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BACKGROUND:
The BioFire FilmArray Meningitis/Encephalitis System (bioMérieux) is a rapid (1 h) molecular assay for the diagnosis of meningitis and encephalitis (ME). The test provides a qualitative result for 14 community acquired ME pathogens, including viruses, bacteria and yeasts. We aimed to evaluate the reliability and the added-value of this assay one year after its introduction in our hospital.
MATERIALS AND METHODS:
A limited retrospective study (frozen clinical specimens and quality controls) was performed and analysed prior making the test available for physicians 7/7 days/8am-10pm upon a phone call to the laboratory. Pathogens for which in-house PCRs were available, were retested within 24h (1); this included Haemophilus influenzae, Listeria monocytogenes, Neisseria meningitidis, Streptococcus agalactiae, Streptococcus pneumoniae, Cytomegalovirus, Enterovirus, Herpes simplex virus 1 and 2, Human herpes virus 6. Clinico-laboratory assessment was achieved to investigate discrepant results.
RESULTS:
The retrospective analysis revealed an overall agreement ME panel/in-house PCRs of 100% (15/15). After the introduction of the ME panel (so far n=61; cases inclusion still ongoing), the overall agreement was 91% (58/61); sensitivity 71% (5/7) and specificity 96.4% (53/55). Two adult patients tested positive for E. coli K1 with the ME panel were negative with in-house PCR, among whom only one of them could eventually correspond to a true positive by clinico-laboratory assessment. Two patients with a clinico-laboratory assessment compatible with a viral encephalitis tested negative for HSV-1 with the ME panel but positive with in-house real-time PCR with very low DNA copy number.
CONCLUSIONS:
Overall performance of the test appeared intermediate. However, important unexpected discrepant results occurred, which forces us to carefully check every result more than usual. This may be problematic for a first line assay expected to support decision making in the setting of a life-threatening disease. Additional cases will be included allowing to better assessing the pro and cons of this new molecular test.

Reference:
1. Greub G, Sahli R, Brouillet R, Jaton K. Ten years of R&D and full automation in molecular diagnosis. Future Microbiol. 2016;11(3):403-25.

P115

Whole genome sequencing characterization of Isoniazid resistance mechanisms in Mycobacterium tuberculosis undetected by conventional molecular methods

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Background: We report the delay in the introduction of a complete efficient anti-tuberculous drug regimen in a patient due to a Mycobacterium tuberculosis strain displaying a high level of resistance to Isoniazid (INH), undetected by conventional molecular targeted approach. We aimed to characterize the resistance mechanism of this isolate and to assess the occurrence and significance of such mechanism.
Materials and Methods: We used Sanger amplicon sequencing approach as well as whole genome sequencing (WGS) to characterize the INH-resistance isolate. Furthermore, we conducted a large WGS-based study to assess the occurrence and the clinical significance of such resistance mechanism using local and publicly available genetic and whole genome sequence data representing 2398 strains.
Results: Sanger sequencing did not reveal any known mutation in katG nor inhA in this INH-R isolate. WGS identified a large loss of function insertion (>1,000 pb) in katG together with an oxyR-ahpC mutation −57C>T known to rescue katG function, previously described as markers of INH-R. A total of 2398 genomes were analyzed, including 1364 INH-S and 1034 INH-R. Among the 1034 INH-R isolates, 915/1034 had katG Ser315 and/or inhA −15G mutations. Eighteen INH-R isolates presented low frequency oxyR-ahpC mutation; among them 7/18 specimen displayed a katG loss of function mutations (frameshifts, early stops or structural variants near katG). The eleven remaining INH-R strains had mutations in katG of unknown significance. Low frequency, putative compensatory oxyR-ahpC mutations were found in both INH-R and INH-S datasets, questioning their diagnostic relevance for resistance prediction.
Conclusions: This study demonstrates that some INH-R mechanisms due to katG loss of function mutations associated with high MICs may remain undetected by targeted molecular approaches but could be detected by WGS mapping. This study improves the understanding of the association between oxyR-ahpC compensatory mutations, and structural variation in katG suggesting that screening for oxyR-ahpC compensatory mutations could be beneficial, but should always be treated with caution.

P116

Real-life food safety behavior and food-borne infections in solid-organ transplant recipients

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Purpose: Specific food safety measures are highly recommended in solid-organ transplant (SOT) recipients. However, the actual adherence of patients in real life and the impact of these measures on the incidence of food-borne infections remains largely unexplored. Therefore, we aimed to assess the food safety behavior of SOT recipients followed at our institution.
Methods: We performed a survey among consecutive SOT recipients followed at our institution and transplanted between January 2012 and June 2017. Patients were questioned on consumption of 12 foods associated with a risk of pathogen contamination, and adherence to 4 hygiene and food-handling recommendations using an anonymous questionnaire. Answers were scored using a Likert-scale (from 0 “Never” to 4 “Very often” or “Always”, respectively). Participants were also asked to evaluate the information they received about food safety. Finally, knowledge of participants was tested in 6 hypothetical situation commonly faced in all-day life. Episodes of microbiologically documented food-borne infections were assessed by chart review.
Results: 197 / 310 (64 %) patients responded to the survey (kidney = 117, lung = 35, liver = 29, heart = 16). Median time from transplant was 2.67 years. Overall, 22 % of the participants were considered to respect all food safety recommendations (26 % avoid all food at risk of infection and 70 % systematically apply hygiene and food-handling recommendations). The foods consumed more frequently were unpasteurized cheese, raw charcuterie, and meat cooked rare (consumed at east “Often” by 19 %, 10 %, and 11 %, respectively). Although 160 participants (81%) declared being informed about food safety at transplantation, only 27% of patients were able to identify all situations at risk for food-borne infection. In multivariate analysis, early (within the first year) post-transplant period (OR 6.9, 95 % CI 2.5 – 19.2, $P < 0.001$) and female sex (OR 3.9, 95 % CI 1.6 – 9.6, $P = 0.003$) were associated with respect of food safety recommendations. In our cohort, 8 patients (4%) had a microbiologically documented food-borne infection (4 Campylobacter, 3 hepatitis E, 1 Salmonella).
Conclusion: Transplant recipients frequently consume risk-associated food, particularly late after transplantation but follow appropriate measures of food hygiene. This behavior seems not be associated with high rates of food-borne infections.

P117

Virulence factor prediction: comparison of databases and their use for Staphylococcus aureus genomes analysis

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Background
Virulence can be defined as the ability of a microbe to induce disease. Variations of bacterial virulence are attributed to i) the presence/absence of virulence factors (VFs) encoded on mobile genetic elements (MGE) or the chromosome, but also ii) mutations in VFs modifying the protein activity, as well as iii) changes in the expression of these VFs. Reference databases can be used to identify and annotate known VFs in bacterial genomes. This work aimed at investigating and comparing the content of existing public databases for the annotation of bacterial VFs.
Methods
Amino acid sequences and annotations of VFs were retrieved from five different sources: 1) the Pathosystems Ressource Integration Center (PATRIC), 2) Victors, 3) Swiss-Prot, 4) the Virulence Factor Database (VFDB) and 5) the pathogen-host interaction database (PHI-base). Comparisons were made by clustering VFs at 90% sequence identity. The conservation of VFs was investigated for complete genomes of selected taxa including Staphylococcus aureus.
Results
Comparative analyses revealed that VFs from the five databases are highly heterogeneous. Out of over 11,000 non-redundant VFs, only 49 were found in all 5 databases and 116 in 4 out of 5 databases. In a specific case of S. aureus infection with toxic shock syndrome but no TSST-1, 95% of identified VFs were also identified in a majority of 396 published S. aureus genomes.
Conclusion
Those results highlight the lack of consistency in VF databases that reflects the difficulty of databases curation in the context of a loose definition of virulence. This limits the predictive value of VF identification in terms of disease outcome and clinical usefulness for patient management. The construction of a database containing curated clinically-relevant VFs, comparative data and a defined ontology is essential to overcome current limitations and allow target VF analysis in the routine of diagnostic laboratories.

P118

Introduction of HIV-PCR at the Centre Hospitalier Régional Spécialisé (CHRS) in Macenta, Forest Region, Guinée-Conakry

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Background & aims: Since 2008, the HIV program at the CHRS started antiretroviral treatment (ART) in 2858 patients, of whom 64.2 % women and 3.2 % children under 15 years at inclusion. Overall, 1206 (42.2 %) are retained in care (no longer than 3 months overdue since last scheduled appointment), while 318 (11.1 %) have died, 136 (4.8 %) have been transferred out and 1198 (41.9 %) are lost to follow-up. Until the introduction of HIV-PCR, treatment failure has been diagnosed immunologically and clinically – with a low switch rate to 2nd line ART of 0.7 %. Viral load (VL) measurement was introduced in November 2018. We present the first results.
Methods: We measured VL on the Cepheid Xpert® platform (cartridge Xpert HIV-1 Viral Load® with a lower detection limit of 40 copies/ml). Since availability of cartridges was limited, we restricted VL testing to a) all patients with clinical or immunological failure and b) two random patients on ART for > 6 months per morning. We defined HIV suppression as VL < 1000 cp/ml according to the WHO definition, but used a < 40 cp/ml cutoff for sensitivity analysis.
Results: In total, 299 valid tests from 283 patients (15 or 5.3 % for clinical failure) were performed, representing 23.5 % of the currently active cohort. Median age at testing was 41 years (interquartile range (IQR) 34 – 48), 72 % were women. Patients were on 1st line ART for a median of 44 months (IQR 25 – 74) and on 2nd line (4 women, 1.4 %) for 26 months (21 – 79). TDF/FTC/EFV was used in 98.6 %, 2nd line ART included LPV/r or ATV/r.
Among the 279 VL measurements on 1st line, 81.4 % had a VL < 1000 c/ml with a significantly higher rate in men (90.0 %) than in women (77.9 %; p = 0.02); 64.5 % reached the < 40 cp/ml cutoff with no difference between the sexes. Among patients on 2nd line ART 2 were suppressed < 1000 cp/ml and 1 < 40 cp/ml.
Clinical failure was confirmed by a viremia >1000 cp/ml in 73.3 %, while routine VL testing showed suppressed viremia in 83.9 %. Due to a non-functioning CD4 machine, immunological failures could not be diagnosed in this period.
Conclusion: The 16.1 % viremia in asymptomatic patients illustrates the importance of VL-based ART monitoring for early recognition of viral failure or non-adherence.
While men achieve the UNAIDS target of 90 % suppression on ART, women fall back markedly. Assisting women to achieve similar rates of viral suppression is a challenge in a socio-economic environment with limited autonomy for women.

Additional information:
WHO Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection
Recommendations for a public health approach - Second edition - June 2016
(available at: https://www.who.int/hiv/pub/arv/arv-2016/en/)

P119

Switching to DTG+3TC fixed dose combination (FDC) is non-inferior to continuing a TAF-based regimen (TBR) in maintaining virologic suppression through 24 Weeks (TANGO Study)

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Background:
DTG+3TC 2-drug regimen (2DR) is noninferior to DTG+TDF/FTC 3 drug regimen in HIV-1 infected ART-naïve adults. Efficacy and safety of switching to DTG+3TC in ART-experienced adults suppressed on 3DRs have been demonstrated in smaller studies.
Methods:
TANGO, a randomized, open-label, multicenter, non-inferiority Phase III study evaluates efficacy and safety of switching to DTG+3TC once daily in HIV-1 infected adults on TBR with HIV-1 RNA < 50c/mL for > 6 months, without prior virologic failure, no historical NRTI or INSTI major resistance mutations. Participants were randomized 1:1 (stratified by baseline 3rd agent class: PI, NNRTI, INI) to switch to DTG+3TC or continue TBR through Week 148. Primary endpoint: proportion of participants with plasma HIV-1 RNA ≥ 50c/mL at Week 48 (FDA Snapshot algorithm) for Intention To Treat-Exposed (ITT-E) population. Planned Week 24 interim analysis assessed non-inferiority of DTG+3TC with 4% non-inferiority (NI) margin. Secondary endpoint: Virologic suppression (HIV-1 RNA < 50c/mL by FDA Snapshot, ITT-E) with 8% NI margin.
Results:
741 randomized/exposed participants (DTG+3TC: 369; TBR: 372). demonstrated switching to DTG+3TC was non-inferior to continuing TBR at Week 24 - Snapshot Virologic Failure: < 1% vs. < 1%; adjusted difference: -0.5% (95% CI: -1.6%, 0.5%). Proportion with plasma HIV-1 RNA < 50 c/mL was high and similar in both arms (95% (DTG+3TC) vs 96% (TBR)) and demonstrated non-inferiority. Zero participant on DTG+3TC and 1 participant (< 1%) on TBR met protocol-defined virologic failure with no resistance mutations observed at failure. No unexpected AEs were identified for DTG or 3TC.
Conclusions:
At Week 24, switching to DTG/3TC FDC was non-inferior to continuing a TAF-based 3DR in maintaining virologic suppression in HIV-1 infected ART-experienced adults. The safety profile of DTG/3TC FDC was consistent with the DTG and 3TC respective labels. DTG/3TC 2DR offers a new robust switch option with reduced ART exposure, without increased risk of virologic failure or resistance. The study is ongoing.

P120

A novel combinatorial approach combining CAR T cell therapy, PD1 knockdown and CCR5 disruption as a once-off treatment for HIV

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The human immunodeficiency virus (HIV) type-1 is a major global health burden, which has claimed over 25 million lives in the past 30 years. While effective, combined anti-retroviral treatment (cART) is associated with adverse events, viral resistance in the case of non-adherence and the inability to target the latent viral reservoirs. Novel once-off treatment for the cure of HIV is highly needed. In this study, we propose to introduce a chimeric antigen receptor (CAR) targeting HIV-infected cells and a microRNA down-regulating the check-point PD1 (programmed cell death 1) into the CCR5 genomic locus of T-cells. The CAR encodes for the CD4 cell surface molecule, which selectively binds the HIV envelope (env) surface protein expressed on productively infected cells and thus kills these cells in a highly specific manner. The efficacy of this approach will be evaluated in vitro and in vivo using 'humanized' mice. To assess the functionality of the CD4 CAR construct, transduction of peripheral blood mononuclear cells (PBMCs) was carried out using a lentiviral vector encoding the CD4 CAR. Next, a cytotoxicity assay was carried out using Hela243 cells which express HIV env. The Hela243 cells were stained with the PKH-26 membrane dye prior to incubation with the CAR T cells at different effector to target (E:T) ratios. Target cell death was assessed by the addition of the viability probe TO-PRO-3 iodide (TP3), followed by flow cytometry analysis. After 72 hours, 95% specific lysis of target cells was observed at an E:T ratio of 1:1, whereas 67% cell death was observed with untransduced PBMCs, and only 5% with the target cells alone. To assess the ability of the CAR T cells to control HIV replication, autologous T cells were infected with the NL4.3 HIV strain and incubations carried out at different E:T ratios. ELISA for the HIV p24 antigen in the supernatant was carried out after 6 days. Compared to the control sample which did not contain CAR T cells, the 1:1 E:T ratio resulted in a significant reduction in p24 antigen, with levels going below the limit of detection for the assay. As next steps, the effects of PD1 silencing and CCR5 knockdown will be assessed, and ultimately the efficacy of the CAR T cells in the context of in vivo prevention and treatment models will be determined. This combinatorial approach, which targets crucial elements involved in HIV pathogenesis in a way not previously explored, may be a significant step forward in the cure of HIV.

P121

Development of two pan-Tropheryma PCRs for the detection of Tropheryma species from clinical specimens

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Background: Tropheryma whipplei is an intracellular bacterium responsible of the classical Whipple's disease, characterized by diarrhoea, weight loss, arthritis and that can further progress to more severe disease affecting the lungs, heart and central nervous system. A new Tropheryma sp., for which actual specific T. whipplei PCRs remained negative, was recently reported in a kidney transplant patient with recurrent pleuritis. Therefore, there is a need for new validated diagnostic tools. We describe here the development of two Pan-Tropheryma real-time PCRs aiming to detect T. whipplei, the new Tropheryma sp. and potential new species.
Materials/methods: Starting from DNA extracted from formalin-fixed paraffin-embedded lung biopsy positive for the new Tropheryma sp. using 16s rRNA PCR, we performed a sequencing run of Illumina HiSeq and used the genomic data to design pan-Tropheryma PCRs.
Results: Although most sequencing reads obtained were human reads, 266 reads mapped on the T. whipplei reference genome including sequences corresponding to the rnpB and the 23S rRNA genes. Based on these sequences, we designed two TaqMan-based pan-Tropheryma real-time PCRs targeting the rnpB and the 23S rRNA genes. Both PCRs i) exhibited a limit of detection between 10 and 100 DNA copies per ml using recombinant plasmids and satisfying intra- and inter-run reproducibility ii) did not result in any cross-detection when testing 31 bacterial strains including closely related bacteria and iii) could detect both T. whipplei and the new Tropheryma sp.
Conclusions: The new pan-Tropheryma PCRs successfully detect both T. whipplei and the new Tropheryma sp. Diagnostic performances in a clinical setting (sensitivity and specificity) are currently investigated. In addition, retrospective and prospective screens are being conducted to assess the occurrence and the clinical significance of the new Tropheryma sp. and potential other new Tropheryma species.

P122

Diagnostic accuracy and prediction of follow-up positive cultures by the Xpert® vanA/vanB assay from a selective enrichment broth during a vanB vancomycin-resistant Enterococcus faecium outbreak

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Background
Rapid and precise diagnosis of newly colonized contact patients during a hospital outbreak with vancomycin-resistant enterococci (VRE) is of utmost importance for infection control. Currently, molecular-based methods lack specificity to accurately identify vanB-VRE from rectal swabs. Additionally, it is unknown whether a molecular-based method can predict a positive culture in follow-up swabs. The aim of this study was to answer these questions by testing swabs following inoculation in a selective enrichment broth.
Materials/methods
Prospective study of contact patients of VRE cases between July and August 2018, during an ongoing vanB-VRE (ST796) outbreak. All consecutive rectal swabs were tested by both conventional culture and a molecular-based method.
Swabs were inoculated in a selective enrichment broth (supplemented with 4.5 mg/L vancomycin, 2 mg/L meropenem, 16 mg/L amoxicillin) at 35° C for 20-25 hours. We then used the Xpert®-vanA/vanB assay to detect the vanB gene. For conventional culture-based testing, the broths were plated on selective/chromogenic plates. We identified colonies by MALDI-TOF MS and confirmed the presence of vanB with the Xpert® vanA/vanB assay. Vancomycin resistance was assessed by minimum-inhibitory-concentration testing. For data analysis, we used the pROC package in R.
Results
We included 597 rectal swabs from 396 patients. 32/597 swabs (5.4%) were culture-positive vanB-VRE. Sensitivities and specificity, using culture as the gold standard, per PCR cycling time threshold are shown in Figure 1a. The calculated ROC area under the curve was 0.99 (95%CI: 0.98-1). The negative predictive value at a cycling time of 33 was 99% (95%CI: 98%-100%).
128 (32%) patients had a median of 1 (range 1-4) follow-up screenings. In 6/128 (4.7%) patients with >1 screen, a follow-up swab was culture-positive. Figure 1b demonstrates that preceding cycling time values were not indicative of subsequent culture positivity.
Conclusions
The use of the Xpert® vanA/vanB assay with prior enrichment in selective broth yielded an excellent specificity for the diagnosis of vanB-VRE and a high negative predictive value for ruling it out. In the context of an outbreak, this approach is attractive in that it can quickly exclude VRE carriers. However, the molecular method is unable to predict culture-positive VRE in follow-up swabs.

P123

Cluster of a Verona integron-encoded metallo-β-lactamase producing Pseudomonas aeruginosa among patients without healthcare or travel abroad in a secondary care hospital in Eastern Switzerland

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Background:
Switzerland is considered to be a low-risk setting for carbapenemase-producing organisms, with most cases being due to importation from high-endemic countries. Here, we describe a patient cluster of Verona integron-encoded metallo-β-lactamase (VIM)-producing Pseudomonas aeruginosa in a secondary care hospital in Eastern Switzerland.
Materials/methods:
Upon detection of three patients with VIM-producing P. aeruginosa, an outbreak investigation was started. Epidemiological data were collected. Patient contacts (i.e. sharing the same room at the same time) underwent rectal, urine (in case of catheter), and wound screening. Environmental swabs were taken from the sinks (watertaps and syphons) and showers in the patient room, as well as from common toilets and showers on the ward.
Results:
Patient A was positive for VIM-producing Pseudomonas aeruginosa in a clinical sample from an open wound. Patient B - a contact of patient A – had a positive rectal swab. Patient C - being neither a direct contact of patient A nor B, but hospitalized in the same room as patient A 8 weeks later - was positive in a wound sample. All three P. aeruginosa strains were producing VIM and showed the same resistance patterns. None of the patients had ever travelled outside Switzerland nor had they been hospitalized abroad. All patients had large wounds and were treated with vacuum assisted closure-therapy. One-way materials were used for these therapies and dressing changes were done in different settings (patient room, operating theaters) by different surgeons.
Further contact screening revealed 21 patients, whereof 9 were tested negative. The remaining contacts were discharged without screening, but labeled for screening upon future admissions. A prospective surveillance for patients with VIM-producing P. aeruginosa was implemented, no further case was detected.
Ten of 30 environmental swabs were positive for Pseudomonas spp. No carbapenemase production was detected.
Conclusions:
This report of a cluster of VIM-producing P. aeruginosa among patients hospitalized in Eastern Switzerland without any known risk exposure is concerning. Although not detected in environmental screening, our finding that patients were hospitalized in the same room, but not at the same time, suggests dissemination of VIM-producing P. aeruginosa in the hospital environment.

P124

Scabies in nursing homes : experiences in canton de Vaud, Switzerland?

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Cases of scabies in nursing homes (NH) can be problematic to manage, mainly because diagnosing scabies is difficult. Indeed, the elderly can be paucisymptomatic and the identification of the parasite is complex and requires expertise. Because diagnosis is often delayed, additional measures are not immediately implemented.
The main purpose of this review is to demonstrate the importance of rapid identification and management of cases and contacts
We reviewed scabies cases reported in four NH between June 2017 and March 2019.
Among residents, sixteen cases were identified with three close contact cases. Moreover, one case engendered two contact cases in healthcare workers. A treatment was given to the sixteen cases, the three close contacts among residents and the two healthcare workers. We describe the special situation of a NH with seventy-two residents on four floors and two healthcare workers teams (floors 1-2 and floors 3-4). In December 2018, a case of Norwegian scabies in a hospital was confirmed. The case and two healthcare workers as secondary cases were diagnosed and treated accurately. All the residents and healthcare workers of the same floor (second floor) received a treatment. In January 2019, three residents (to the first and second floor) were diagnosed with Norwegian scabies; none contact case was identified. Unfortunately, the treatment of the forty-four contact residents was not concomitant (time differential from 1 to 5 days due to the availability of drugs). In March 2019, four cases were diagnosed (first and third floor), without reported contact cases. The treatment was once again given to all the forty-four contact residents and to all the healthcare workers of the institution. Within three months, all residents and healthcare workers had to take the treatment at least two times, which represents more than 150 treated people.
This analysis demonstrates the importance of applying the PCI recommendations (identifying contact cases and the concomitant treatment of residents and healthcare workers) are essential to eradicate scabies in NH, in particular in case of Norwegian scabies.

P125

Sonden ohne Spülkanal - Evaluation einer neuen Aufbereitung

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Hintergrund
Manuelle Aufbereitungen von thermolabilen Sonden mittels Tauchbädern sind umständlich, ressourcenzehrend und unökologisch.
Diese Tauchbäder sind nicht konfektioniert im Markt erhältlich, Desinfektionsmittellösungen müssen jeweils frisch angesetzt werden und regelmässige Reinigungen sind erforderlich. Für gewisse häufige Anwendungen wurden daher teilmaschinelle Aufbereitungsverfahren implementiert.
Von Nutzerseite zeigte sich ein Bedürfnis, alternative Aufbereitungsverfahren zu prüfen.
Ziel
Eine einfache und sichere Aufbereitungsmethode nach einem manuellen Verfahren, ohne die oben genannten Nachteile, inklusive Rückverfolgbarkeit mittels Dokumentation der Aufbereitung in einem Protokollbuch.
Zur Vermeidung von Fehlern soll ausserdem die Einführung eines solchen Verfahrens mittels klaren Vorgaben an die Anwender stattfinden.
Vorgehen
1. Durchführung einer Ist-Analyse sowie Abwägen möglicher Alternativen
2. Erstellung klarer Vorgaben für das ausgewählte neue Aufbereitungsverfahren, Tristel® Trio
3. Das neue Verfahren in zwei Testkliniken gemäss der erarbeiteten Vorgaben etablieren
4. Begehungen in den Abteilungen und mikrobiologische Tests (Abstrichuntersuchungen) bei den nach neuer Vorgehensweise sowie nach herkömmlichen Verfahren aufbereiteten Sonden
5. Auswertung des Datenmaterials

Resultate
Durch die mikrobiologischen Untersuchungen konnte gezeigt werden, dass das manuelle Aufbereitungsverfahren für die vorgesehenen Anwendungen funktioniert, d.h. die Sonden blieben nach der Aufbereitung mit Tristel® Trio ohne Keimnachweis. Als Schwachstellen erwiesen sich die Aufbereitung von Handgriffen sowie Steckern. Unabhängig von der Aufbereitungsmethode konnten an diesen Stellen wiederholt Keime nachgewiesen werden.
Diskussion
Die Aufbereitung von Sonden ist als kritisch einzustufen und bedingt klare Vorgaben und enge Begleitung durch die Spitalhygiene sowie eine designierte verantwortliche Person, welche den Aufbereitungsprozess für den jeweiligen Bereich leitet und prüft. Das hier getestete, manuelle Aufbereitungsverfahren (auf Chlordioxyd-Basis) zeigte Defizite in Abhängigkeit von der Gründlichkeit und Technik der Aufbereitung

P126

Evaluation einer Echt-Pflanzenwand in einem Krankenhaus der Insel Gruppe

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Hintergrund
Um das Wohlbefinden von Patienten und Angestellten zu steigern, wurde begonnen Pflanzenwände in Räumen ohne Bezug zur Aussenwelt zu installieren. Systematische Untersuchungen solcher Grünflächen im Innenbereich von Spitälern, welche die Risiken für immunsupprimierte Patienten evaluieren, gibt es nicht.
Versuchsweise wurde eine Pflanzenwand in einem Korridor eines Neubaus erstellt und von Februar bis Mai 2018 beobachtet. Mai bis Juni 2018 folgte eine zweite, optimierte Version.
Methoden
- Bestimmung der Luftkeimzahlen d.h. Gesamtkeimzahl (GK) und Hefen/Pilze sowie Partikelmessung (PM10) an 3 Messpunkten
- Abklatschproben an drei Positionen an der Pflanzenwand
- Wasserproben aus Zuleitung Frischwasser, Tank und Ablauf. Kontrolle hinsichtlich Gesamtkeimzahl, Legionellen, Pseudomonaden sowie atypische Mykobakterien
- Festhalten der Raumtemperatur, Luftfeuchtigkeit und CO2 Gehalt der Luft
- Sichtkontrolle auf Schädlingsbefall, abgestorbene Pflanzenteile und Pflanzenkrankheiten
- Sichtkontrolle Schimmelstellen im Raum

Resultate
Im Verlauf der Bobachtungszeit zeigten sich zunehmende Anteile an welken Pflanzen, faulige Geruchsbildung und Biofilmbildung in den Zu- und Auslaufbehältern. In den Luft- und Abklatschproben über die gesamte Zeitspanne massive Erhöhung der Gesamtkeimzahl sowie der Hefe- und Schimmelsporen. Aspergillus fumigatus wurde an drei Messtagen nachgewiesen.
Aufgrund der genannten Messresultate wurde die erste Pflanzenwand entfernt und eine Zweite mit Tillandsien und Sukkulenten aufgebaut; durch eine deutliche Feuchtigkeitsreduktion sollte eine Reduktion der Keimlast am Trägermaterial sowie eine Reduktion der Hefe- und Pilzsporenproduktion erreicht werden. Dies war jedoch nicht der Fall.
Schlussfolgerungen
Aus den folgenden Gründen halten wir die Pflanzenwand für Patienten, insbesondere für Immunsupprimierte für risikoreich und entschieden uns für den Rückbau: Hohe Pilzsporendichte und Gesamtkeimzahl der Luft, früher Bakteriennachweis an den Wassertanks, Biofilmbildung mit Gefahr der Aerosolisierung, massive Verkeimung der Pflanzenwand mit Bakterien und Pilzen sowie Insektenbefall erhöhen alle das Risiko, dass im Spitalumfeld Keime auf Patienten übertragen werden.

P127

Screening for multiresistant bacteria in a swiss dialysis unit: is it worthwile?

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Background
Dialysis is a known risk factor for colonization with multiresistant bacteria. The swiss VRE-task force recommended VRE screening in patients transferred from dialysis units. In our 500 bed tertiary care hospital MRSA-Screenings have routinely been performed in patients returning from holiday dialysis abroad. We describe all MRSA-screenings since 2014 and a point-prevalence of colonisation with multiresistant gramnegative bacteria (MRGN) and VRE in all dialysis patients.
Methods
Data on MRSA-screening were analysed using surveillance data, which do not include travel destinations. Stool samples were collected at home and screened for MRGN as a well as VRE using standard culture and resistance testing. The MALDI-TOF pattern of MRGN with identical species and resistance pattern were compared to identify potential clonality. For all patients with MRGN, data on travel and antibiotic treatment in the past 12 months were collected by chart review.
Results
216 MRSA-screening sets (pooled samples from nares, tonsils, axilla and inguina) have been collected in patients after holiday dialysis abroad between 2014 and 2018 without any detection of MRSA.
A total of 85 stool samples were collected from our 90 dialysis patients: 1 patient was on holiday and 4 refused to collect a stool sample. 7/85 (8.2%) samples were positive for E. coli ESBL with an additional K. pneumoniae ESBL in one patient (1.2%). VRE or other MRGN such as carbapenemase-producers were not found.
Resistance patterns of the E. coli ESBL strains differed in 5/7 strains. The MALDI-TOF pattern in the 2 patients with identical resistance excluded clonality. No epidemiological link, including travel history and antibiotic use, identified the patients colonised with MRGN.
Discussion
Screening of our dialysis patients showed no MRSA colonisation and ESBL colonisation rates similar to the ones reported by anresis. Systematic screening of hemodialysis patients will be stopped; similar to repatriated inpatients, screenings will be restricted to patients transferred from high-risk settings.

P128

A nosocomial outbreak of vancomycin-resistant Enterococcus faecium vanB ST117 with low-level resistance to vancomycin: a challenge for the laboratory

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Background
Vancomycin-resistant Enterococcus faecium (VREfm) carrying the vanB gene are considered to be phenotypically diverse, showing moderate- to high-level resistance (64–1024 mg⁄L) to vancomycin. However, some strains might show low MIC values (< 6 mg/L). Here we report an outbreak of VREfm with low vancomycin MIC and describe the challenges the laboratory had to face.
Methods
Since the occurrence of several nosocomial VREfm outbreaks in 2015-2016, we introduced weekly VRE screening in ICU and twice monthly in visceral and septic surgery units. Screening was performed by culturing a rectal swab in an enrichment broth with 3.3 mg/L of vancomycin and chromogenic selective agar plates.
Results
In August 2018, three new patients carrying VREfm were identified. Isolates carried the vanB gene and their vancomycin MIC ranged between 1.5 to 4.0 mg/L. The detection of this strain with low-level vancomycin resistance was particularly problematic (characteristic colonies observed only after 48h of incubation on primo-culture, only few suspect colonies on plates following enrichment broth, absence of vancomycin resistance detection by Vitek). The investigation performed by the infection control team identified 4 other cases. All E. faecium isolates from clinical samples were tested retrospectively (2 weeks) and prospectively (1 month) by PCR for the van genes. None was positive. Typing with wgMLST revealed that all 7 isolates belong to ST117 and were closely related (0-2 loci differences). Clinical microbiology laboratories were alerted and the strain was send to those wishing to test their identification procedures. Out of 14 laboratories giving a feedback, four were not able to identify the resistance, mainly due to the use of MIC strips and the Vitek. Moreover, all reported the necessity to incubate chromogenic agar plates up to 48h to detect its growth.
Conclusion
Low MIC VREfm constitutes a challenge for laboratories depending on procedures and could therefore remain undetected.

P129

Successful control of an outbreak of vancomycin-resistant Enterococcus faecium clone ST796 at the University Hospital of Lausanne

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Background
The VREfm clone ST796 emerged as a major nosocomial clone in Australia and New Zealand. Switzerland was the first European country to report an outbreak with this clone, affecting several hospitals in the Canton of Bern since December 2017. Here, we describe a VREfm ST796 outbreak that occurred at Lausanne University Hospital.
Methods
Since the occurrence of several nosocomial VREfm outbreaks in 2015-2016, we introduced weekly VRE screening in ICU and twice monthly in visceral and septic surgery units. This allowed to highlight an unsuspected outbreak. Whole genome sequencing (WGS) was performed routinely on all isolates and wgMLST was used to compare their genetic similarity .
Results
On December 11th 2018, the systematic weekly screening in ICU revealed a new patient colonized with VREfm. Investigation of contact patients and weekly screenings of units identified 10 other cases, the last case being identified on January 1st 2019. Contact isolation precautions were prescribed for all cases and contacts. Weekly screenings were performed. WGS revealed that the 11 cases carried the VREfm clone ST796. Moreover, all isolates were grouped within the same cluster with high genetic similarities (0 to 2 loci differences) and were very similar to isolates from Bern (< 7 loci differences), highly suggesting a link between the two outbreaks. The index case remained undetermined so far: none of the 11 patients had an obvious link with Bern, all but one lived in the canton of Vaud. However, one known ST796 patient from Bern attended our ambulatory pain clinic during the same period and we cannot excluded a transmission through healthcare workers.
Conclusion
A year after its first identification in Switzerland, the ST796 VREfm clone is circulating between Swiss hospitals. We showed that prompt detection and strong infection control measures, as described in recently published Swiss national guidelines, are efficacious to contain VRE outbreaks.

P130

Disinfecting non-critical medical equipment – Effectiveness of hydrogen peroxide dry mist as an adjunctive method

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Objective: Non-critical medical devices are often contaminated with human bacterial pathogens. As manual disinfection procedures are prone to failure, disinfection by airborne hydrogen peroxide might be a promising adjunctive method to further reduce bacterial contamination after standard disinfection.
Method: One cycle of dry mist of hydrogen peroxide (DMHP) nebulization was applied on a convenience sample of sixteen different types of 'ready to use' (i.e. disinfected according to local guidelines) non-critical medical devices. Of every object, two adjacent areas with assumed similar bacterial burden were swabbed before and after nebulization, respectively. After culturing, colony forming units (CFU) were counted, and bacterial burden per 100cm2 calculated.
Results: In total, 160 objects were disinfected with DMHP nebulization. These objects had a median bacterial burden of 13.7 CFU/100cm2 (range: 0.0 – 12500) before nebulization. After excluding a subset of objects from analysis (e.g. objects with zero CFU before nebulization) a decrease from a median of 28 CFU/100cm2 (range: 1.4 – 700) to a median of 0 CFU/100cm2 (range: 0.0 – 350) ($p < .001$) was observed. The bacterial burden was reduced by more than 90% in 64.2% (95% confidence interval: 54.3-73.2) of objects. DMHP nebulization performed better in objects with lower (< 100 CFU/100cm2) bacterial burden ($p=.046$).
Conclusion: DMHP nebulization was effective in reducing CFU count on non-critical medical devices and might be a useful non-manual adjunctive disinfection method, e.g. in high-risk or outbreak settings. Further research is needed, however, to proof evidence that DMHP nebulization of non-critical medical devices reduces bacterial transmission.

P131

Diversity of nontuberculous mycobacteria in Heater– Cooler Devices – Results from prospective surveillance

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Background: Nontuberculous mycobacteria (NTM) are well known to colonize water systems and potentially contaminate medical devices. The global outbreak of Mycobacterium chimaera infections associated with exposure to infectious aerosols generated by contaminated heater-cooler devices (HCD) during cardiac surgery highlighted the importance of NTMs. At our center, steel housings were built for strict separation between air in the operation room and potentially contaminated air around HCDs [1]. In the present study, we report results from prospective mycobacterial surveillance of HCDs.
Material and Methods: This study was conducted at the University Hospital Zurich, Switzerland, a tertiary care center with approximately 700 open-heart surgeries with use of extracorporeal circulation per year. In 2014, five factory-new LivaNova 3T (London, UK) HCDs were purchased, which were maintained with an intensified in-house protocol after mid-April 2014 (1). Mycobacterial surveillance included monthly 50ml water samples from both, patient and cardioplegia circuit, as wells as airflow samples. Water samples were incubated in the MGIT 960 automated mycobacterial detection system and on Middlebrook 7H11 agar plates at 37°C for 7 weeks or until positive. Air samples were grown on 7H11 agar plates. Mycobacterial species were identified by 16S rRNA gene sequence analysis.
Results: Out of 406 HCD-derived water samples, 154 (37.9%) revealed growth of NTM and 8 samples thereof grew two different NTM species (Figure 1). The most frequently detected NTM were M. chimaera (n=107 (66%)); followed by M. gordonae (n=32 (19.6 %)), M. paragordonae (n=16 (9.9%)), M. chelonae (n=3 (1.9%)), M. abscessus (n=1 (0.6%)) and other NTM (n=3 (1.9%)) (Figure 2). In total, 139 air samples were cultured. Two (1.4%) air samples yielded NTM growth. One sample grew M. fortuitum, the other a Mycobacterium species of the M. abscessus/chelonae complex, which could not be further differentiated.
Conclusions: Prospective surveillance of HCDs revealed frequent detection of NTM in water samples despite intensified maintenance. A wide diversity of NTM was detected in water with M. chimaera being the most common species. The majority of air samples remained without growth. The relevance of NTM other than M. chimaera is poorly defined, but a recent report on a HCD-associated outbreak with M. abscessus supports a potential threat [2].

Figures 1&2: Will be presented at the congress. No possibility to upload for abstract submission.

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Authorship:
Peter Schreiber and Hugo Sax contributed equally to this work (last authors).

P132

A new speciality title Additional training for ID specialists required for infection control: A new federal requirement

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Background: In most countries, hospital epidemiologists (HE) get their training in courses such as provided by ESCMID or similar institutions. However, few countries have federal requirements for training and diploma for physicians as commonly provided for infection control practitioners (ICP). In Germany, there is a “Facharzt für Hygiene und Umweltmedizin; in Switzerland, chiefs of hospital epidemiology uniformly are board certified in internal medicine and infectious diseases (ID). However, a specialty in infection control is missing that is federally regulated.
Materials/methods: A search was performed using databases (pubmed, EMBASE, google) in addition to publications issued by the European Centers for Disease Control and Prevention to get a summary of current practices for HE training in Europe as well as the US. Training in Switzerland for ID requires 3 years of internal medicine and 3 years of specialty training in ID. In Switzerland, chiefs of HE are board-certified ID specialists and have commonly received a master of epidemiology, but there is not standardized mandatory training to become a HE.
Results: Only Germany was found to provide a title issued by the medical societies, requiring standardized training to become federally regulated and accepted HE. The Netherlands have a well-organized curriculum with multiple courses, but – to best of our knowledge – not a federally regulated title with an exam. Even in the US; HEs are commonly board certified in ID, but training for HE is ill defined, and not regulated. Since 2019, HEs training has been federally approved in Switzerland by the Swiss Medical Society (called FMH, www.fmh.ch). The title requires being board-certified ID and an additional defined approved training of ≥ 1 year and passing a written and oral exam.
Conclusions: Training of HEs in Europe is ill regulated. In 2019, Switzerland will provide a federally regulated title for HE. Given the importance of infection control in future, training of physicians for HE should be harmonized in Europe to improve quality as well as facilitating exchange of HE between countries.

P133

Impact of an infection control service on rates of nosocomial infections in a university psychiatric hospital: results from an 18-year surveillance in Switzerland

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Background: In contrast to acute care hospitals and long term care institutions, few studies addressed the prevalence of nosocomial infections (NIs) in psychiatric hospitals. In acute care hospitals, 5-15% of hospitalized patients acquire a NI. To our knowledge, the only published data on point prevalence of NIs in a large a psychiatric hospital reports a point prevalence of 0.71% (Deutsche nationale Punkt-Prävalenzerhebung zu nosokomialen Infektionen und Antibiotika-Anwendung 2016, www.nrz-hygiene.de, report in german). We thus sought to determine prevalence and in addition, to assess the impact of a new infection control service in an academic psychiatric hospital.
Material/methods: From 2001 to 2018, 8 prevalence studies were conducted at the university psychiatric hospital in Basel, Switzerland, a 309-bed hospital with approximately 3'300 admissions per year. Studies were done during a one to seven day period. Inclusion criteria were hospitalization for more than 24 hours (2001-2003) resp. more than 48 hours (2004-2018). Nosocomial infections were defined by the criteria outlined by Centers for Disease Control and Prevention. Infection control service includes weekly visits at the hospital, hygiene guidelines and outbreak management.
Results: Overall, prevalence of NIs decreased from 4.2% in 2001 to 0% in 2018 ($p < 0.01$, Fig. 1).The most common nosocomial infections were urogenital infections (50%), followed by skin and soft tissue infections (15.8%), respiratory infections (7.9%) and gastroenteric infections (2.6%). Data of the focus of infection was missing in 23.7%. The mean length of stay was 33.6 days (SD 0.60) during the study period, significantly longer than at the acute care University Hospital Basel (6.5 days, SD 0.58; p-value < 0.00001).
Conclusion: Prevalence of nosocomial infections was low in a psychiatric hospital despite long mean lengths of stay. The introduction of a professional infection control service further decreased prevalence over an 18-year study period.

P135

A six-year experience of a hospital-admission screening program for multidrug-resistant Gram-negative pathogens

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Background
Multidrug-resistant Gram-negative bacteria (MRGN) are a concern worldwide. We analyzed data from a hospital admission screening in order to assess trends over time and to identify risk factors for MRGN colonization.
Methods
Patients hospitalised abroad within the last 6 months were rectally screened at least once within 5 days after admission. Additional samples were obtained from wounds, urinary catheters or tracheal secretions, if applicable.
After 24 hours of enrichment in TSB broth samples were streaked on chromogenic ESBL- and OXA-48 screening plates. Susceptibility testing was done with the BD PhoenixTM instrument and ESBL/CPE confirmation with phenotypic methods (i.e. E-Test and/or ROSCO discs). The presence of the most relevant carbapenemase genes was confirmed by PCR.
MRGN were defined as Gram-negative bacteria producing an extended-spectrum beta-lactamase (ESBL) or a carbapenemase. For risk factor analysis, ESBL E. coli were excluded. Asia and Africa, as well as Southern/Eastern Europe were regarded as high-risk regions, compared to Australia, America and countries from Western/Northern Europe (low-risk).
Results
From 03/2013 until 07/2018 458 patients underwent admission screening. Thereof, 111 (24%) were colonized with MRGN. Sixteen patients were colonised with more than one resistant isolate. Altogether, we found 129 isolates; 21 of these being carbapenemase-producers (16%), 38 non-E. coli ESBL (30%) (mostly K. pneumoniae), and 70 E. coli ESBL (54%).
Over time, the proportion of E. coli ESBL among all screened patients showed an increasing trend (p=0.09), whereas the other MRGNs remained stable (p=0.52).
In univariable analysis, hospitalisation in a high-risk region, central venous and urinary catheters, open wounds, diabetes, and antibiotics before screening were identified as risk factors. In multivariable analysis only high-risk region remained significantly associated with MRGN colonization (OR 2.4, 95% CI 1.2-5.0, P=0.017). Among 128 patients hospitalised in low-risk regions, only 4 (3.2%) were colonized with MRGN.
Conclusion
Over almost 6 years, the proportion of repatriated patients being colonized with carbapenemase-producers or non-E. coli ESBL remained stable. The predominant risk factor for colonization was hospitalisation in a high-risk region. A neglectable proportion of patients repatriated from low-risk regions was colonized with MRGN, questioning the effectiveness of the screening program for this population.

P136

Wenn Filter nicht halten, was sie versprechen: nosokomiale Legionellose in einer Akutgeriatrie

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Ausgangslage
Auftreten von nosokomialen Legionellenpneumonien im Provisoriumstrakt einer Akutgeriatrie, detektiert im Rahmen der aktiven Surveillance nosokomialer Legionelleninfektionen durch die Spitalhygiene.
Ziel
Strukturierte Beschreibung der spitalhygienischen Aufarbeitung eines kleineren Legionellenausbruchs.
Material und Methoden
Erkennung von Legionelleninfektionen durch Übermittlung positiver (Urinantigen-) Befunde durch das Labor an die Spitalhygiene. Prüfung, ob potentiell eine nosokomiale Infektion vorliegen könnte gemäss BAG-/BVL-Empfehlungen und der elektronischen Krankengeschichte. Standardisierte und gezielte Entnahme von Wasserproben sowie Inspektion von Räumlichkeiten und Plänen der Wasserversorgung mit dem technischen Dienst.
Resultate
Im 5/2018 sowie 9/2018 wurden zwei Fälle einer Legionellenpneumonie erkannt, die nach Aufenthalt in demselben Zimmer eines kürzlich erbauten provisorischen Trakts einer geriatrischen Klinik auftraten. Wassertemperaturmessungen (zentral 60°C und bei Austritt 57°C), die Begehung der Räumlichkeiten und die Analyse der Pläne der Wasserversorgung ergaben keine Verdachtsmomente. Die standardisierte Entnahme von Wasserproben zeigten Legionellen unter dem Grenzwert (< 10 und < 100 KBE/l), die gezielte Beprobung des im voluminösen Duschkopf stehenden Wassers jedoch deutlich erhöhte Legionellenwerte (18‘400 KBE/l). Hierauf erfolgte die Installation von Duschköpfen mit Legionellenfilter (WaterShield© Hand Shower; keine Zertifizierung als Medizinalprodukt) durch den technischen Dienst. Drei Monate nach Installation der Wasserfilter trat erneut eine Legionellenpneumonie auf. Die Wasserproben direkt aus den Filterduschköpfen wiesen Legionellen mit 12‘800 KBE/l nach. Nach Ersatz der Filter durch kleinvolumige Duschköpfe und Etablierung von täglichen Spülungen mit Heisswasser wurden bislang keine weiteren Fälle beobachtet. Erneute Wasserproben zur Kontrolle sind vorgesehen.
Schlussfolgerungen
Die Infektionen traten trotz nahezu optimalen baulichen Voraussetzungen des Warmwassersystems aufgrund von stehendem Wasser auf dem «letzten Meter» auf. Die selten benutzten und grossvolumigen Duschköpfe stellten das Hauptreservoir dar. Zertifizierte und korrekt angewendete Legionellenfilter können in speziellem Kontext eine (allerdings kostspielige) Möglichkeit zur Kontrolle nosokomialer Legionellen sein. Nichtzertifizierte Produkte können kontraproduktiv sein und sind klar nicht empfehlenswert.

P137

Appropriateness of protected anti Gram-negative antibiotics in eight Swiss hospitals: preliminary results of the NRP72 project "OPA study"

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Context and Objectives:
Recent data on appropriateness of antibiotic therapies in Swiss hospitals are lacking and the extent of room for improvement is unknown. In the context of the NRP72 on antimicrobial resistance, we initiated the OPA project in eight Swiss hospitals located in the French-speaking part of Switzerland consisting in the evaluation of the impact of weekly clinical audits and multifaceted feedback strategies on reducing the use of anti-Gram-negative antibiotics that deserve a restrictive prescription: quinolones, 3rd- and 4th-generations cephalosporins, piperacillin/tazobactam and carbapenems. We report here the preliminary results on appropriateness.
Materials and methods:
Internal medicine, general surgery and intensive care units of participating hospitals were allocated to either intervention or control group. The intervention consisted in one-day weekly audits of protected antibiotic prescriptions over six months by a tandem of an infectious diseases specialist and a senior physician in charge of the patients, using a standardized checklist, followed by immediate feedback to prescribers and monthly reports to the medical team with key messages. Additionally, a website with didactic material dedicated to prescribers was created.
Results:
Between March 2018 and March 2019, we performed 169 weekly audits in medical, surgical and intensive care units. Among a total of 9565 in-patients charts reviewed, we identified 1681 (18%) patients receiving a protected antibiotic targeted by the study. The auditing tandem proposed an optimization of the antibiotic therapy in 398/1681 (24%) patients including 167 (42%) stops, 87 (22%) switch to the oral route and 86 (22%) de-escalations. The adhesion rate to the propositions made by the tandem was 54%.
Conclusions:
Preliminary results showed that there is room for improvement in prescriptions of protected antibiotics in the Swiss hospital setting. Special attention should focus on shorter durations, early switch to the oral route and de-escalations. Medical directors, head physicians and pharmacists of participating hospitals are aware of antibiotic resistance threat and support local initiatives aiming at antibiotic use optimization.

P138

The effect of varying multidrug-resistence (MDR) definitions on rates of MDR Gram-negative rods

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Objective: To determine the effects of different definitions of multidrug-resistance (MDR) on rates of Gram-negative multidrug-resistant organisms (GN-MDRO).
Methods: MDR definitions of the European Centre for Disease Prevention and Control (ECDC), the German Commission of Hospital Hygiene and Infection Prevention (KRINKO) and the University Hospital Zurich (UHZ) were applied on a dataset comprising isolates of Escherichia coli, Klebsiella pneumoniae, Enterobacter sp., Pseudomonas aeruginosa, and Acinetobacter baumannii complex. Rates of GN-MDRO were compared and the percentage of patients ever having had a GN-MDRO was calculated.
Results: In total 11'407 isolates from a three year period were included. For Enterobacteriaceae and P. aeruginosa, highest MDR-rates resulted from applying the 'ECDC-MDR' definition. 'ECDC-MDR' rates were up to four times higher compared to 'KRINKO-3MRGN' rates, and up to six times higher compared to UHZ rates. Lowest rates were observed when applying the 'KRINKO-4MRGN' definitions. Comparing the 'KRINKO-3MRGN' with the UHZ definitions did not show uniform trends, but yielded higher rates for E. coli and lower rates for P. aeruginosa. On the patient level, the percentages of GN-MDRO carriers were 2.1%, 5.5%, 6.6%, and 18.2% when applying the 'KRINKO-4MRGN', 'UHZ-2015', 'KRINKO-3MRGN', and the 'ECDC-MDR' definition, respectively.
Conclusions: Different MDR-definitions lead to considerable variation in rates of GN-MDRO. Differences arise from the number of antibiotic categories required to be resistant, the categories and drugs considered relevant, and the antibiotic panel tested. MDR definitions should be chosen carefully depending on their purpose and local resistance rates, as definitions guiding isolation precautions have direct effects on costs and patient care.

P139

Kontaminierte Endoskope durch Unwissen und Stillstand

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Hintergrund: Die korrekte Aufbereitung von Endoskopen ist herausfordernd und benötigt personelle Ressourcen, Wissen und geeignete strukturelle Voraussetzungen. Wir berichten über Abklärungen und Konsequenzen nach positiven mikrobiologischen Proben anlässlich der geforderten regelmässigen Untersuchungen.
Methoden: Nach wiederholtem Nachweis von Haut-/Umgebungskeimen in allen Kanälen und an der Albarran Nische bei zwei von vier Endoskopen im November 2018 erfolgten Abklärungen durch die Spitalhygiene an diesem Spital mit 2-7 Gastro-/Koloskopien bei 80 Betten und rund 4000 stationären Patienten/Jahr. Für die Aufbereitung sind medizinische Praxisangestellte verantwortlich, Richtlinien zur Aufbereitung und Beprobung beruhen auf der Schweizerischen Richtlinie zur Aufbereitung flexibler Endoskope (2010).
Resultate:

- Begehungen 12/18 und 01/19 : Beengende Arbeitsverhältnisse ohne Möglichkeit einer Trennung von sauber und schmutzig; fehlende Schulung des Personals; Unklarheiten im Zusammenhang mit Händehygiene und Handschuhgebrauch; ausstehende Validierung des Reinigungs- und Desinfektionsgeräts für Endoskope (RDG-E); positive Abstriche mit der Bezeichnung Albarran Nische wurden am Instrumentierhebel entnommen (Gastroskop hat keine Albarran Nische); Kontrollabstriche nach erneuter Aufbereitung negativ.
- 03/19: Routinekontrollen erneut mit Wachstum von Non-Fermentern in allen Kanälen des Gastro- und eines Koloskopes. Auffallend: Aufbereitung der positiven Endoskope nach längerem Nicht-Benutzen des RDG-E. Die nach Wieder-Inbetriebnahme des RDG-E aufbereiteten Endoskope blieben negativ. Hypothese: Kontamination des Spülwassers/Spültanks und Wachstum der Bakterien bei Nichtgebrauch der nicht validierten RDG-E.
- 04/19: Vorübergehende Schliessung der Endoskopie bis zur geplanten Validierung, in der Folge Verwendung eines Leih-RDG-E. Umzug in grössere Räumlichkeiten und Schulung des Personals geplant. Die mikrobiologischen Kontrollen ergaben negative Proben.

Schlussfolgerung: Optimale Voraussetzungen für eine korrekte Aufbereitung von Endoskopen ist keine Selbstverständlichkeit. Die Schulung für das Personal, adäquate räumliche Verhältnisse, korrekte Probenentnahmeorte wie auch regelmässige Wartungen des RDG-E sind unabdingbar. Lange Standzeiten des RDG-E ohne Reinigungsvorgänge hat in unserem Fall mutmasslich zu kontaminierten Endoskopen geführt. Eine Überprüfung der Hypothese mit mikrobiologischer Untersuchung des Spülwassers des RDG-E erfolgte leider nicht.

P140

Acquisitions nosocomiales d'infections par le virus respiratoire syncitial mises en évidence dans un centre de réadaptation gériatrique grâce à la détection simultanée des virus Influenza et RSV

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Contexte :
Le Centre universitaire de traitement et réadaptation gériatrique (CUTR) Sylvana dépendant du Centre hospitalier universitaire vaudois (CHUV) comprend 95 lits répartis sur 6 étages. Chaque année y sont admis > 1400 patients avec une moyenne d'âge de 84 ans. Pendant la saison de grippe saisonnière, une recherche virale est effectuée par frottis naso-pharyngés chez les patients présentant des symptômes grippaux. Le test utilisé combine la détection des virus Influenza et RSV (Xpert, Cepheid). Nous rapportons ici des cas groupés d'infections nosocomiales de RSV détectées grâce à ce test combiné et les mesures de prévention et contrôle de l'infection mises en place.
Résultats :
Au cours de l'hiver 2018-2019, un total de 17 cas d'infections à RSV ont été détectés au CUTR Sylvana entre le 26 décembre et le 3 mars chez des patients avec une moyenne d'âge de 86 ans (extrêmes de 76 à 97 ans), majoritairement des femmes (71%). Au moment du diagnostic d'infection à RSV, les patients étaient hospitalisés depuis une moyenne de 17 jours (extrêmes de 8 à 49 jours). Trois clusters temporels de 5 cas chacun ont été observés : cinq cas sur trois étages entre le 12 et 14.01, cinq autres cas sur deux étages entre le 21 et 31.01 et finalement cinq cas sur trois étages entre le 20.02 au 03.03. Les mesures prises lors de la première flambée ont consisté à la mise en isolement gouttelettes des patients infectés et à une discussion avec les responsables médico-infirmiers afin de rappeler les bonnes pratiques d'hygiène des mains et de port du masque en cas de symptômes respiratoires. Lors de la 2ème flambée, les transmissions ont persisté sur un étage malgré les mesures. Notre investigation a permis de mettre en évidence une patiente positive souffrant de symptômes comportementaux et psychologiques dans le cadre d'une démence avec déambulation dans le service y compris dans les chambres d'autres patients. L'étage incriminé a été mis en quarantaine : arrêt des repas à la salle à manger et de la rééducation en dehors de la chambre, port systématique du masque de soins par tout le personnel dans les zones de soins, y compris par le personnel vacciné contre la grippe.
Conclusions :
L'utilisation du test combiné Influenza/RSV a permis de mettre en évidence plusieurs flambées d'infections nosocomiales à RSV chez des patients d'un centre de réadaptation gériatrique et de proposer des mesures de contrôle de l'infection afin de limiter la transmission.

P141

Whole genome sequencing revealed the dissemination of a vancomycin-resistant Enterococcus faecium clone ST117 in Switzerland

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Background
The Swiss Centre for Antibiotic resistance (Anresis) revealed an increased rate of vancomycin-resistant Enterococcus faecium (VREfm) during the last four years. Meanwhile, a large outbreak occurred in Bern's hospitals, due to a highly epidemic clone (ST-796), raising the concern of inter-hospital spread of this opportunist pathogen. On a voluntary basis, several laboratories sent to the NARA selected isolates of VREfm for molecular typing. Here we report the use whole genome sequencing (WGS) on VREfm isolates for assessing their genetic similarities and inferring putative inter-hospital transmissions.
Material and Methods
Isolates were analyzed by WGS on an Illumina platform at the Genetic unit of the Institute of Microbiology. Whole genome multilocus sequence typing (wgMLST) was used to compare the genetic similarity between isolates (Bionumerics).
Results
Among analyzed VREfm isolates, no strain belongs to the hyper-epidemic clone of Bern (ST-796). However, 23 isolates belonging to ST-117 were grouped within the same cluster with high genetic similarities (0 to 26/2754 loci differences). Epidemiological data revealed that these isolates were recovered from:

- one outbreak of 7 patients in a Vaud hospital in 2016, the index case being a transfer from a Ticino hospital,
- one patient transferred in 2017 from a Northern Italy hospital to a Vaud hospital and was screened positive at admission,
- Four patients from an outbreak in a Ticino hospital
- One patient hospitalized in 2017 in a Ticino hospital,
- One outbreak of 8 patients in another Ticino hospital from 12-2018 to 02-2019.

The number of loci differences between isolates from the Ticino outbreak (0 to 8 loci) is consistent with a direct transmission, whereas diversity between isolates from the Vaud outbreak (2 to 23 loci pairwise differences) suggest the index case was a long-term carrier.
Conclusions
These results highly suggest the spread of a predominant ST-117 VREfm clone in Ticino and Northern Italy hospitals and its inter-hospital transmission.

P142

Unusual carriage of methicillin-resistant Staphylococcus aureus in a maternity ward decrypted by whole genome sequencing

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Background
Despite the decline of methicillin-resistant Staphylococcus aureus (MRSA) in most European countries, it remains a major concern in the hospital setting. A molecular epidemiological surveillance of this pathogen is performed for many years in several western-Switzerland hospitals; at least one isolate per patient is routinely typed by the DLST method (double locus sequence typing).
Material and Methods
Outbreak investigation. Screening of patients and staff members for MRSA. Reinforcement of infection control measures. Molecular and genomic typing.
Results
From May to August 2018, three babies were found to harbour the genotype DLST119-2. An epidemiological investigation was performed and seven other cases were discovered (2 babies, 4 adults and one staff member). Surveillance data showed that this genotype was found mainly in the Jura region first appeared in 2012 and was the cause of an outbreak in the nursery in 2013. In order to decipher if transmission occurred between 2018 cases, these 10 isolates, together with three isolates from the 2013 outbreak and one from 2017, were analysed by whole genome multilocus sequence typing (wgMLST).
Less than 10 loci differences were observed between 2018 isolates, suggesting a common ancestor. As the mean rate of diversification was estimated to be 5 loci per year, direct transmission was suggested between members of one family (baby, mother and farther) and a second family (baby and farther) with a staff member.
Conclusions
These results suggest either a long-term carrier who would have contact with all cases, or undetected links due to a remaining reservoir in the region following the 2013 outbreak.

P143

Impact de l'arrêt des mesures additionnelles contact pour les patients porteurs d'Escherichia coli producteurs de β-lactamase à spectre étendu

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Contexte
La prévalence d'Escherichia coli producteur de β-lactamase à spectre étendu (BLSE) a augmenté ces 10 dernières années. Afin de limiter la transmission nosocomiale de cette bactérie multi-résistante aux antibiotiques (BMR), il avait été recommandé la mise en place des mesures additionnelles contact (MAC) pour les patients colonisés ou infectés par cette bactérie. La pertinence de ces mesures a été remise en question et, en 2014, Swissnoso a préconisé leur abandon. L'objectif de cette étude était de mesurer l'impact de l'arrêt des MAC sur les cas d'E.coli-BLSE dans un centre hospitalier universitaire.
Matériel et méthode
Un cas a été défini comme le 1er prélèvement urinaire (PU) positif à E.coli-BLSE entre le 1er janvier 2007 et le 31 décembre 2018 chez un patient hospitalisé au Centre Hospitalier Universitaire Vaudois (CHUV). Les données ont été recueillies de manière rétrospective dans la base des alertes BMR du laboratoire. Deux périodes ont été définies : P1 (1er trimestre 2007 - 3ème trimestre 2012) et P2 (4ème trimestre 2012 - 4ème trimestre 2018), soit avant et après l'arrêt des MAC pour les patients porteurs d'E.coli-BLSE au CHUV. Une analyse de série temporelle interrompue (STI) a été réalisée afin de mesurer l'impact de cette stratégie sur l'incidence des PU positifs à E.coli-BLSE > 48h après l'admission au CHUV.
Résultats
Au total, 1484 PU positifs à E.coli-BLSE avaient déclenché une alerte BMR ; 889 correspondaient à une primo-identification. Parmi ces derniers, 488 (54,9 %) ont été retrouvés > 48 h après l'admission à l'hôpital. L'incidence moyenne était de 0,15 / 1000 journées d'hospitalisation (JH) en P1 et 0,36 / 1000 JH en P2 ($p < 10\text{-}4$). Elle était de 0,06 / 1000 JH (IC95% : [0,05 - 0,07]) en P1 pour les cas identifiés dès l'admission (≤48h) et de 0,09 / 1000 JH [0,08 - 0,10] pour les cas acquis durant l'hospitalisation (> 48h). En P2, les incidences étaient respectivement de 0,17 / 1000 JH [0,15 - 0,19] et 0,19 / 1000 JH [0,17 - 0,21]. L'analyse de STI ne montre pas d'association significative entre l'arrêt des MAC et l'évolution de l'incidence des PU nosocomiaux positifs à E. coli-BLSE ($p = 0,47$).
Conclusion
Suite à l'arrêt de la mise en place des MAC au CHUV, il n'a pas été identifié de modification significative de l'évolution de l'incidence des PU nosocomiaux positifs à E.coli-BLSE. L'augmentation parallèle des cas d'E.coli-BLSE détectés à l'admission appuie l'hypothèse d'un réservoir majoritairement communautaire.

P144

One year with respiratory viruses – Analysis of non-influenza/non-RSV viral infections in a 380-bed hospital.

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Aims:
Mulitplex-PCR for respiratory infections (Biofire Filmarray Respiratory Panel, bioMérieux) was introduced in our institution in March 2016 and has since gained widespread acceptance.
As a result we are confronted more often with a diagnosis of viral-infection of unclear significance, especially all non-influenza/non-RSV pathogens.
Our aim therefore was to describe the characteristics of patients with non-influenza/RSV-respiratory infections, especially from an in-patient and infection-control point of view.
Methods:
In our 380-bed institution we retrospectively looked at all Respiratory-Multiplex-Panels between 01/2018 and 12/2018. Those who were positive were further analysed using our in-hospital patient-database and the isolation protocols of infection control unit.
We excluded all bacterial pathogens as well as influenza and RS-Virus (the latter due to possible confounding due to an available parallel assay).
We analysed for baseline characterisitcs, age and sex as well as hospitalization and isolation days. Furthermore we looked at differences between in- and out-patients, with a special interest in nosocomial transmissions. We defined nosocomial transmission as positive testing more than 48hours after admission.
Every nosocomial transmission was subsequently analysed to confirm or reject nosocomial transmission.
Results:

- In total 662 tests were performed on in- and out-patients, of which 192 were positive (29%).
- The most common respiratory pathogens were Rhino/Enterovirus (52%), Metapneumovirus (15%), Coronavirus (19%) and Adenovirus (8%)
- 36 patients (23%) with a positive test were admitted for stationary therapy.
- Median age of out-patients was 5y (Quartilen 2-57y), only 22% were > 65y old.
- Median age of in-patients was 69y (Quartilen 58-83y), 72% were > 65y old.
- Median duration of isolation was 4 days (range 2-6d).
- In 7 of 36 inpatients (19%) diagnosis was made more than 48hours after hospitalization and therefore classified as nosocomial
- 6 (86 %) of nosocomial pathogens were Rhino/Enterovirus, 1 was Metapneumovirus
- File-to-File-Analysis of nosocomial cases confirmed only 3 cases as true-nosocomial. All 3 had significant complications.

Conclusion

- Rhino/Enterovirus, Metapneumovirus and Coronavirus account for 86% of all proven respiratory viruses.
- Rhino/Enterovirus alone accounts for 86% of all nosocomial transmissions (100% of true-nosocomial transmissions)
- True nosocomial transmission is rare and can have significant impact.

P145

Antibiotic Consumption and Resistance in Swiss Intensive Care Units over the Last Decade

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Background
ICUs constitute a high-risk setting for antimicrobial resistance (AMR) due to increased patient susceptibility, exposure to broad-spectrum antibiotics (AB) and high patient turnover. We aimed to assess temporal trends regarding AMR and AB use in Swiss ICUs.
Methods
We analysed data on AMR (2009-2018) and AB use (2009-2017) sent to ANRESIS. Only data of ICUs participating for ≥8 years were included. The following pathogens were analysed: extended-spectrum cephalosporin-resistant *Escherichia coli*(ESCR-EC) and *Klebsiella spp.* (ESCR-K), carbapenem-resistant *Enterobacteriales* (CRE) and *Pseudomonas aeruginosa*(CRPA), methicillin-resistant *Staphylococcus aureus* (MRSA), and vancomycin-resistant *Enterococci* (VRE). AMR (one sample per species/patient/year) was expressed as % of all isolates; use of systemic AB (ATC code J01) as defined daily doses (DDD) per 100 beddays (BD); temporal trends were analyzed with linear regression.
Results
Between 2009 and 2018 (15 ICUs from French/Italian-, 13 from German-speaking parts), we observed a significant increase of ESCR-EC from 8% to 17% (P < .001) among a total of 10'844 *E. coli* isolates and of ESCR-K from 7% to 14% (P < .001; n=5'877). Also CRE increased from 1% to 6% (P=.006; n=18'130). Among 4'467 *P. aeruginosa* isolates, 33% were CRPA, with no change over time (P=.63); likewise, no temporal trend was observed for VRE (mean 2% of 5'222). MRSA (n=5'452) are declining over time from 14% to 7% (P=.06).
The overall AB use (13 ICUs from French/Italian-, 10 from German-speaking parts) did not change from 2009 (105 DDD/100 BD) to 2017 (101 DDD/100 BD). Though there was a marked increase of piperacillin/tazobactam (+30%; P=.002) and ceftriaxone (+19%; P=.03), whereas the use of cefepime (+23%; P=.7) and ceftazidime (+20%; P=.9) did not significantly alter. Moreover the use of imipenem decreased (-48%; P < .001) whilst the use of meropenem (+2%; P=.63) and ertapenem (-14%; P=.81) remained stable. The overall use of reserve antibiotics (according to WHO´s AWaRe classification), which did not change significantly (+54%; P=.8).
Conclusion
In Swiss ICUs, resistant Gram-negative pathogens have been steadily increasing over the last decade. Particularly worrisome is the rise of CRE and the high proportion of CRPA showing intermediate or resistant susceptibility towards carbapenems. The overall and reserve AB use is not increasing in this setting, while the use of carbapenems, particularly imipenem, is even decreasing.

P146

Bacterial contamination of ultrasound probes in different radiological institutions before and after specific hygiene training: do we have a general hygienical problem?

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OBJECTIVES:
Aim was to investigate hygienic conditions of ultrasound probes before and after hygiene training in radiology institutions in comparison to bacterial contamination in public places.
METHODS:
In three radiology departments, bacterial contamination was evaluated using baseline agar plates for cultures taken from 36 ultrasound probes. Afterwards teams were trained by a hygiene service centre and 36 ultrasound probes were routinely disinfected with regular disinfecting wipes and then evaluated. In comparison, bacterial contamination in public places (bus poles, n = 11; toilet seats, n = 10) were analysed. Plates were routinely incubated and the number of colony forming units (CFU) analysed.
RESULTS:
Cultures taken from the probes showed a median of 53 CFU before and 0 CFU after training ($p < 0.001$). Cultures taken from public places showed a median of 4 CFU from toilets and 28 from bus poles and had lower bacterial load in comparison to ultrasound probes before training ($p = 0.055$, toilets; $p = 0.772$, bus poles), without statistical significance.
CONCLUSIONS:
Bacterial contamination of ultrasound probes prior to hygiene training proved to be high and showed higher bacterial load than toilets seats or bus poles. Radiologists should be aware that the lack of hygiene in the field of ultrasound diagnostics puts patients at risk of healthcare-associated infections.

P147

Is It Useful To Treat Blastocystis spp.? A Double Blind Randomised Crossover Study.

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Background
Blastocystis spp is frequently found in the stool of travellers presenting with non-specific gastrointestinal symptoms. However, its pathogenic potential is uncertain, and hence treatment usefulness questionable. Successful treatment in some past studies may be explained by metronidazole activity on undetected concomitant infections with other parasites.
Objectives
To evaluate the potential benefit of metronidazole for improving gastrointestinal symptoms of patients found to harbour Blastocystis solely. To explore whether Blastocystis subtype or concomitant parasite infection undetected by microscopy may influence treatment outcome.
Methods
An alert e-mail system identified patients with microscopy positive for Blastocystis. Inclusion criteria included adults with GI symptoms lasting >14 days and with Blastocystis solely. We randomised patients to receive 10 days of metronidazole or placebo, followed by a crossover for those still symptomatic. Stool samples were tested for Blastocystis subtype by sequencing the 18SrRNA gene and for 11 protozoa by PCR.
Results
We screened 474 patients, 424 were excluded [refused (122), comorbidities (88), co-infection (55), recent antibiotics (39), no GI symptoms (33), immunosuppression (22), symptoms < 14 days (19), significant weight loss (17), fever (16), bloody diarrhoea (13)] We randomised 50 patients. 82% of patients reported recent travel, 39% of which to South Asia. The proportion of patients reporting an improvement of symptoms was 48% (12/25) in the metronidazole group, 44% (11/25) in the placebo group. Real-time PCR and subtyping were performed for 80% (40/50) of patients. 25% (10/40) had a PCR positive for another protozoa (Dientamoeba fragilis=6, Entamoeba dispar=2, Cyclospora cayetanensis=2) undetected by microscopy. 10% (4/40) had a negative PCR for Blastocystis spp. Subtyping was successfully determined in 31/36 patients. The most frequent subtypes were ST4 (11/36) and ST2 (10/36). Stratified analysis according to subtype or simultaneous presence of other protozoa showed no significant difference in the benefit of treatment with metronidazole, but numbers were small.
Conclusions
This study failed to show the benefit of metronidazole in improving gastrointestinal symptoms of patients with Blastocystis infection, irrespective of subtype or concomitant infection. The pathogenicity of Blastocystis's subtypes seems thus to be very limited, and the role of concomitant infections remains unclear.

Additional information:
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P148

Comparative analysis of nematode miRNAs using computational prediction of their ability to circulate

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Small non-coding RNAs such as microRNAs (miRNAs) modulate gene expression, thus impacting a variety of eukaryotic physiological functions. In the past decade, great progress has been made on the characterization of excretory/secretory miRNAs of parasitic nematodes, and their ability to modulate host gene expression has become apparent. The ever-increasing amount of sequences stored in the miRBase database enables comparative analyses of parasite and host miRNAs.
This work explores parasite miRNA nucleotide sequences and their conservation across species. Expecting immunomodulatory functions to converge due to their common parasitic lifestyle, their predicted functional roles in their hosts were analyzed. Using the literature and previously published scores representing the likelihood for exogenous miRNA to be found in the host circulation, we designed computational experiments to discriminate secreted (i.e released into host circulation) from non-secreted miRNAs from five species of parasitic nematodes. We assessed the similarity between host and parasite miRNA seed sequences (determining target specificity) and predicted targets for the parasite miRNAs in the host immune system.
This contribution adds up to the body of knowledge of host-nematode interactions and how computational tools may facilitate cross-species comparison when experimental data are lacking. While target pathway enrichment revealed putative effects of parasite secreted miRNAs on host T cell activation and differentiation, further analyses with expanded miRNA sequence input will be required to fine tune the discrimination of secreted from non-secreted miRNAomes.
We conclude that the application of a score to extract secreted/cicrculating miRNAs from miRBase may require additional experimental data and larger datasets to refine the cutoff. Although overrepresented pathways within the host immune system did not overlap as much as expected across species, miRNAs released by nematode parasites seem to converge on modulation of T cell activation and differentiation.

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Identification of novel drug targets in Echinococcus multilocularis by metabolomics

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Alveolar echinococcosis (AE) is caused by the metacestode of the zoonotic parasite Echinococcus multilocularis. Current chemotherapeutical treatment of AE relies on benzimidazoles, but these compounds are not parasiticidal, and therefore life-long treatment is often required with the risk of adverse effects. In some individuals, benzimidazoles are inactive or cause toxicity, leading to treatment discontinuation. Therefore, alternatives to benzimidazoles are urgently needed.
E. multilocularis depends entirely on nutrients from its host and this could offer new ways for targeting the parasite. In vitro intake and release of small metabolites by E. multilocularis metacestodes was analyzed by nuclear magnetic resonance (NMR) spectroscopy metabolite foot printing. Results were confirmed by independent experiments and enzyme-based methods. The amino acid threonine was remarkably highly consumed by E. multilocularis metacestodes. In vitro experiments showed that parasite growth was accelerated by L-threonine. However, the high threonine-consumption could not be fully explained by incorporation into proteins. Preliminary experiments showed increased parasite respiration upon addition of threonine to metacestodes, which might indicate the use of threonine in energy metabolism. Currently, experiments with radiolabeled threonine are ongoing to track down the pathways in which threonine is consumed by E. multilocularis.

P150

Clinical presentation and outcome of untreated febrile children positive by ultra-sensitive malaria tests: a retrospective comparative study.

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BACKGROUND
Many malaria infections are missed by standard rapid diagnostic tests (sd-mRDT) due to limited sensitivity for low-density (LD) parasitaemia. The clinical impact of these missed infections is unknown. This study investigates the clinical presentation and outcome of febrile children with LD infections attending primary care facilities in a moderately endemic area.
METHODS
2801 febrile paediatric (2 - 59 months) outpatients in Dar es Salaam, Tanzania, were included. All were managed with standardised electronic clinical algorithms where only sd-mRDT+ cases received antimalarials. Frozen blood was tested for Plasmodium falciparum (Pf) by ultrasensitive qPCR (us-qPCR). Clinical features and outcomes in LD patients (sd-mRDT-/us-qPCR+, not given antimalarials) were compared to those with undetectable malaria (ND: sd-mRDT-/us-qPCR-) or high-density infections (HD: sd-mRDT+/us-qPCR+, antimalarial-treated).
RESULTS
Pf positivity was 7.1% and 9.8% by sd-mRDT and us-qPCR respectively (28.0% us-qPCR+ cases were missed by sd-mRDT). Compared with ND, LD patients more frequently had fever-without-focus with suspected viral origin (RR = 2.0; 95%CI = 1.3 - 3.1; p = 0.003) and severe malnutrition (RR = 3.2; 95%CI = 1.1-7.5 p = 0.030). No differences between LD and ND were seen for clinical failures (2.6% vs 4.0%; RR = 0.7; 95%CI = 0.2-3.5; p = 0.694) or secondary hospitalisations (2.6% vs 2.8%, RR = 0.7; 95%CI = 0.2 - 3.2; p = 0.888). HD patients, however, experienced more secondary hospitalisations (10.1%; RR = 0.3; 95%CI = 0.1-1.0; p = 0.005).
CONCLUSIONS
Febrile children with untreated LD Pf parasitaemia did not develop clinical malaria nor did they experience any other negative consequences during a 28-day follow-up. Thus, ultra-sensitive malaria diagnostics would probably not bring clinical benefit nor risk at the primary care level.

P151

Strongyloides stercoralis prevalence and diagnostics at the Mahosot Hospital in Vientiane, Laos

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Background and Aims:
The soil-transmitted threadworm Strongyloides stercoralis causes one of the most neglected helminth infections in humans, despite 370 million people are estimated to be infected worldwide. Infection can lead to hyperinfection and dissemination in immunocompromised patients with a very high fatality rate. An overall country-wide S. stercoralis prevalence of 30.8 % has been estimated for Lao PDR, relating to community-based surveys. Diagnosis of strongyloidiasis is crucial for prevention of life-threatening complications. Currently used diagnostic methods have a very low sensitivity. We prospectively analyzed stool samples from patients admitted to the Mahosot hospital, Vientiane, with four different methods (wet smear, Baerman larval concentration, Koga agar cultivation (KAPC) and real-time PCR) for the presence of S. stercoralis.
Methods:
A prospective, hospital-based study was conducted between September and December 2018 enrolling in-patients from Infectious Diseases ward at Mahosot Hospital. In addition to the routinely performed wet smear, the Baerman concentration method and the KAPC was performed at the Mahosot hospital in Laos. Real-time PCR analysis of stool samples was performed at the Diagnostic Center of Swiss TPH in Basel, Switzerland. Results of the four methods were compared and prevalence rates, as well as sensitivity were calculated using the combined results.
Results:
Stool samples of 104 patients were analyzed with all four methods. The following positivity rates were determined: wet smear 2.9 % (n = 3; 95 % CI: 0.6-8.2 %), Baermann 20.2 % (n = 21; 95 % CI: 12.9-29.1 %), KAPC 20.2 % (n = 21; 95 % CI: 12.9-29.1 %) and real-time PCR 25 % (n = 26; 95 % CI: 17.0-34.4 %). When combining the two methods Baermann and KAPC, the prevalence increased to 26% (n = 27; 95 % CI: 17.9-35.5 %). A combination of all diagnostic methods led to a S. stercoralis infection prevalence of 33.7 % (n = 35; 95 % CI: 24.7-43.5 %).
Conclusion:
Wet smear analysis alone, the current gold standard at Mahosot hospital, detected S. stercoralis infection in only 2.9% of the study participants whereas real-time PCR had the highest detection rate with 25%. However molecular methods are costly and need well equipped laboratories. The combination of Baerman concentration and KAPC- both simple and low cost techniques- showed a slightly superior detection rate of 26% and therefore the combination is the recommended tool for Mahosot Hospital.

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Schistosoma real-time PCR in serum as powerful diagnostic tool in migrants and Swiss travelers

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Aims
Schistosomiasis is one of the most prevalent parasitic diseases worldwide and the infection frequently affects travelers and migrants. Currently diagnostic methods are limited to the microscopic detection of eggs in stool or urine, a point-of-care test detecting Circulating Cathodic Antigen (POC-CCA) in urine and serological detection of antibodies. However, diagnosis of active schistosomiasis remains challenging because of serum scars and low sensitivity of microscopy and POC-CCA. Previously, detection of a multicopy gene of Schistosoma (ccfDNA) by real-time PCR from serum has been described for Schistosoma mansoni and Schistosoma haematobium as a tool to diagnose early stages of infection. We evaluated this detection of ccfDNA by real-time PCR in serum to discriminate active infection from past infection in sera showing antibodies to Schistosoma spp.
Methods
We retrospectively analyzed 78 sera from patients with suspected Schistosomiasis that were sent to our laboratory for serological investigation for Schistosoma antibodies. DNA was extracted from 0.5 - 2ml serum from 35 samples of sera-positive patients, 39 sera-negative and 4 sera-insecure patients. One patient was prospectively followed after treatment in two-monthly intervals for over 8 months.
Results
S. mansoni ccfDNA was detected in 18 of 35 antibody positive serum samples and S. haematobium ccfDNA was detected in one of these 35 samples. All POC-CCA positive and microscopy positive patients were confirmed by S. mansoni ccfDNA. We detected ccfDNA in four samples with positive serology but negative microscopy. In addition, we detected S. mansoni ccfDNA in one patient with positive serology but negative CCA test and in one patient with repeatedly insecure serology. Thus, infection was confirmed and a species diagnosis was achieved in 19 of the 35 (54%) serum positive samples including multiple diagnostically difficult samples. On the other hand, active infection was excluded in 16 of 35 sera-positive, 3 of 4 sera-insecure and in all of sera-negative patients. Prospective follow-up of one patient after treatment showed a continuous decrease of detectable ccfDNA for 4 month before disappearance.
Conclusion
The ccfDNA-PCR is a promising tool for the diagnosis of active infection with Schistosoma spp. and for the discrimination of serum scars due to past exposure from active infection. According to our preliminary data, the ccfDNA-PCR seems a suited tool for treatment control.

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Prevalence and risk factors of animal schistosomiasis and fascioliasis in Côte d'Ivoire

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Schistosoma and Fasciola species are zoonotic parasites of public health importance. They cause significant human and animal diseases, including economic losses in the livestock sector. Both parasite genera are present in Côte d'Ivoire but while the epidemiology of schistosomiasis in humans has been well studied, prevalence data of fascioliasis and schistosomiasis in livestock is sparse. In March and August 2018, a cross-sectional study was conducted in 10 departments in the central and northern parts of Côte d'Ivoire to evaluate the prevalence of schistosomiasis and fascioliasis and identify risk factors in livestock. Adult Schistosoma and Fasciola were collected in abattoirs by examining the mesenteric veins and livers of slaughtered cattle, sheep and goats. Additionally, faeces from live cattle, sheep and goats were collected on farms to detect eggs of Schistosoma and Fasciola by using a sedimentation technique. A total of 304 cattle, 112 goats and 71 sheep from abattoirs and 435 cattle, 22 goats and 176 sheep from farms were included in the study. Prevalence was higher in abattoirs than on farms. In slaughtered animals, Schistosoma bovis was present in all 10 departments. The prevalence of schistosomiasis in slaughtered cattle varied between 9.4% (95% Confidence Interval (CI): 2.0-25.0) and 53.3% (CI: 37.9-68.3) with the highest prevalence in Ouangolodougou (northern Côte d'Ivoire). Cattle from farms had a relatively low prevalence of schistosomiasis, with the highest prevalence in Ouangolodougou (2.4%, CI: 0.7-6.1). The prevalence of fascioliasis ranged between 0.0% (CI: 0.0-18.5) and 50.8% (CI: 43.4-58.2), with the highest prevalence in farm cattle in Dikodougou (northern Côte d'Ivoire). Sheep and goats had lower prevalences of schistosomiasis and fascioliasis than cattle. The highest prevalence of Schistosoma and Fasciola were found in slaughtered sheep in Ferkessédougou (7.1%, CI: 0.2-33.9), and farm sheep in Sinématiali (north) (12.2%, CI: 6.3- 20.8), respectively. The prevalence of schistosomiasis and fascioliasis were statistically not different between sexes, age groups and breeds in slaughtered and farm livestock. Schistosomiasis and fascioliasis are prevalent in livestock in abattoirs and farms across Côte d'Ivoire and animals are at risk regardless of sex, age and breed. Animal reservoirs play an important role in the transmission of zoonoses and therefore, it is vital to have an understanding of the epidemiology of schistosomiasis and fascioliasis in livestock in order to efficiently control and eliminate these diseases in humans.

Key Words: Epidemiology, schistosomiasis, fascioliasis, livestock, Côte d'Ivoire

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Genetic Diversity and Transmission Dynamics of Schistosoma and Fasciola in Côte d'Ivoire

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Schistosoma and Fasciola are parasitic blood and liver flukes, respectively, that cause considerable human morbidity and economic loss to the livestock industry. While schistosomiasis and fascioliasis have different global distributions, both cause public health and veterinary problems in West Africa. Population diversity and distribution of genotypes can reveal valuable information about population structure and transmission dynamics for animals and humans involved in the same transmission cycles. The relationship between humans and animals in the transmission cycle can seriously affect the success of control and elimination programmes because spill-overs are always a risk when animal reservoirs remain.

This study aims to provide unequivocal species identification of all specimens by molecular means and describe genetic diversity and transmission dynamics of Fasciola and Schistosoma populations in Côte d'Ivoire using a 'One Health' approach. Of particular interest is the transmission of parasites between human and livestock populations and hybridization within the two specific parasitic genera. Flukes (from slaughtered livestock in abattoirs) and miracidia (from stool and urine of humans and livestock) were sampled from villages, farms and abattoirs in 15 departments across Côte d'Ivoire. Polymerase chain reaction and sequencing of the ITS1/2 and cox1 loci as well as microsatellites were performed on the DNA from flukes and miracidia in order to identify species and to determine genetic diversity and gene flow using phylogenetic and population genetics methods.

Parasites populations were compared based on geography (north vs. south), host species (cattle vs. sheep or humans) and within individual hosts (populations within a single host compared to another host). Genetic diversity of Fasciola in Côte d'Ivoire appears to be low in mitochondrial DNA and all specimens appear to be F. gigantica. Schistosoma in animals appear to be S. bovis, while hybrids of S. bovis x S. haematobium appear prevalent in humans.

Transmission dynamics of parasites are an important, albeit often overlooked, factor when considering control programmes. This project uncovers genetic diversity and gene flow of Fasciola and Schistosoma, therefore revealing the transmission dynamics, within and between individuals, host species and regions in Côte d'Ivoire.

Key Words:
Fasciola gigantica, Fasciola hepatica, Schistosoma, Africa, Genetic Analysis

P155

The effect of recall period in the measurement of Household out-of-pocket health expenditure: Evidence from an experimental study in northern Ghana

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Background: Financial risk protection is a key component of universal health coverage. Measuring out of pocket payments (OOPs) through household surveys is challenging and recall bias has been identified as one of the main sources of bias in previous studies. This study investigates the effect of two different recall periods on reported OOPs. Methods: We used data on OOPs from health providers and community surveys using two versions of the same survey instrument adapted from the world health survey and living standards measurements survey. We compare estimates of households OOPs related to health services using recall of 2weeks for medicines and outpatient care, 3months for preventive care and 6months inpatient care and medical products for one questionnaire version and 4weeks for medicines and outpatient care, 6months for preventive care and 12months for inpatient and medical products in the other questionnaire version. We estimated the ratio of the mean annualized OOPs from the two recall periods, and the mean bias and variability between household expenditures and their corresponding provider data using the Bland-Altman method. Findings: We surveyed 800 and 480 households in the two recall periods respectively, of which 48% and 58% respectively had incurred OOPs, of these, 73% and 81% of the households could be successfully matched to provider records. For both recall periods, OOPs reported by the households were 4 times higher than provider in the first recall period group and about 2 times higher than those of the provider in the second recall period group. There was no evidence of a difference in the overall bias by recall period for OOPs, either by comparing the mean of the OOPS reported by households or using provider records as the gold standard. There was substantial variability in the ratios of individual household to provider OOPs. Conclusion: This study suggests that a recall period of 6 months and 12 months for inpatient care or 2 weeks and 4 weeks recall period for asking about OOPs for medicines do not yield substantially different estimates.
Keywords: Recall period, out-of-pocket, universal health coverage, household survey, comparability, validation, Ghana

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Effect of number of health expenditure items on Out-Of-Pocket estimates using new COICOP classifications: Evidence from Northern Ghana

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Background: Measuring out of pocket payments (OOPs) through household surveys is challenging. The effect of number of health items on OOPs has been identified as one of the main sources of bias in measuring OOPs. This study experimentally tests the independent effect of number of Health items in the measurement of OOPs. Methods: Two sources of data was used for this study; health provider data and household OOPs data. Household data was derived from three versions of the same survey instrument adapted from the world health survey, living standards measurements survey and new COICOP classes of health expenditure. We compare estimates of households OOPs related to health services using 11 health items for one version, 44 health items for a second versions and 56 health items for a third version. We estimated ratio of the average OOPs from the three groups, the mean bias and variability between household expenditures and corresponding provider data using Bland-Altman method of agreement.
Findings: We found evidence of difference in the overall bias by levels of disaggregation for OOPs in inpatient care and medications. More detail levels of disaggregation yielded lower OOPs estimates than aggregated levels of health expenditure items. There was no substantial variability in the individual OOPs ratios across different levels of disaggregation of health items. Conclusion: Our findings suggest that, systematically decomposing health expenditure items into finer sub-classes tend to produce smaller OOPs estimates which also tend to have lower agreement when compared to provider estimates

Keywords
Health items, out-of-pocket, universal health coverage, household survey, comparability, validation, Ghana

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Clinical outcome of febrile children with severe malnutrition identified using anthropometric measures versus clinical signs to detect nutritional risk factors: a subgroup analysis of the ePOCT randomized controlled trial in Tanzania

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Children with malnutrition are at higher risk of infection, with more severe outcomes. How clinicians are to assess nutritional risk factors in febrile children in primary care is unclear. The aim of this substudy is to compare the clinical outcome of children with severe malnutrition when using two different diagnostic strategies to identify and manage nutritional risk factors.
We conducted a post-hoc subgroup analysis of children with severe malnutrition enrolled in a randomized, controlled trial of febrile children in 9 primary care centers in Dar es Salaam, Tanzania. The clinical outcome of children with severe malnutrition was compared between those managed using ePOCT, a novel electronic clinical decision algorithm that used a combination of weight for age and mid-upper arm circumference to identify and manage nutritional risk factors, and those managed using ALMANACH, an electronic 2008 IMNCI-derived algorithm that used the clinical signs of edema of both feet and/or visible severe wasting.
From December 2014 to February 2016, 3192 children were randomized into the main study, of whom 106 were included in the present analysis. ePOCT identified 56/57 children with severe malnutrition, while ALMANACH identified 2/49. Those identified with severe malnutrition were prescribed antibiotics and referred to the hospital in both arms. Using ALMANACH, an additional 21 patients received antibiotics and an additional 5 patients were referred to the hospital for other reasons. The proportion of clinical failure by D7 (per-protocol) was 1.8% (1/56) using ePOCT versus 16.7% (8/48) using ALMANACH (risk difference -14.9%, 95% CI -26.0%, -3.8%; risk ratio 0.11, 95% CI 0.01, 0.83).
Anthropometric measures identified more children with severe malnutrition than clinical signs alone resulting in better clinical outcomes among children with acute febrile illness.

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FeverTravelApp : A Clinical Decision Support Algorithm For Managing Fever In The Returning Traveller and Migrant.

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Background
Most infections causing fever in returning travellers and migrants are self-limiting, but some pose a daunting management challenge, either because they are potentially life-threatening or relatively rare. Mobile electronic clinical decision support tools are ideal to guide physicians in place and time of need. We, therefore, developed www.fevertravel.ch, a website providing interactive practice guidelines based on a systematic review of the literature that needs now to be transformed in a user-friendly app that could be easily updated in real time.
Objective
To describe the design and development of FeverTravelApp, a mobile clinical decision support algorithm to help primary care and outpatient department physicians managing fever in returning travellers or migrants.
Methods
The medical team updates the guidelines while a mixed team of medical/IT specialists develops a platform allowing non-IT developers to update the algorithm themselves. The consultation process elements were classified into ten groups: demographic/travel characteristics, exposures, symptoms, signs, working diagnoses, basic and specific lab tests, final diagnoses, treatments and management. For each working diagnosis, a tree was constructed i) backward by combining qualitatively clinical predictors (so that the estimated diagnosis probability falls above the testing threshold) and ii) forward proposing the relevant lab tests and, based on the results, the appropriate treatment/management (if the estimated disease probability falls above the treatment threshold). In a second step, quantitative values for predictors' accuracy and diseases probabilities will be added, that can be modified in the future based on real patient data accumulated by using the app.
Results
An alpha version of the app was developed using an iterative testing process to debug, update, evaluate and improve the app. The beta version will be presented during the meeting and participants will have hands-on experience with the App. One big challenge, user experience, is being assessed through a qualitative study involving GPs and simulated patients.
Conclusion
The present version of FeverTravelApp is being improved, especially to take into account the physicians' user experience aspects. Its safety and clinical effectiveness will be evaluated, first through a retrospective analysis using patient data collected prospectively, and later on in a prospective clinical trial.

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Ostreopsis ovata: An ancient Hawaiian curse strikes the Mediterranean

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Introduction
An ancient Hawaiian legend tells the story of how Maui villagers killed a Shark God guilty of eating fishermen. They burned him and tossed his ashes into a tide pool. Soon, brown anemones started to grow in it. Later, the villagers discovered that any weapon smeared with these anemones would turn lethal. The little anemones came to be known as “Limu Make O Hana” or Seaweed of Death from Hana. Sampling of water from that legendary tide pool clarified the origin of the potent venom, palytoxin (PLTX) and PLTX-like substances produced by tropical corals and microalgae responsible for harmful blooms.
Case description
We report the case of a 42-year-old woman evaluated in Lausanne university hospital emergency department for dyspnoea on exertion, chest pain and cough. Past medical history was only relevant for chronic rhinitis. Travel history revealed a recent two-week stay in the Apulia region in southern Italy. Clinical examination showed scattered wheezes; laboratory tests and chest x-ray were normal. Further questioning revealed that she had recently experienced low-grade fever, myalgia, cough and conjunctivitis short after a stay on a beach, which had been declared at risk for Ostreopsis ovata bloom. This microalga can produce toxins of the palytoxin group. The patient's partner, her daughter and three friends had all experienced similar symptoms.
The patient's symptoms resolved after a 2-week course of inhaled long-acting bronchodilators and corticosteroids.
Discussion
Intoxications are relatively rare in the Mediterranean, but frequency, intensity and toxicity of algal blooms are increasing because of global warming. Humans may get intoxicated through ingestion of seafood acting as toxin bioaccumulators, through direct contact with corals (e.g. aquarium hobbyists), or through inhalation of aerosolized particles. Symptoms vary according to the route of exposure, ranging from rhabdomyolysis and cardiac arrest when ingested, to a mild flu-like respiratory illness for 1-2 days when inhaled. Treatment is supportive.
Our patient reported a single exposure probably through inhalation and an uncommon symptoms' duration for more than 14 days.
Conclusion
Our case raises clinicians' awareness about this emerging problem. Climate change, human activities and travel are spreading these tropical microalgae to our temperate areas.

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P160

Measles induced by MMR vaccination in a patient treated with natalizumab

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Background:
Natalizumab is an effective and well tolerated monoclonal antibody treatment for the prevention of relapse and progression of relapsing-remitting multiple sclerosis (RRMS) (1). The extent of its immunosuppression is unclear, resulting in contradictory recommendations for the administration of live-attenuated vaccines during natalizumab treatment (2-6).
Case description:
We describe here a case of vaccine-induced measles in a 35 year old patient with RRMS treated with natalizumab for the past three years. Before a change in her treatment in favor of fingolimod, her vaccinations were updated and following the local recommendations (3), she was vaccinated with the live attenuated measles, mumps, and rubella (MMR) vaccine, after discussion of the potential risk and evidence available. Seven days after vaccination she described diffuse muscle pain and fatigue, followed by fever, sore throat and thereafter an erythematous maculopapular rash that spread initially from the trunk and then to the extremities. No travel history or measles exposure was reported. A Measles PCR throat swab confirmed our suspicion of measles.
Discussion:
This is the first case of vaccine induced measles in a patient treated with natalizumab, based on a comprehensive search of PubMed and the Vaccine Adverse Event Reporting System.
Natalizumab, is a disease-modifying agent (DMT) that reduces the ability of T-cells to cross the blood-brain barrier (7), with CD4:CD8 ratios in cerebral spinal fluid of patients treated with natalizumab found to be decreased, findings often associated with central nervous system (CNS) immunosuppression and opportunistic infections (8, 9). While Natalizumab treatment has been associated with a higher risk of progressive multifocal leukoencephalopathy (10, 11), a CNS opportunistic infection, and possibly CNS herpesvirus infections (12, 13), there does not seem to be any data suggesting non-CNS immunosuppression.
Conclusion:
There is insufficient evidence to conclude that natalizumab treatment could favor the onset of vaccine-induced measles, and further reports are needed. While it may be prudent to avoid live-attenuated vaccines, this must be balanced with the risk of acquiring wild-type measles, which is globally on the rise since 2016 (14).

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7-year Outcome Analysis of the Tuberculosis Programme at the Centre Hospitalier Régional Spécialisé (CHRS) in Macenta, Forest Region, Guinea-Conakry

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Background
We report population characteristics and treatment outcome data of the tuberculosis program between 2010 and 2016.
Methods
The main outcome is treatment success (cured plus treatment completed) in new patients, according to WHO and the Guinea tuberculosis program.
Results
We included 3438 patients (1246, 36.2% female) with a median age 35 years (interquartile range (IQR) 25 - 47), of which 5.1% were children < 15 years. Most patients came from Macenta town and surroundings (45.4%). For patients from other places within Guinea, the median distance was 94 km (IQR 73 - 253 km, max. 608 km), and 106 (3.1%) came from neighbouring countries.
Pulmonary tuberculosis was the main presenting form (n = 2844, 82.7%), of which 2209 (78%) were sputum positive by microscopy and 635 (22%) sputum negative. Extrapulmonary manifestations of tuberculosis (17.2% of total) were pleural (6.3%), spinal (5.0%), lymph node (1.9%), peritoneal (1.3%), and other (2.9%).
HIV was tested in 88.2% of all patients, 605 (17.6%) tested positive. Among these patients, 331 (54.7%) were already on antiretroviral treatment.
The main outcome was the percentage of new TB patients (n= 3050) successfully treated: 75.2% (sputum-positive patients 78.4%, all other patients 69.3%). Death occurred in 11.6%, treatment failure in 2.5%, 10.8% of patients were not evaluated or lost to follow-up.
In a multivariable regression model, the following factors at treatment start were statistically significantly ($p < 0.05$) associated with treatment success: age (per 10 year increase above 15 years) adjusted odds ratio (aOR) 0.87 (95% confidence interval (95% CI) 0.82 - 0.92); distance from clinic (per 100km further away) aOR 0.94 (0.89 - 0.99); and HIV status: HIV-positive on antiretroviral treatment (ART) aOR 0.32 (0.24 - 0.42) and HIV-positive not on ART aOR 0.28 (0.21 - 0.38). The following factors were not associated with treatment success: sex, year of treatment start, treatment start in years with ongoing Ebola epidemic (ie. 2014 + 2015) or unknown HIV-status.
Conclusion
HIV co-infection, distance to clinic and age were factors that contributed to the missing gap to reach WHO goals of > 90% treatment success in new patients.

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