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Supplementum

Abstracts

**Jahrestagung 2021
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**Réunion annuelle 2021
de la Société Suisse de Médecine Intensive SSMI**

Interlaken, 22.–24. September 2021 | 22–24 septembre 2021



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O01

Iatrogenic events contributing to paediatric intensive care unit admission

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AIMS: To identify the incidence of iatrogenic events leading to paediatric intensive care unit (PICU) admission and to analyse these patients regarding demographic, illness severity and outcome parameters.

MATERIAL AND METHODS: This was a retrospective case series. The computerised charts of all patients admitted to the multidisciplinary, tertiary, 18-bed PICU in 2014 were analysed. Iatrogenic events leading to PICU admission were identified and their preventability assessed. Underlying diseases, causes of iatrogenic events, illness severity at PICU admission, presence of complex chronic conditions, patient origin, length of stay on the PICU and outcome were analysed.

RESULTS: There were 138 admissions associated with iatrogenic events out of 1102 admissions (12.5%). Ninety iatrogenic events led to unplanned admissions and 48 cases concerned scheduled admissions, where the iatrogenic event would have led to PICU admission by itself or caused a second, planned PICU admission for re-operation. Iatrogenic complications during surgery (31% of all iatrogenic events), wrong management decisions / delayed diagnoses (20%) and nosocomial infections (14%) were the categories most often involved. Regarding origin of the patients, the greatest difference between iatrogenic event admissions and non-iatrogenic event admissions was found for the ward (21% vs 11%). The patients admitted for iatrogenic events had a higher mean expected mortality (8.4 vs 4.7%, $p = 0.02$) and a higher observed PICU mortality (5.8 vs 3.3%, $p = 0.15$). Of all iatrogenic events, 60.1% were judged to be preventable. The highest preventability rate was found in the categories “nosocomial infections” (100%) and “management decisions / delayed diagnoses” (92.9%).

CONCLUSION: In our setting, the number of PICU admissions associated with iatrogenic events is significant and comparable to adult data on admission to ICU caused by iatrogenic events. The categories with most potential for improvement are nosocomial infections and the wrong management decisions / delayed diagnoses. Focused measures on these iatrogenic events may have a major impact on patient outcome, availability of PICU resources and healthcare costs.

O02

PREPICare: An intelligent, pressure distributing positioning system for critically ill neonates in paediatric intensive care: First insights from a pilot studyB Brotschi Aufdenblatten¹; A Müller²; M Camenzind²; R Staempfli²; N Fromme²; R Zemp³; A Breuss⁴; P Wolf⁴; B Taylor⁵; R Rossi²; A Schluer⁶

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Aim and background: Severely ill neonates in paediatric intensive care units (PICU) regularly suffer from support surface-related pressure ulcers, with an incidence of 28% (1, 2). Besides provoking pain and stress for the affected individual, pressure ulcers make treatment of life-threatening illnesses more challenging and considerably prolong the hospital stay. Standard foam mattresses on which the neonates lie may cause pressure peaks causing pressure ulcers. Therefore, we have developed an air-mattress to better distribute the pressure. In this pilot study, we measured for the first time the interface pressures experienced by neonates lying on standard foam mattresses and compared them to pressures when our new air-mattress was applied.

Material and methods: A novel laser-welded air-filled mattress with pressure redistributive and peak reductive capacity was developed. In this pilot study, we measured 5 critically ill, sedated, intubated and ventilated neonates. Surface pressures were measured using a textile pressure sensitive mat (Sensomatic GmbH) in order to identify zones of elevated pressures for both the standard foam mattress and the air-mattress.

Results: In all 5 neonates elevated pressure values were measured at the occiput, the shoulders and the sacrum (range 15 – 27 mmHg) in comparison to the other body regions for both the foam mattress and the air-mattress. For all neonates the mean of the interface pressures was reduced in the air-filled sequence, compared to foam-mattress, with differences ranging from 9% to 29% ($p = 0.03$). For all neonates, the average of the 10% highest interface pressure values (number of values $n = 9451$) was reduced in the air-filled sequence, compared to foam mattress, with differences ranging from 23% to 41% ($p = 0.03$).

Conclusion: With this pilot study, for the first time the potential benefit of an air-filled surface regarding pressure distribution for critically ill PICU patients in a real life setting has been shown. The air-filled mattress redistributed pressures over a larger area with reduced peak pressure magnitudes compared to the foam mattress. More research and innovation in this field is needed to further ensure safe, as well as patient-adapted, pressure ulcer prevention surfaces development. This is of high relevance to optimize outcome for children treated in this highly vulnerable setting, especially during the early years of life.

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O03

Evolution of mortality over time: results from the COVID-19 Swiss hospital surveillance system (CH-SUR)M Roelens¹; A Martin¹; B Vidondo²; A Iten³; A Cusini⁴; D Flury⁵; M Buettcher⁶; F Zukol⁷; C Balmelli⁸; P Zimmermann⁹; N Troillet¹⁰; D Vuichard-Gysin¹¹; PW Schreiber¹²; S Bernhard-Stirnermann¹³; S Tschudin-Sutter¹⁴; Y Nussbaumer-Ochsner¹⁵; R Sommerstein¹⁶; R Gaudenz¹⁷; J Marshall¹⁸; F Maximiano²; B Fricker²; G Schuepbach²; S Harbarth³; A Widmer¹⁴; M Vázquez¹⁸; L Damonti¹⁸; C Kuhm¹⁹; T Riedel⁴; U Heininger²⁰; C Berger²¹; N Corti²²; A Uka²³; A Niederer-Loher²⁴; P Kaiser²⁵; S Kuster²⁶; M Maeusezahl²⁶; M Wymann²⁶; C Scheuter²⁶; C Gardiol²⁶; O Keiser¹

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Introduction and aim: The assessment of COVID-19 associated mortality is crucial to evaluate the impact of the pandemic and to assess the effectiveness of measures. We aimed to investigate trends in COVID-19 related mortality over time in Switzerland, using data from the COVID-19 Hospital-based Surveillance (CH-SUR) database.

Methods: CH-SUR is a prospective hospital surveillance system for COVID-19 patients from 21 hospitals. Considering four different time periods corresponding to the different waves of COVID-19 in Switzerland (Spring, Summer, Autumn 2020, Winter 2021), we calculated crude and adjusted mortality rates and performed survival analyses using Fine & Gray survival models accounting for competing risks. Similar models were conducted for patients admitted to ICU.

Results and Discussion: Overall 16,967 episodes and 2,307 deaths were recorded. Crude in-hospital mortality rates were 15.6% in the 1st and 14.4% in the 2nd wave; for ICU patients it was 24% and 31.3% respectively. Patients were slightly older (median 73 vs 63 years), more likely male (59.9 vs 58.5%) and more comorbid (62 vs 60%) in the 2nd than the 1st wave. Dexamethasone use also increased during the second wave. The adjusted risk of death was lower for hospitalised patients during the 2nd compared to the 1st wave (HR 0.75, 95% CI 0.73 – 0.77). In contrast, the risk of death in patients admitted to ICU was higher during the 2nd wave (HR 1.62, 95% CI 1.54 - 1.70) and patients with invasive ventilation also had a higher mortality (HR 2.10, 95% CI 1.99 - 2.20).

Conclusion: The lower mortality in the second wave compared to first wave was not explained by changes in demographic characteristics, but may be explained by more effective patient care. Especially in the western part of Switzerland, ICU capacity in several cantons reached almost its limits during several weeks in the 2nd wave, which might have contributed to the higher mortality of patients in ICU.

O04

Prolonged mechanical ventilation in patients with terminated status epilepticus and outcome: an observational study

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Background: Status epilepticus (SE) a neurologic emergency with high morbidity and mortality often requires neurointensive care including mechanical ventilation (MV) 1-5. Although initially lifesaving and a useful measure to protect airways, intubation carries the risk of side effects and promotes ventilation-associated pneumonia (VAP) during MV that are associated with unfavorable courses of SE 6,7. Despite this, clinicians tend to underestimate the capacity of patients to breath successfully when disconnected from ventilators 8,9. Delayed extubation in neurocritically ill patients not meeting established extubation criteria is critical, as it increases the risk of complications 10.

Aim: To investigate the frequency and clinical associations with adult SE patients requiring MV, and to identify predictors and the impact of prolonged MV after SE termination.

Material and methods: From 2012-2018, SE patients treated on the ICUs at a Swiss academic care center were included. Primary outcomes were frequency and duration of MV, prolonged postictal MV > 24 hours, no return to pre-morbid neurologic function, and in-hospital death.

Results: Of 262 patients, 42% were ventilated with 24% on prolonged postictal MV. Ventilated patients had a lower Glasgow Coma Score (GCS) at SE onset, higher proportions of nonconvulsive SE and presumed fatal etiologies, and more severe and longer SE. Patients with prolonged postictal MV were extubated at a median of 7 days with 56% not being extubated despite being weaned from MV. Reasons for this delayed extubation were altered consciousness (56%) and lack of airway-protective reflexes (17%). Non-invasive ventilation was performed in 4.6% and re-intubation in 3.7%. Prolonged postictal MV was associated with increased relative risk for death independent of potential confounders (RR 2.7; 95% confidence interval 1.1-6.6; $p = 0.02$). While at SE onset, decreased GCS and presumed fatal etiology independently predicted prolonged postictal MV, duration of anesthesia did not correlate with prolonged MV.

Conclusions: Our data reveal that prolonged postictal MV is frequent and an independent risk of in-hospital death. Extubation is often delayed for days despite weaning from the ventilator and altered airway-protective reflexes in only few patients. Studies need to investigate whether more rigorous extubation strategies improve outcome.

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O05

Initial albuminemia and albumin administration in severely burned patients; do they matter?

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Background & aims: During burn shock, the early use of albumin to decrease the fluid requirements, mortality or acute kidney injury (AKI) has always been debated. We hypothesized that early hypoalbuminemia was an independent risk factor for mortality and that early albumin administration was associated with a decrease in mortality, AKI, dialysis and fluid requirements.

Materials and methods: This retrospective, single-center study was conducted in the burn intensive care unit of Lausanne University Hospital between 01.01.2006 and 31.12.2018. Inclusion criteria were age ≥ 14 years and burns > 20 % total body surface area (TBSA). Exclusion criteria were admission > 8h after burn accident, transfer in the first week to another burn unit or withdrawal of therapy during the first 72h.

Results: 141 patients were included, with burns 35 (24-50) %TBSA, age 39 (26-56) years, 68.1% were male and 56.7% had inhalation injury. ABSI score was 8 (7-10). 17 (12%) patients died. Minimal albuminemia in the first 24h was lower in non-survivors (15 (14-20) vs. 24 (19-31) g/l; $p < 0.001$) and was found to be an independent risk factor for mortality when adjusted for ABSI ($p < 0.001$) with a best cut-off of 22 g/l to predict mortality (sensitivity 63.6 %; specificity 87.5 %). In univariate analysis, albumin 20% was administered more often to non-survivors (12 (71%) vs. 30 (24%); $p < 0.001$), in increased quantities (47 (25-58) vs. 30 (10-40) g; $p = 0.030$) and earlier (9 (5-13) vs. 18 (14-20) h; $p < 0.001$). AKI was more frequent in albumin recipients (29 (69%) vs. 33 (33%); $p < 0.001$). The logistic regression model adjusted for ABSI found that albumin administration increased the risk of developing AKI in the first 7 days (OR 1.03 (95% CI 1.00-1.05); $p = 0.035$), without any significant effect on mortality or fluid requirements. Increased quantities of albumin administered in the first 7 days was associated with higher cumulated fluid balance, even after adjustment for TBSA.

Conclusions: Hypoalbuminemia < 22 g/l in the first 24h was found to be an independent risk factor for mortality. Albumin administration was associated with an increase of AKI, without significant reduction of fluid requirement at 24h, but with an increase of fluid balance on day 7. Our study was underpowered to draw conclusions on mortality and dialysis. In the absence of a prospective study clearly demonstrating a benefit of albumin, its use should remain confined to extreme hypoalbuminemia.

O06

Mental health outcomes of ICU and non-ICU healthcare workers during the COVID-19 outbreak: a cross-sectional study

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Background: Intensive care workers are known for their stressful environment and for high prevalence of mental health outcomes. This study aimed to evaluate how the COVID-19 pandemic has impacted the mental health and lifestyle habits of intensive care unit (ICU) healthcare workers (HCW) and then to compare these results with HCW in other hospital units. Another objective was to understand which associated factors aggravate their mental health during the COVID-19 outbreak.

Methods: From 28 th May to 7 th July 2020, this cross-sectional survey collected sociodemographic data, lifestyle changes and mental health evaluation as assessed by the Generalized Anxiety Disorder 7 items (GAD-7), the Patient Health Questionnaire 9 items (PHQ-9), the Peritraumatic Distress Inventory (PDI) and the World Health Organization Well-Being Index (WHO-5), in the Geneva University Hospitals, Switzerland. ICU HCW were analyzed for mental health outcomes and lifestyles changes and then compared to non-ICU HCW. A series of linear regression analysis were performed to assess factors associated with mental health scores.

Results: A total of 3,461 HCW participated in the study, including 352 ICU HCW, 145 (41%) showed low well-being, 162 (46%) anxiety symptoms, 163 (46%) depressive symptoms and 76 (22%) had peritraumatic distress. The mean scores of GAD-7, PHQ-9 and WHO-5 were more pathologic in ICU HCW rather than

in non-ICU HCW ($p < 0.01$). Working in the ICU rather than in another department resulted in a change of eating habits and alcohol consumption ($p < 0.01$). Being a woman, the fear of catching and transmitting COVID-19, anxiety of working with COVID-19 patients, being overloaded with work, eating less, drinking more alcohol and having trouble sleeping were associated to worse mental health outcomes.

Conclusion: This study confirms the suspicion of high prevalence of anxiety, depression, peritraumatic distress and low well-being during the first COVID-19 wave among HCW, especially among ICU HCW and allows the identification of associated risk factors. Long-term psychological follow-up should be considered for HCW.

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O07

Facing the unpredictability of the disease trajectory of chronically critically ill patients, their families and healthcare providers: An interpretive description

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Background: Unpredictable disease trajectories and frequent acute complications leave patients with chronic critical illness (CCI) in a vulnerable and life-threatening condition. In this state patients transfer between various care settings and encountering diverse healthcare providers. Thus, the disease trajectory and the course of the settings are not consistent, but change according to the patient's condition. Only 10% of patients with CCI achieve functional autonomy and are living at home one year after being discharged from the ICU. Little is known about the experiences, and anxieties of patients with CCI, their families and healthcare providers during the disease trajectory.

Aim: To describe and understand the challenges of patients with CCI, their families and healthcare providers during the disease trajectory.

Methodology/Design: This qualitative study follows Thorne's methodology of interpretive description and was guided by the ethnographic methods of observation and participation. Five cases, each comprising one patient with CCI, his/her family members and several healthcare providers, were followed from the intensive care unit of a university hospital in Switzerland across different set-

tings. In total, five patients with CCI, 12 family members and 92 healthcare providers (nurses, nursing students, care assistants, physiotherapists and occupational therapists, and physicians) were observed.

Findings: Regardless of the medical diagnoses and disease trajectories of patients with CCI, all cases faced three main challenges: 1) Dealing with the unpredictability of the disease trajectory beyond the underlying disease; 2) Coping with the complexity of care and 3) Perceiving communication challenges despite all involved parties' dependency on it.

Conclusion: This is one of the first qualitative studies to undertake a comprehensive exploration of the challenges of five CCI cases during the disease trajectory across different settings. It was therefore important to consider cases rather than single perspectives and to maintain observations in the ICU and beyond to capture the complexities that result in challenges independent of the setting. Unpredictability is not only a unique characteristic of the prolonged disease trajectory of patients with CCI, but also one of the main challenges of the participants. Therefore, the way unpredictability is handled is dependent on changes in the complexity of care and communication, highlighting t

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O08**Bauchlagensitz bei COVID-19-Patient_innen – Effekte der Bauchlage im Sitzen nutzen**

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Hintergrund & Ziele: Die Bauchlage bei intubiert-beatmeten COVID-19-Patient_innen erwies sich vielfach als wirksame Intervention zur Verbesserung der pulmonalen Funktion. Spontan atmende Patient_innen sind aufgrund der Erkrankung und der daraus resultierenden reduzierten Lungenfunktion bei der Mobilisation an den Bettrand oder in den Lehnstuhl körperlich wenig belastbar. Sie leiden oft unter ausgeprägter Dyspnoe und können nur eingeschränkte Zeit ausserhalb des Bettes verbringen. Wir suchten nach einer Möglichkeit, das Wirkprinzip und die Effekte der Bauchlage auch in sitzender Position zu nutzen.

Material & Methoden: Wir kombinierten Anteile der Bauchlage mit der Sitzposition und entwickelten so das Prinzip des «Bauchlagensitzes». Spontan atmende Patient_innen mit Highflow- oder NIV-Therapie sitzen hierbei am Bettrand oder im Lehnstuhl in einer weit nach vornüber gebeugten Position. Der Oberkörper liegt auf einem davor abgestellten Tisch und wird mit Kissen gestützt. Die Lagerung kann variiert werden, indem der Kopf auf die linke oder rechte Wange auf Kissen abgelegt wird und die Hände daneben gelagert werden.

Resultate: Erste Erfahrungen zeigen, dass Patient_innen diese neue Position sehr gut tolerieren. Sie finden sie bequem, entspannend, äussern weniger Atemnot und können sich nach der Mobilisation ausruhen und erholen. Wir konnten Verbesserungen in der Sauerstoffsättigung am Monitor und in den arteriellen Blutgaswerten feststellen sowie ein ruhiges Atemmuster beobachten. Pflegenden und Physiotherapeut_innen schätzen die einfache Umsetzung mit geringem zeitlichen Aufwand und wenig Material.

Schlussfolgerungen: Der Bauchlagensitz ist aus unserer Sicht eine effektive, einfach zu realisierende Intervention, um COVID-19-Patient_innen mit bestehender Dyspnoe und geringer körperlicher Belastbarkeit zu mobilisieren und ausserhalb des Bettes zu positionieren. Die Mobilisation kann nach unserer Einschätzung so auch frühzeitiger erfolgen. Wir sehen Anwendungsmöglichkeiten auch bei anderen Patient_innen mit pulmonalen Problemen und planen eine systematische Datenerfassung zum Wirksamkeitsnachweis.

O09**Das «Intensivtagebuch light» – Die Pandemieversion des Intensivtagebuchs**

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Hintergrund: Während der Pandemie ist es aufgrund der knappen Ressourcen für Gesundheitsfachpersonen kaum möglich, Zeit in das Schreiben von Patiententagebüchern zu investieren. Konsequent wird diese Aufgabe an Angehörigen delegiert, die sich selber in einer existentiellen Krise befinden. Zudem konnten sie aufgrund der Besuchsrestriktion kaum einen eigenen Eindruck der ICU gewinnen, womit das Tagebuchschreiben schier unmöglich wird. Ziel dieses Abstracts ist es, das «Tagebuch light» zu beschreiben und erste Erfahrungen aufzuzeigen.

Methoden: Zwischen März und Mai 2020 wurde bei rund 50 Patienten der ICU ein «Tagebuch light» erstellt. Dieses bestand aus Patientenfotos, auf deren Rückseite Gesundheitsfachpersonen Erklärungen zu den Fotos oder der Situation des Patienten dokumentierten. Ein- bis zweimal pro Woche wurden neue Fotos erstellt. Bei Austritt / Versterben eines Patienten wurden die Fotos in ein separates Couvert verpackt, den Patienten / Angehörigen mitgegeben oder mit einem Informationsbrief an die Patienten / Angehörigen versendet. Zur Evaluation wurden Rückmeldungen thematisch analysiert.

Resultate: Es gab viele positive Erfahrungen zum «Tagebuch light». Besonders geschätzt wurden die Fotos mit den Beschreibungen die den Krankheitsverlauf nachvollziehbar machten und Sicherheit vermittelten. Das «Tagebuch light» unterstützte zudem eine gemeinsame Verarbeitung. Es gab auch Rückmeldungen zum traumatisierungsähnlichen Charakters der Bilder. Vor allem bei Angehörigen, welche eine nahestehende Person auf der Intensivstation verloren, und die den Begleitbrief erst nach Sichtung der Fotos gelesen haben. Dies führte zu starkem emotionalem Schmerz, der schwierig zu verarbeiten war.

Schlussfolgerungen: Das «Tagebuch light» ist ein geschätzter Ersatz für das bekannte Intensivtagebuch. Neben einem Vergleich mit dem bekannten Intensivtagebuch, sollte dringend evaluiert werden, wie die Abgabe der «Lightversion» besser gestaltet werden kann.

O10**Zwischen Himmel und Hölle – eine qualitative Studie zu den Erfahrungen von Eltern mit einem kritisch kranken Kind mit extrakorporaler Membranoxygenierung (ECMO)**

Y Kröger

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Hintergrund: Wenn ein Kind infolge einer schweren Erkrankung intensive Pflege und medizinische Versorgung braucht, ist das für Eltern traumatisch. Diese Situation wird noch herausfordernder, wenn eine hoch technische Therapie, wie die extrakorporale Membranoxygenierung (ECMO) auf der pädiatrischen Intensivstation erforderlich ist.

Ziel: Die Studie beleuchtet die Erfahrungen von Eltern von kritisch kranken Kindern mit ECMO-Therapie mit dem Ziel, deren Bedürfnisse besser zu verstehen und Handlungsoptionen für Gesundheitsfachpersonen zu erkennen.

Methode: Die qualitative Studie untersuchte mit narrativen Paarinterviews die Erfahrungen und das Erleben von Eltern, deren kritisch krankes Kind eine ECMO-Therapie erhält oder im vergangenen Jahr erhalten hat. Die Analyse der insgesamt sechs Paarinterviews erfolgte mithilfe intensiven Paraphrasierens und induktiven Kodierens.

Ergebnisse: Die Situation der Eltern ist geprägt durch das Phänomen der Ambivalenz. Dies zeigt sich am deutlichsten bei den gleichzeitigen Gefühlen von Hoffnung und Angst. Sie werden unerwartet aus ihrem bisherigen Familienleben gerissen, was zu einer grossen Hilflosigkeit mit starken emotionalen Reaktionen führt.

Schlussfolgerungen: Die Ambivalenz der Eltern ist ein zentraler Aspekt und Gesundheitsfachpersonen sind für sie wichtige Ansprechpersonen und können wesentlichen Einfluss nehmen. Diese Studie trägt dazu bei, die Gesundheitsfachpersonen zu sensibilisieren, um die Ambivalenz der Eltern wahrzunehmen und ihr Handeln darauf auszurichten.

Additional information:

Kröger et al. Pflege 2020;6:375.

O11**L'interprétation et la gestion des courbes ventilatoires.**

B Paulo

Introduction: Les problèmes perçus sur les courbes de pression et débit sont habituelles. Des études concluent que la présence d'asynchronies augmente l'échec d'extubation, mène à un sevrage plus difficile, à une ventilation prolongée et à des altérations de la qualité du sommeil, mais sans incidence sur la mortalité.

Objectif: Améliorer la compréhension des courbes ventilatoires et comprendre l'importance qu'elles peuvent avoir pour une meilleure prise en charge des patients ventilés.

Question de recherche: Y a-t-il dans le service des soins intensifs du RHNE une bonne interprétation et une bonne gestion des courbes ventilatoires dans les modes principaux VAC et VSAI, par l'équipe infirmière ?

Hypothèses: Différents niveaux de formation infirmière et manque de formation spécifique. Certaines asynchronies/phénomènes mieux gérées que d'autres car plus de pratique usuellement. Absence d'alarme spécifique.

Méthodologie: Questionnaire composé de 8 questions principales divisées par des sous-questions pour un total de 17. Distribuer à 50 infirmiers sous forme électronique par la plateforme Google Forms. Comme complémentarité, une revue de littérature pour argumenter les recommandations de bonnes pratiques dans la gestion de la ventilation mécanique.

Résultats: Les résultats sont de manière générale satisfaisant avec quelques exceptions positives et négatives. Les infirmiers experts EPD ES SI ont obtenu de meilleurs résultats globaux que les infirmiers diplômés. Certaines anomalies sont mieux reconnues et gérées que d'autres.

Conclusion / Perspectives: Les connaissances sur le sujet sont satisfaisantes mais peuvent être travaillées de manière à être améliorées, pour cela, nécessité d'une formation répondant aux différents niveaux de formation. Dans la suite du travail, j'envisage la création d'un document ressource pour la gestion des asynchronies. Création d'une carte de poche. Création d'un atelier pratique dédié à ce thème. Tout cela, en collaboration avec l'équipe pluridisciplinaire, pour une meilleure prise en charge de ce type de patient.

O12

Gestion de la sédation aux soins intensifs

M Rébischung

H-JU

Contexte: La sédation-analgésie permet aux patients hospitalisés aux soins intensifs de mieux tolérer les traitements souvent invasifs, mais son utilisation peut avoir de nombreux effets délétères. La sédation-analgésie doit par conséquent faire l'objet d'une gestion rigoureuse grâce à la mise en œuvre de protocoles adéquats afin de minimiser ces effets.

L'arrêt quotidien de sédation permet de limiter l'accumulation médicamenteuse et de favoriser le réveil, même partiel, du patient. Cependant cette méthode n'est pas systématiquement appliquée.

YOUNG INVESTIGATORS' SESSION

O13

Oliguria in Critically Ill Patients: Impact on AKI Classification and Outcomes Prediction

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Context & Objectives: Current definition and staging of acute kidney injury (AKI) considers both serum creatinine (sCr) and urinary output (UO) alterations. However, the relevance of oliguria-based criteria is disputed. We aimed to determine the contribution of oliguria, as defined by KDIGO criteria, to AKI diagnosis, severity assessment and mortality prediction.

Material and methods: We conducted a cohort study including all adult patients consecutively admitted within a multi-disciplinary intensive care unit between January 1st 2010 and June 15th 2020. Daily sCr and hourly UO measurements along with socio-demographic characteristics and severity scores were extracted from our electronic medical charts. Long-term mortality was assessed by cross-referencing our database with the Swiss national death registry. We determined the onset and severity of AKI according to KDIGO classification using UO and sCr criteria separately and assessed their agreement. Using a multivariable model accounting for baseline characteristics, severity scores and sCr stages, we evaluated the relative influence of UO criteria on 90-day mortality. Sensitivity analyses were conducted to assess the impact of missing sCr, body weight and UO values.

Results: Among the 15'620 patients included in the study [10'330 (66.1%) males, median age 65.0 years (IQR, 53.0 - 75.0), median SAPS score 40.0 (IQR, 30.0 - 53.0), median follow-up 67.0 months (IQR, 34.0 - 100.0)], 12'143 (77.7%) fulfilled AKI criteria. sCr and UO criteria had poor agreement on AKI diagnosis and staging (Cohen's weighted kappa = 0.36, 95% CI 0.34 - 0.37, p < 0.001). Compared to the isolated use of sCr criteria, consideration of UO criteria enabled to identify AKI in 5'630 (36.0%) patients. Those patients had a higher 90-day mortality than no-AKI patients (respectively 12.9% and 8.3%, p < 0.001). On multivariable analysis accounting for sCr stage, comorbidities and illness severity, UO stage 2 and 3 were associated with a higher 90-day mortality [OR 2.4 (1.6 - 3.8), p < 0.001, and 6.2 (3.7 - 10.5), p < 0.001, respectively]. These results remained significant in all sensitivity analyses.

Conclusions: Oliguria lasting more than 12 hours (KDIGO stage 2 or 3) has major diagnostic and prognostic implications, irrespective of sCr elevations.

Acknowledgment: The authors want to thank Samia Abed Maillard for her precious support in all regulatory aspects of this work.

Objectif: L'objectif de ce travail est de comprendre quelles peuvent être les réticences infirmières à l'application d'un arrêt quotidien de sédation au sein d'une unité de soins intensifs.

Méthode: Une recherche dans la littérature est effectuée sur ce thème pour définir l'utilité de ce type de protocole ainsi que ses limites. Dans un deuxième temps, un questionnaire est distribué au sein de l'équipe de soins intensifs de l'H-Ju, afin de comprendre quels facteurs peuvent entraver sa mise en place.

Résultats: L'importance d'une bonne gestion de la sédation est généralement reconnue par tous. Toutefois, la fenêtre de sédation n'est pas quotidiennement effectuée car elle est susceptible de décompenser le patient ou d'engendrer des événements indésirables selon les personnes interrogées. Vectrice d'une surcharge de travail, elle nécessite une organisation préalable.

Conclusion: La crainte d'être délétère pour le patient représente une barrière fondamentale à la mise en œuvre de l'arrêt quotidien de sédation. La fenêtre thérapeutique peut toutefois être très bien envisagée si elle est effectuée dans des conditions sécuritaires tant pour la personne soignée que pour le soignant.

O14

COVID-19: Impact on Circuit Lifetime and Performance during Continuous Renal Replacement Therapy

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Introduction: SARS-CoV-2 infection is associated with a coagulopathy characterized by increased fibrinogen and D-dimers levels. The impact of this coagulopathy on continuous renal replacement therapy (CRRT) circuit lifespan and performance remains unknown.

Methods: In this prospective observational study, we enrolled all consecutive patients who received CRRT in the intensive care unit of a tertiary hospital between September and December 2020. All therapies were administered in continuous veno-venous hemodialysis mode with regional citrate anticoagulation. We collected patients' baseline characteristics, laboratory results, CRRT circuit lifespan as well as plasma and effluent samples at 12 (T1), 24 (T2), 48 (T3) and 72 hours (T4) of CRRT circuit initiation. At each study time point, we computed urea, creatinine and β 2-microglobulin clearance. Results obtained in patients with COVID-19 (C19 group) were compared to those without COVID-19 (control group). Circuits' lifespan was assessed using Kaplan-Meier estimates and compared using log-rank test. Filter clearances at each study time point were compared using Student's T-test. Mixed models analyses were conducted to assess determinants of circuit lifetime and filter clearance.

Results: We included 35 patients, 26 (74%) males with a median age of 68 [IQR 57–71] years. Of those 16 (45%) were COVID-19 positive. We analyzed 150 CRRT circuits: 77 (51.3%) in the C19 group and 73 (48.7%) in the control group. Compared to patients in the control group, those in the C19 group had a significantly shorter median circuit lifespan (57 [49.0–66.0] versus 68 [66–71] hours, p = 0.016). They had a lower median urea (T1 27.5 vs 31.4; T2 26.8 vs 32.6; T3 27.3 vs 30.4 and T4 26.4 vs 30.7 ml/kg/h, all p < 0.05) and creatinine (T1 22.7 vs 24.7; T2 23.0 vs 24.5; T3 20.4 vs 22.9 and T4 21.3 vs 22.8 ml/kg/h, respective p values: 0.03, 0.02, 0.06 and 0.08) clearance at all study time points. However, there was no difference in β 2-microglobulin's clearance between the two groups (respective p values: 0.6, 1.0, 0.8 and 0.7).

Conclusion: Patients with COVID-19 disease had a shorter CRRT circuit lifetime and a lower urea and creatinine clearance. The magnitude of this difference was, however, limited and further studies are required to explore clinical implications of such differences.

O15

Prospective observational study on Health Care Worker Exposure to Sevoflurane and Isoflurane during postoperative Sedation with the Anaesthetic Conserving Device (AnaConDa®) - a safe option during intravenous sedative shortage in COVID-19 pandemic

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Background: Volatile anaesthetic agents have been used in the intensive care unit (ICU) setting as sedative due to favorable pharmacokinetics. Worldwide shortage of intravenous sedatives during the actual COVID-19 pandemic has emphasised volatiles as a valuable alternative for ICU sedation. Nevertheless, the use of volatile sedation has been limited by difficulties on safety concerns over environmental pollution and staff exposure in an ICU. The aim of the study was to evaluate occupational exposure levels to sevoflurane and isoflurane during the use of Anaesthetic Conserving Device (AnaConDa®).

Methods: A prospective observational study on occupational exposure was conducted in a cardiovascular ICU at the University Hospital of Zurich 2008, 2011 and 2016 on post-conditioning in cardiac patients. Concentrations of either sevoflurane or isoflurane were measured in indoor air at the sites of volatile sedation using photoacoustic spectroscopy during volatile sedation with sevoflurane and isoflurane applied by AnaConDa®. Measured gas concentra-

tions were extrapolated and interpreted in accordance with current legal guidelines and allowed workplace concentrations. In addition, the nursing work cycle at bedside was logged in a standardized manner in order to correlate specific staff activities with measured anaesthetic gas concentrations.

Results: Sevoflurane and isoflurane concentrations were measured in three series over a cumulative operating time of the AnaConDa® system of more than 400 hours at eight patients. Concentrations mean values for an eight-hour shift for health care staff never exceeded the bedside air concentration of 1 part per million [ppm] and the exposition of the health care staff was less than 10% of the workplace limit values for sevoflurane (10 ppm) and isoflurane (10 ppm). The maximum measured concentration during regular tasks was 18.2 ppm during exchange of the AnaConDa® filter. Higher concentrations only could be measured close to the waste gas absorber CONTRAfluran® the exhaust of the oxygenator and the patient gas monitor. No one of the measured peaks had an impact on the mean eight-hour workplace exposure or exceeds the time limited short-term exposure limit neither for sevoflurane nor isoflurane.

Conclusion: Volatile sedation via AnaConDa® appears to be justifiable in terms of the contamination indoor air on the ICU if the device is handled correctly. Occupational exposure can be reduced by gas extraction systems or scavenging

BESTE DIPLOMARBEITEN NDS INTENSIVPFLEGE | MEILLEURS MÉMOIRES DE MAÎTRISE EPD SOINS INTENSIFS

O17

Schau genau hin, um mich zu verstehen- Stresspräventive Massnahmen in der Pflege von extrem Frühgeborenen

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Einleitung: In der Schweiz kommen jährlich mehr als 400 extrem Frühgeborene (FG) zur Welt, die intensivmedizinische Unterstützung benötigen, um ausserhalb des schützenden Uterus überleben zu können. Die Diplomarbeit befasst sich mit dem Thema Stress im Zusammenhang mit extrem Frühgeborenen (FG). Sie zielt darauf ab, Pflegepersonal in der Beobachtung und im Umgang mit den FG zu sensibilisieren sowie die Folgen von Stress für FG zu kennen.

Fragestellung: Die Diplomarbeit befasst sich mit den Fragestellungen, welche Auswirkungen Stress auf die neurologische Entwicklung der FG hat, wie Stress bei ihnen erkannt werden und welche stressminimierenden Massnahmen das Pflegepersonal während der Pflegerunde treffen kann. Dabei werden nur jene FG mit nicht-invasiver oder ohne Atemunterstützung mit einbezogen. Intubierte analgosedierte FG sind ausgeschlossen. Ebenfalls ausgeschlossen sind stressreduzierende Massnahmen, welche nicht im direkten Zusammenhang mit der Durchführung der Pflegerunde stehen.

Methode: Zur Beantwortung der Fragen werden mittels Literaturrecherche die Stressoren auf der Intensivpflegestation (IPS), die objektiven und subjektiven Stresszeichen, die akuten und langfristigen Folgen von Stress sowie die Massnahmen zur Stressminimierung und Entwicklungsförderung beleuchtet. Zudem fliessen Erfahrungen und Beobachtungen aus dem Berufsalltag auf der IPS in die Bearbeitung mit ein.

Resultate und Schlussfolgerungen: Das Gehirn der FG befindet sich zum Zeitpunkt der Geburt in einer Phase der komplexen Entwicklung und ist sehr anfällig dafür, durch Stressoren negativ beeinflusst zu werden. Es liegt in der Verantwortung des Pflegepersonals sich den Auswirkungen bewusst zu sein und mögliche Massnahmen zur Stressminimierung anzuwenden. Das Eindämmen von Stress zielt auf die Förderung der Gehirnentwicklung und Stärkung des Wohlbefindens ab. Hierzu gehört eine an die Patientensituation individuell durchgeführte Pflegerunde und das Erkennen von Zeichen der Überforderung. Die FG signalisieren Stress mit einer Vielzahl von subjektiven und objektiven Zeichen. Es bedarf einer guten Beobachtungsgabe und Erfahrung seitens des Pflegepersonals. Die behandelte Thematik betrifft alle Neugeborenen, die auf der IPS betreut werden. Aufgrund der Vulnerabilität des Gehirns steigt jedoch mit abnehmendem Gestationsalter die Gefahr für neurologische Auswirkungen.

O18

Angehörige - Last oder Entlastung

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Angehörige von Patienten auf Intensivstationen (ICU) sind in einer sehr belastenden Situation. Da sich bei bis zu 80% der Patienten auf der ICU ein Delir entwickeln kann, ist das für Angehörige zusätzlich verstörend und beängstigend. Gleichzeitig sind Angehörige eine grosse Ressource für den Patienten und das Behandlungsteam. Gerade in der Delir-Erkennung und in der Delir-Prävention können sie einen wichtigen Beitrag leisten.

Um Angehörige in die Pflege miteinbeziehen zu können, müssen die Pflegefachpersonen jedoch deren Bedürfnisse erkennen und diesen bestmöglich entsprechen.

Deshalb stellte ich mir im Rahmen meiner Diplomarbeit die Frage: Was benötigen Angehörige von deliranten Patienten von den Pflegefachpersonen auf der Intensivstation, um die Situation besser zu bewältigen und den deliranten Patienten optimal unterstützen zu können?

Dazu habe ich eine Literaturrecherche in Pubmed und GoogleScholar® durchgeführt.

Das grösste Bedürfnis der Angehörigen ist das Informationsbedürfnis. Darum habe ich eine Informationsbroschüre für Angehörige zum Thema Delir entworfen. Sobald weitere Bedürfnisse wie Ruhe, Kommunikation und Nähe zum Patienten befriedigt sind, können Angehörige aktiv in den Behandlungsprozess mit einbezogen werden. Besonders unruhige Patienten werden in Anwesenheit ihrer Angehörigen entspannter, was direkt zu einer Verminderung der Arbeitsbelastung des Behandlungsteams führt. Patienten mit Delir haben durch den Miteinbezug ihrer Angehöriger ein deutlich besseres Outcome. Sie sind weniger lang hospitalisiert und zeigen seltener posttraumatische Belastungsreaktionen. Angehörige, die in die Pflege mit einbezogen werden, können sich bereits während der Hospitalisation mit der Situation vertraut machen, was zu einer früheren Entlassung führen und somit die Gesundheitskosten reduzieren kann.

Der Miteinbezug von Angehörigen in die Betreuung von Patienten mit Delir auf der ICU ist herausfordernd und aufwändig. Werden Massnahmen systematisch und konsequent umgesetzt, hat dies direkte positive Konsequenzen für den Patienten, seine Angehörige und das Behandlungsteam.

Aufgrund der gewonnenen Erkenntnissen aus meiner Diplomarbeit ist es aus meiner Sicht unumgänglich, ein Massnahmenpaket für den Einbezug von Angehörigen zu entwickeln und zu verfolgen.

O19

«Herausforderung Bauchlage» - Die Vermeidung von Komplikationen bei der 180° Bauchlage während Vorbereitung, Durchführung und Nachbereitung

N Gafriller

Die Durchführung der 180° Bauchlage hat in den letzten Monaten an Bedeutung zugenommen. Sie führt zur Reduktion der Mortalität, Zunahme der Oxygenierung und Verbesserung des Ventilations-Perfusions-Verhältnisses. Trotz der Vorteile ist die Indikation kritisch zu stellen, da sie zu diversen Komplikationen führen kann.

Ziel dieser Diplomarbeit ist es, die häufigsten in der Literatur genannten Komplikationen der 180° Bauchlage zu erfassen. Der Fokus liegt auf den pflegerischen Möglichkeiten, welche dazu führen sollen, Komplikationen zu erkennen und zu verhindern. Daraus ergibt sich folgende Forschungsfrage: Was sind die pflegerischen Aspekte, um bei intubierten und analgosedierten Patienten während der Vorbereitung, Durchführung und Nachbereitung der 180° Bauchlage die häufigsten in der Literatur beschriebenen Komplikationen zu vermeiden?

Die vorliegende Arbeit stützt sich auf eine Literaturrecherche in der deutschen und englischen Fachliteratur und wird durch die praktische Erfahrung ergänzt.

Die Literaturrecherche ergab als häufigste Komplikation die Hautschädigung. Die Druckpunkte der Bauchlage sollen durch Hautschutzprodukte geschützt und mittels Lagerungshilfsmitteln gepolstert werden. Die Tubusdislokation soll durch die Fixierung des Tubus mittels eines Bandes, welches durch ein dünnes Hydrokolloid-Pflaster befestigt wird, verhindert werden. Eine ungeplante Entfernung von zentralen und arteriellen Leitungen kann durch die doppelte Fixierung der Katheter unterbunden werden. Die erste Fixierung dient der Platzierung des Katheters, die zweite schützt vor Zugkräften. Die Anti-Trendelenburg-Lagerung verhindert weitere Komplikationen wie Gesichtsoedeme und Erbrechen. Die Nervenläsion des Plexus brachialis gehört zu den Spätfolgen. Sie ist durch die Abduktion der Schulter um maximal 80° und einer maximalen Beugung des Ellenbogens um 90° zu verhindern. Aufgrund der vielen Schritte, die im Prozess der Bauchlage beachtet werden müssen, wurde ein einfaches Schema für die pflegerischen Massnahmen mittels eines ABCDEFGH-Bündels erstellt.

Gut ausgebildete und trainierte Pflegefachpersonen sind die Voraussetzung, damit die Bauchlage eine sichere Lagerungstechnik für Patienten darstellt. Ein Schema zur sicheren Vorbereitung, Durchführung und Nachbereitung der Bauchlage unterstützt die Pflegefachperson beim Prozess und kann Komplikationen durch die Ausführung von einfachen, pflegerischen Massnahmen verhindern.

O20

Impacts d'une politique de visites flexibles aux soins intensifs : le patient au cœur des soins

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Introduction: L'univers des soins intensifs est stressant pour les patients. Il est source d'agression et provoque un isolement social. Néanmoins, une prise en charge centrée sur la personne en intégrant son environnement social est primordiale. Pourtant, les heures de visites ne sont pas libres aux soins intensifs de l'HFR. L'objectif de cette étude est de connaître les impacts d'une politique de visites flexibles pour un patient hospitalisé aux soins intensifs avec un SAS supérieur ou égal à 3.

Méthode: Les recherches sur les bases de données ont permis d'effectuer une revue systématique non exhaustive de la littérature. La stratégie initiale consiste en une combinaison de termes MeSH. Les articles retenus font ressortir des résultats significatifs concernant uniquement les patients adultes aux soins intensifs. Les études rapportant exclusivement des interventions visant les soignants et/ou les familles, ainsi que celles portant sur une population pédiatrique n'ont pas été sélectionnées. Cinq études avec des résultats qualitatifs, quantitatifs et/ou mixtes sont analysées avec l'aide de la grille Mc Master.

Résultats: Dans quatre études sur cinq, les patients du modèle à visites prolongées reçoivent significativement plus de visites par jour avec une durée plus longue ($p < 0,001$). La contamination bactérienne des surfaces est positivement associée aux visites ou-

vertes ($p = 0,001$) mais sans plus de complications septiques. Les patients du modèle à visites prolongées présentent une longueur de delirium plus courte ($p = 0,03$) ainsi qu'un séjour en USI plus court ($p = 0,04$). Toutefois, trop de visiteurs en même temps peuvent facilement créer du stress pour certains patients. Par contre, d'autres patients décrivent la présence de leur famille comme un soutien important pendant la situation critique de leur hospitalisation, ce qui leur procure un sentiment de sécurité.

Conclusion: L'organisation d'une politique de visites flexibles est un défi majeur pour l'ensemble des services hospitaliers, notamment pour les services de soins intensifs. L'élaboration d'une politique de visites en fonction de chaque patient semble être l'objectif à atteindre. Cette dernière aura indéniablement un impact sur le vécu de l'hospitalisation. Un aménagement des visites qui répondra aux besoins de chacun, y compris du personnel, favorisera la communication et améliorera la satisfaction des patients et de leur famille.

O21

Iatrogen erworbene Anämien auf der Intensivstation

M Pöll

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Hintergrund und Ziele: Ca. zwei Drittel der Patienten sind schon bei der Aufnahme auf der Intensivstation anäm. Auf der Intensivstation entwickeln Patienten eine Anämie verschiedener Ausprägung. Das Ziel der Diplomarbeit war es, eine Auflistung an Risikofaktoren und Ursachen für die Entstehung von iatrogen erworbenen Anämien zu beschreiben, um den Pflegepersonen in der praktischen Tätigkeit hierfür ein grösseres Bewusstsein zu vermitteln und eine Auflistung an pflegerischen Massnahmen darzustellen, welche die Anzahl und Menge der entstehenden Blutverluste reduzieren.

Material und Methoden: Das Methodik war die Literaturrecherche, welche als Handsuche in Print- und E-Print-Medien in diversen Bibliotheken, sowie digital in Datenbanken (Cochrane Library, MEDLINE, CINAHL und Academic Search Elite via EBSCO Host) und Google Scholar erfolgte. Es wurden Studien in englischer und französischer Sprache sowie sonstige Literatur in deutscher Sprache verwendet.

Resultate: Die Ursachen und Risikofaktoren für die Verursachung einer iatrogen erworbenen Anämie auf Intensivstationen sind kritisch kranke Patienten mit vielen therapeutischen Massnahmen (vor allem invasive Diagnostikformen), verschiedene Erkrankungen und Pathologien am Herz, Gefässsystem, der Niere oder der Leber, Medikamente, die die Blutbildung beeinflussen, Nierenersatzverfahren, die Einlage von Gefässkathetern und die Blutentnahmen in hohen Mengen. Der durchschnittliche Blutverlust beträgt laut einer Studie 40-70 ml pro Tag, der Höchstwert in den ersten 48 Stunden vom Intensivaufenthalt. Massnahmen die das Risiko von iatrogen erworbenen Anämien reduzieren sind die Reduktion der Menge der Blutabnahmen, Installation und Verwendung von geschlossenen invasiven Druckaufnehmersystemen, vorzeitige Blutrückführung bei der Nierenersatztherapie, spezielle Pflege bei erhöhter Blutungsneigung, Mitwirkung beim Patient-Blood-Management, nicht-invasives Monitoring gewisser Parameter oder Monitoring via Mikroblutentnahmen sowie die Erweiterung vom Wissensstand beim Pflegepersonal über die Ursachen und Risikofaktoren für die Entstehung von iatrogen erworbenen Anämien.

Schlussfolgerungen: Das Risiko der Entstehung einer iatrogen erworbenen Anämie kann reduziert aber nicht ausgeschlossen werden, da die Risikofaktoren nicht immer zu beeinflussen sind. Jedoch ist es möglich durch bestimmte Verhaltensweisen, Materialien und Konzepte das Risiko zu reduzieren und das Bewusstsein auf die vorhandene Problematik zu lenken.

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POSTER SGI ÄRZTESCHAFT | SSMI MÉDECINS

P01

Fluid overload is associated with Mortality in Adult Intensive Care Patients – a systematic Review and Meta-Analysis

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Background: Fluid overload (FO) in critically ill patients is one of the hot topics in critical care, as recent research points towards an increased morbidity and mortality in critical ill patients who have received large volumes of fluids (1-4). Here, we systematically reviewed and synthesized the evidence on fluid overload and mortality in critically ill patients and have performed a meta-analysis of available data.

Data Sources: We performed a systematic search on PubMed, Embase, and the Cochrane Library databases.

Study Selection: Studies evaluating the impact of fluid overload (FO, defined by weight gain > 5%) or positive cumulative fluid balance (CFB) on mortality in adult critical care patients were eligible for analysis. We excluded animal studies and trials in pediatric populations (age < 16 years), pregnant women, non-critically ill patients, very specific subpopulations of critically ill patients, and on EGDT (Early Goal-Directed Therapy). Assessment followed the COCHRANE/MOOSE guidelines for systematic reviews.

Results: We included and analysed 31 observational and three randomized controlled trials (including 31,076 ICU patients). We included only observational studies in the meta-analysis. CFB and FO were both associated with pooled mortality: after 3 days of ICU stay, adjusted risk ratio (aRR) for CFB was 2.15 (95% CI 1.51 - 3.07), and for FO 8.83 (95% CI 4.03 - 19.33), at any time point during ICU stay, aRR for CFB was 1.39 (95% CI 1.15 - 1.69), and for FO 2.79 (95% CI 1.55 - 5.00). CFB was linked to mortality in patients with sepsis (aRR 1.66; 95% CI 1.39 - 1.98), AKI (aRR 2.63; 95% CI 1.30 - 5.30), and respiratory failure (aRR 1.19; 95% CI 1.03 - 1.43). FO was associated with mortality in patients with both acute kidney injury (AKI) (aRR 2.38; 95% CI 1.75 - 2.98) and surgery (aRR 6.17; 95% CI 4.81 - 7.97). The risk of mortality increased by a factor of 1.19 (95% CI 1.11 - 1.28) per liter increase in positive fluid balance.

Conclusion: The adjusted risk estimates reported in this meta-analysis suggest an association of fluid overload and positive cumulative fluid balance with increased mortality in the general critical care population, as well as in defined subgroups.

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P02

Physiological response of prone positioning in intubated adults with severe COVID-19 acute respiratory distress syndrome: a retrospective study

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CONTEXT AND AIM: Prone positioning is recommended for COVID 19 moderate to severe acute respiratory distress syndrome (ARDS) in intubated patients, but few data are available. The study aim was to assess the effect of proning on gas exchanges, respiratory system compliance (CRS) and ventilatory ratio (VR).

MATERIAL AND METHOD: Retrospective analysis of the patients intubated and prone in the Lausanne Adult ICU for COVID 19 ARDS between March 06 and May 30 2020. Patients' characteristics, blood gas analysis at admission and number and duration of the prone position sessions were recorded. Ventilator settings, gas exchanges, CRS and VR were recorded before proning and before returning to supine position. Response in term of oxygenation was defined as increase in PaO₂/FiO₂ > 20%. Treatment failure was defined as death or start of extracorporeal membrane oxygenation (ECMO). Results expressed as median (IQR).

RESULTS: 42 patients (71% of males) were included. Age 63 (57-62) years, SAPSII 41 (34-46) and SOFA 7 (6-8). At intubation, PaO₂/FiO₂ was 137 mmHg (118-172), alveolo-arterial gradient (AaO₂) 255 mmHg (200-345), CRS 36.4 ml/CmH₂O (29.3-42.5), VR 1.7 (1.3-2.2). 191 sessions of prone positioning were performed. Time from the first PaO₂/FiO₂ < 150mmHg with FiO₂ > 0.6 to first proning was 16 (5-36) hours. Number of sessions per patient was 3 (2-6) and duration 17 (16-19) hours. For all proning sessions PaO₂/FiO₂ increased from 107 (90-129) to 180 (148-210) mmHg, FiO₂ decreased from 0.6 (0.5-0.7) to 0.4 (0.35-0.5) (p < 0.0001 for both). PaO₂/FiO₂ increase > 20 % was found in 83 % of proning. AaO₂ decreased from 275 (212-334) to 127 (92-176) (p < 0.0001). CRS increased from 32.3 (27.7-40.8) to 36.2 (30-41.7) (p = 0.003) and VR from 2.3 (1.9-2.8) to 2.4 (2.0-2.9) (p = 0.03). Two (5 %) patients needed ECMO support and survived. Ten patients died (24 %). Patients in treatment failure group were older (73 (61-78) vs 60 (56-69), p = 0.009) and had more often a BMI > 30 kg/m² (47 vs 8 % p = 0.03).

CONCLUSION: Prone positioning improved PaO₂/FiO₂ and AaO₂ gradient. CRS and VR only slightly increased suggesting that the main effect is improvement in ventilation/perfusion ratio.

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P03**Improvement in oxygenation after the first awake pronation session is associated with lower intubation rate in patients with Sars-Cov-2 acute hypoxemic respiratory failure**

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Context and objectives: Prone positioning in non-intubated patients with severe Covid-19 pneumonia could help improving oxygenation and reducing intubation rate but data are missing. The objectives of this study were to assess the feasibility and physiological effects of this procedure and to assess whether response to the first prone positioning could help predict intubation.

Material and Methods: We conducted a retrospective analysis of the patients hospitalized for severe Covid-19 pneumonia between March 13th and October 29th 2020 in the Lausanne Adult ICU for whom awake prone positioning was performed for at least 45 minutes. We collected and compared the respiratory and blood gas parameters before and after each pronation (T-test or Wilcoxon test). It was also assessed whether the effects of the first session could predict the need for intubation.

Results: During the study period, 48 non-intubated patients (27.7 % of the admissions) were prone for more than 45 minutes. 29 of them were included in the analysis (17 denied consent for retrospective analysis and 2 had a "do not intubate order"). 21 were men (72.4%). Age was 60 ± 13 . At ICU admission PaO₂/FiO₂ was 92 [74-110] mmHg. A total of 110 sessions were performed in the included patients (3 [1-6] per patient, range 1 to 12). No adverse events were reported. Complete data were available for 74 sessions (67.3%). Aa-O₂ decreased from 335 ± 99 before pronation to 269 ± 128 mmHg ($p = 0.002$) after pronation. PaO₂/FiO₂ increased from 103 [80-127] to 140 [85-173] mmHg ($p = 0.003$). Ph, PaCO₂, RR were not different. Complete data for the first session were available for 25 patients. During the first pronation session, Aa-O₂ decreased from 362 ± 82 to 275 ± 128 mmHg ($p = 0.001$) and PaO₂/FiO₂ increased from 94 [78-100] to 141 [91-189] mmHg ($p = 0.002$). Among the 29 included patients, 10 were intubated (34.5%). Two died in the ICU (6.9%). For similar Aa-O₂ and PaO₂/FiO₂ before the first pronation session, we found that Aa-O₂ was lower and PaO₂/FiO₂ was higher after the first pronation session in patients who did not require intubation compared to patients who had to be intubated ($p = 0.000$ and $p = 0.003$ respectively).

Conclusions: Awake pronation in spontaneously breathing patients is feasible, improves PaO₂/FiO₂ and reduce Aa-O₂. Response to the first session was associated with lower intubation rate.

P07**Neue Ansätze zur Früherkennung und Prophylaxe des akuten Nierenversagens**F Temori¹; P B. Luppá²¹ Technical University of Munich; ² Klinikum rechts der Isar, Technische Universität

Zielstellung: Das akute Nierenversagen (ANV) stellt eine schwere Erkrankung mit tödlichem Potenzial dar. Seit Jahren bestehen hohe Prävalenzen und entsprechende Therapiekosten sowie Mortalitätsraten. Die Diagnostik eines ANV erfolgt in den Klassifikationen RIFLE (risk, injury, loss, end stage) und AKIN (akute kidney injury network) auf Basis der Urinausscheidung und des Serumkreatinins. Beide Verfahren haben eingeschränkte Aussagekraft. Zudem hat weder RIFLE noch AKIN die Fähigkeit, bei fehlenden Basis-Kreatinin-Werten ein ANV von einem chronischen Nierenversagen (CNV) zu trennen. Unsere Studie hatte es zum Ziel, mögliche Vorteile der Biomarker Harnstoff, Cystatin C, TIMP-2 (tissue inhibitor of metalloproteinases 2) und IGFBP-7 (insulin-like growth factor binding protein 7) gegenüber Serumkreatinin hinsichtlich der Detektion des ANV aufzuzeigen. Insbesondere sollte die Wertigkeit der Biomarker in Bezug auf die Prädiktion von Ereignissen wie Mortalität und Auftreten eines ANV untersucht werden.

Methode: Die Kreatinin-Verläufe von 53 Intensivpatienten wurden per Ex-Post Methode auf ANV und CNV geprüft. Bei allen Patienten wurden zu fünf Messzeiten T0, T4-6h, T12h, T24h und T48h ab ICU-Aufnahme je auf die Größen Kreatinin, Cystatin C, Harnstoff im Serum, die Biomarker TIMP-2 und IGFBP-7 im Urin untersucht. Die Bestimmung der klinischen Parameter fand im Labor statt. Die neuen Biomarker wurden im Urin mit dem POCT-Verfahren Nephrocheck® (Astute Medical USA) gemessen.

Ergebnisse: Mit der Ex-Post Methode wiesen doppelt so viele Patienten ANV auf als nach RIFLE und AKIN. Zu allen Messzeiten reagierten die Biomarker Cystatin C, TIMP-2 und IGFBP-7 sehr sensibel auf akute Einschränkung der Nierenfunktion und wiesen hohe Korrelationen auf. Bezüglich der Prädiktion der ICU-Mortalität schnitten die beiden Kenngrößen TIMP-2 und IGFBP-7 zu allen Messzeiten am besten ab (AUC 0,732). Betreffend die Prädiktion eines ANV war die Aussagekraft der Serummarker Kreatinin und Cystatin C zu allen Messzeiten ähnlich gut wie die Urinmarker IGFBP-7 und TIMP-2.

Schlussfolgerungen: Das engmaschige Monitoring von Kreatinin, Cystatin C im Serum, sowie von TIMP-2 und IGFBP-7 im Urin, bietet eine Möglichkeit ANV-Patienten von solchen mit CNV bei fehlenden Kreatinin-Basiswerten im kurzfristigen Verlauf besser zu trennen. Bezüglich der ICU-Mortalität könnte die hohe Prädiktion der Biomarker TIMP-2 und IGFBP-7 dabei helfen das Outcome der Intensivpatienten mit ANV zu verbessern.

P08**Pathologic fractures in pediatric intensive care patients – an underestimated complication of chronic critically ill children; two case reports and a literature review**

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Background: While risk factors for developing osteopenia and fractures in chronically ill children (1) are well described and routinely addressed, there is little awareness of these risk factors in critically ill children.

Methods: 2 case reports and a literature review

Results:

Case A

A preterm boy was born with a median congenital diaphragmatic hernia and several other malformations resulting in chronic respiratory failure and a severe malassimilation syndrome needing continuous intensive care from birth. Due to several episodes of acute kidney injury, he developed a secondary Fanconi syndrome and secondary hyperparathyroidism resulting in severe osteopenia. At the age of 7 months 8 long bone fractures were diagnosed within a few days.

Case B

A late preterm girl born with a tricuspid atresia type 1b was admitted at 3 months of age for an elective cardiac catheterization. She had a highly complicative course resulting in severe chronic cardiac failure requiring respiratory support, diuretics and jejunal feeds. Chronic furosemide medication caused hypercalcuria. The patient developed a secondary hyperparathyroidism resulting in a pathologic humerus fracture and two additional asymptomatic vertebral fractures after 5.5 months of intensive care.

Comparing these two cases with the literature, both cases exhibit several known risk factors for osteopenia.

Discussion: Studies analyzing osteopenia in pediatric critically ill patients (2-4) conclude that risk factors known from chronic illness (e.g. renal insufficiency, loop diuretics, prolonged immobilization) as well as additional risk factors including age < 2 years, respiratory diagnosis, illness severity and length of hospitalization put critically ill children at risk.

Having 2 or more risk factors considerably increases the risk of children sustaining pathologic fractures of which many go unrecognized (2). Implementing a protocol increasing awareness of osteopenia, recognition and management of at-risk children can lower the risk of fractures (2).

Conclusion: Children requiring a prolonged intensive care stay are often at risk for osteopenia with subsequent pathologic fractures due to their underlying disease and the necessary treatments. More awareness of this rare but important complication is required.

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P09

Renal tubular acidosis in pregnant Covid-19 patients

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Background and Objectives: Metabolic acidosis is a common problem in critically ill patients and often a consequence of acute kidney injury or lactic acidosis. With normal renal function and normal anion gap (AG), the diagnostic approach involves a urine analysis and the differential diagnosis are more complex. Renal tubular acidosis (RTA) is a rare disorder (10 in 100,000) in which, despite a well-preserved glomerular filtration rate (GFR), metabolic acidosis develops because of either a defect in the secretion of H⁺ (Type I) or the inability to reabsorb bicarbonate (Type II) [1]. RTA has not been reported in Covid-19 patients, but single cases have been associated with pregnancy [2].

We have observed a high percentage of normal AG (hyperchloremic) metabolic acidosis in pregnant critically ill Covid-19 patients and systematically analyzed the prevalence, etiology and clinical course.

Methods: Retrospective analysis from patient data monitoring system and chart review.

Results: From February 2020 to April 2021 321 Covid-19 patients were admitted to the intensive care units (ICU) of the University Hospital Zurich. Ninety-five (29.5%) were women and 8 were either pregnant or just had C-section before admission to the ICU (age 24 to 42 years, 32 ± 2.7 gestational week). Seven women had symptomatic Covid-19 and were included in the study. Despite a normal renal function (eGFR 137 ± 17 ml/min/m² BSA), 6 out of these 7 patients (85.7%) either presented themselves on admission or during ICU-stay with an AG negative metabolic acidosis (pH 7.27 ± 0.1, min HCO₃⁻ 15.6 ± 3.1 mmol/l, pCO₂ 3.8 ± 1.0). Despite the generally rare incidence of RTA, we found that 3 of these 6 acidotic women fulfilled diagnostic criteria for RTA. Sodium bicarbonate was given over 2.3 ± 0.5 days in 43% of them. All women recovered from RTA within less than 7 days.

Conclusions: Here we report for the first time that metabolic acidosis might be very common (85%) in critically ill pregnant Covid-19 patients and further half of the women had evidence of an extremely rare tubulopathy. We want to point out that the diagnosis of RTA was not made in all of these patients during their ICU stay, but only afterwards, which underlines the relevance of our findings for raising awareness among intensivists treating (pregnant) Covid-19 patients. It remains to be demonstrated if this observation is an indirect epiphenomenon or a putative direct viral effect on the tubular epithelium.

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P10

Nasogastric tube placement: can the tracheal et CO₂ and gastric pH measurements reduce the misplacement?S Dell'Era¹; A Glotta²; M Biggiogero²; G Bona²; E Tasciotti³; F Ruggiero⁴; C Kronenberg⁵; A Saporito¹; S Ceruti⁴

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Introduction: nasogastric tube (NGT) placement is a common procedure performed in critical care setting. Chest X-Ray is the diagnostic gold-standard to confirm correct placement, with the downsides of both the need for critical care patients' mobilization and intrinsic actinic risk. Other potential methods to confirm NGT placement have shown a lower accuracy compared to chest X-ray; ETCO₂ and pH analysis have singularly yet investigated as an alternative to the gold standard. Aim of this study was to determine eventual thresholds in combine measurements of ETCO₂ and pH values, at which correct NGT positioning can be confirmed with the highest accuracy.

Material & Methods: this was a prospective, multicenter, observational trial; a continuous cohort of eligible patients was allocated to two arms, to identify clear cut-off threshold able to detect correct NGT tip positioning with the maximal accuracy. Patients underwent general anesthesia and orotracheal intubation; in the first

group difference between tracheal and esophageal ETCO₂ values were assessed. In the second group difference between esophageal and gastric pH values were determined.

Results: from November 2020 to March 2021, 85 consecutive patients were enrolled: 40 in the ETCO₂ group and 45 in the pH group. The ETCO₂ ROC analysis for predicting NGT tracheal misplacement demonstrate an optimal ETCO₂ cutoff value of 25.5 mmHg, where both sensitivity than specificity reach 1.0 (AUC 1.0, p < 0.001). The pH ROC analysis for predicting NGT correct gastric placement demonstrated the optimal pH cutoff value at 4.25, with a mild diagnostic accuracy (AUC 0.79, p < 0.001).

Discussion: A device capable of combining the presence of a negative marker with a positive marker could be accurate enough in identifying the correct NGTs positioning. Further studies are required to validate the reproducibility of these results by a specific device, whose accuracy also ought to be compared with standard chest X-ray.

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P11

Emergency ABCDE management of status epilepticus: a prospective high-fidelity simulation studyP Kliem¹; K Tisljar²; S Baumann²; P Grzonka²; GM De Marchis²; S Bassetti²; R Bingisser²; S Hunziker²; S Marsch²; R Sutter²

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Objectives: To investigate the frequency and order of correctly performed examination steps of the ABCDE (Airway-Breathing-Circulation-Disability-Exposure) approach by physicians confronted with a simulated scenario of a patient with status epilepticus (SE); to further analyze the compliance of SE treatment with the guidelines in relation to performed ABCDE examinations, and to identify risk factors for non-adherence to the ABCDE approach.

Methods: In this prospective trial at a Swiss academic simulator training center, physicians of different background/affiliations were confronted with a simulated SE. Primary outcomes were correctly performed examination steps "A" to "E", performance of all examination steps, and examinations in correct order.

Results: 74 physicians of different medical specialties recognized SE and performed a median of 4 of the 5 ABCDE checks (interquar-

tile range 3-4). 5% performed complete assessments. Airways were checked within the recommended timeframe in 46%, breathing in 66%, circulation in 92%, and disability (neurologic examination) in 96%. Head-to-toe (exposure) examination was performed in 15% despite paramedics reporting a possible fall. Airways were protected on time in 14%, oxygen supplied in 69%, and antiseizure drugs administered in 99%. These treatments were performed more frequently if ABCDE checks were followed. Participants' neurologic affiliation was associated with performance of fewer checks (OR-0.49; p=0.015).

Conclusions: Adherence to the ABCDE approach in a simulated SE was infrequent but led to a more frequent protection of airways. This calls for intensive training of the ABCDE approach especially for neurologists as the lack of airway protection may increase mortality and promote treatment refractoriness of SE related to aspiration-pneumonia.

Additional information:

We thank all the staff of the medical intensive care unit and the simulator team Ms. Sabine Schweitzer and Mr. Marc Breuer for their most helpful support during the study. We thank all physicians of the University Hospital Basel for participating in this study.

The corresponding author had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. We further thank Sarah Tschudin-Sutter, MD, MSc (University Hospital Basel), for her statistical assistance.

P12

Neuron-specific enolase (NSE) predicts long-term mortality in patients after cardiac arrest: Results from a prospective trial

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Background and goals: Neuron-specific enolase (NSE) increases in response to brain injury and is recommended for outcome prediction at short term in cardiac arrest patients. There is, however, limited understanding of NSEs influence on long term outcomes. Our aim was to investigate whether NSE predicts long-term mortality and poor neurological outcome in cardiac arrest patients.

Materials & methods: Within this prospective observational study, we included consecutive adult patients after cardiac arrest admitted to the ICU. NSE was measured upon ICU-admission and on days 1, 2, 3, 5 and 7. We calculated Hazard-ratios using Cox-regression and logistic regression to study the associations of NSE levels with long term overall all-cause mortality and neurological outcome defined by Cerebral Performance Category (CPC) scale two years after cardiac arrest.

Results: From 403 patients, 176 (43.7%) survived with a median follow-up of 43.7 months (IQR 14.3 to 63.0 months). NSE on day 3 showed the highest prognostic performance for mortality compared to other days of measurement, with an AUC of 0.81 and an adjusted HR of 1.55 and 1.51. Subgroup analysis indicated that predictive value of NSE for mortality was significantly higher in younger patients < 54 years of age and showed excellent sensitivity and negative predictive value of 100%. Results were similar for poor neurological outcome, however there were no significant differences in subgroup analysis.

Conclusion: NSE measured three days after cardiac arrest is associated with long-term mortality and neurological outcome and may thus provide prognostic information that improves clinical decision-making, particularly in the subgroup of younger patients < 54 years, where NSE showed an excellent negative predictive value.

P13

Overmortality and disproportionate resource use during Covid-19 pandemic in the ICU

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Introduction: On March 11th, WHO declared SARS-CoV-2 infection as a pandemic. Switzerland was affected by a first wave (March to Jul) and a second wave (Oct-Dec) in 2020. A remarkable number of patients developed severe ARDS requiring intensive care unit (ICU)

care and mostly invasive mechanical ventilation. ICU resources were severely strained due to high mortality, prolonged ICU length of stay (LOS), lack of ICU beds, need of specialized equipment, and specially trained ICU staff.

To assess the quality and performance of an ICU longitudinally, we regularly track two parameters: Standardized 28 d mortality rate (SMR) as an outcome parameter and standardized resource use (SRU) as a surrogate marker for effectiveness.

Objectives: Analysis of the outcome and effectiveness during the first and second waves of the Covid-19 pandemic in 2020 compared with previous years.

Methods: We analyzed prospectively obtained data of our quality assessment data set of our 12-bed medical ICU. SMR was calculated longitudinally (2012 to 2020) based on a recalibrated original SAPS II model. SRU was calculated longitudinally using the method of Rothen et al. [1], but using SAPS II. Both models were calibrated specifically to our ICU using pooled patient data from 2007 to 2013, generalized additive models (GAM), and a bootstrap sampling procedure.

Results: In 2020 we cared for 1'170 patients, including 137 with severe SARS-CoV-2 infection. 87 (64%) of these patients had been ventilated invasively and 22 (16%) had vv-ECMO. 38 (28%) patients died in the hospital and median ICU-LOS was 9 (IQR 3 to 18) days. This resulted in an SMR of 1.05 and SRU of 1.03, which is substantially higher than in previous years when we observed a steadily decreasing SMR and SRU (Fig. 1 and 2).

Conclusions: During the first Covid-19 pandemic year, the SMR in our ICU increased considerably compared with previous years, while resource use also increased. This reflects the high proportion of patients with Covid-19 who were hospitalized in the ICU during 2020. Mortality and resource consumption were disproportionately high in the first year of the Covid-19 pandemic.

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P14

Intellisync® improves patient-ventilator interaction in an NIV model. A bench test study.

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Context and objectives: During non-invasive ventilation (NIV) poor patient-ventilator synchrony has been associated with increased risk of treatment failure, intubation and less favourable outcome. Specific NIV modes reduce patient-ventilator asynchronies but do not suppress them. Intellisync® (Hamilton, Bonaduz, CH) is an automated ventilator software that adapts inspiratory and expiratory triggers according to real-time analysis of flow- and pressure-time curves. Data on Intellisync® performance are lacking. This bench test study aimed to test the ability of Intellisync® to improve patient ventilator synchrony in a NIV model.

Material and methods: Bench test study. To simulate spontaneous ventilation, one chamber of a two-chamber Michigan test lung was connected to a driving ventilator. The other chamber was connected (double limb circuit) to the Intellisync® equipped ventilator (Hamilton S1, Bonaduz, CH). To simulate NIV, continuous leaks and leaks limited to inspiration were created between the test lung and the Intellisync® ventilator. Pressure and flow transducers were inserted in the circuit for measurements. Patient-ventilator synchrony was assessed for different leaks amplitudes with NIV mode activated and with/without Intellisync®. Pressure support was set at 8 and 14 cmH₂O and PEEP at 5 cmH₂O. Trigger delay (Td), triggering phase pressure-time product (PTP trigger), inspiratory time in excess (Tiex) and major asynchronies (1) were measured for each condition with stable leaks and before and after leaks variations. Comparisons were performed with Kruskal-Wallis and post-hoc Dunn's tests.

Results: Intellisync® activation improved expiratory trigger by optimizing Tiex in the majority of the tested conditions. Intellisync® was efficient to correct both premature cyclings and prolonged pressurizations. Intellisync® also slightly reduced Td and PTP trigger in the majority of the tested conditions. No major asynchronies were observed when closing the leaks (either continuous or inspiratory) with or without Intellisync®. When opening the leaks, a small

number of auto- / double- triggerings were observed without Intellisync®. Its activation did not reduce the number of major asynchrony events.

Conclusions: In our bench test model, Intellisync® improved expiratory synchronisation and reduced Td and PTPtrigger. Clinical studies are needed to assess whether similar results can be observed in ventilated patients.

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P15

Challenging airway management in congenital syngnathia. A case report of a female neonate with bony fusion of the jaws

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Background: Congenital Syngnathia is a rare condition presenting with fusion of the jaws involving either soft tissue (synechia) and/or bony structures (maxillomandibular synostosis) (REF). Syngnathia occurs isolated or as part of a syndromic disease. Its management is prolonged requiring a multidisciplinary approach.

Results: We report of a term female neonate whose parents are consanguine originally from Syria. Retrognathia and polyhydramnion were seen prenatally. Due to insufficient contractions a secondary C-section was performed. At resuscitation it was noticed that she was unable to open her mouth. Nasal CPAP was started because of respiratory distress syndrome due to wet lungs which was resolved after 24 hours. On more detailed examination she was found to have normal lips but the maxilla and mandibular were inseparable hence no jaw movements were seen. A CT confirmed the diagnosis of posterior bony fusion of the processus muscularis mandibulae with the maxilla and zygoma. Besides 11 pairs of ribs further diagnostics including genetics were without any abnormal findings. In view of high risk of aspiration she was nil by mouth and PEN was initiated.

With 28 days of life surgery was planned. Firstly, under sedation a fiberoptic nasotracheal intubation was performed. An extraoral submandibular surgical approach allowed positioning of presurgical planed, patient specific osteotomy guides for a horizontal mandibular osteotomy and interposition of an autologous fatty tissue graft achieving a mouth opening of 2cm. Based on digital intraoral scans a mouth splint was adjusted for sustaining the inter-alveolar space. For definite airway patency a tracheostomy was then conducted. Since the 5th postoperative day with a tracheal cannula in situ she was without ventilatory support. She was on full enteral feeds via nasogastric tube 14 days after surgery. Mouth closure and sucking to drink a bottle has to be learned by logopaedic support. Additionally, further surgical adjustments and physiotherapy are required.

Conclusion: Congenital syngnathia is rare and needs careful and long-term airway management for the multiple surgical interventions required by this condition. Without sufficient jaw release the risk of aspiration remains high even with a tracheostoma in place. Once surgical correction has been performed further intensive multi-professional care is required as well as high suspicion for recurrence which is often described in bony syngnathia.

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P16

Epidemiology and outcome of tracheotomised patients in the Lausanne ICU

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Context & Objectives: Tracheotomy is often performed in ICU patients for prolonged mechanical ventilation (MV) weaning or deficient airway protection. Guidelines are available (1) but many

questions remain opened as optimal time and technique for tracheotomy (2, 3, 4) or weaning strategies. Information on tracheotomised patients and their outcome in the Lausanne Adult ICU is sparse. We aimed to study characteristics for these patients and their hospital outcomes.

Methods: Retrospective analysis of patients tracheotomised in the Lausanne Adult ICU between 05. 2017 and 11. 2018. Burn victims, patients tracheotomised prior to ICU stay or for ENT (ear-nose-throat) reasons were excluded. Demographic and medical data, SAPS II score at admission, dates of intubation, tracheotomy and MV weaning (defined as 3 consecutive days with < 12 hours of MV) were collected from medical files. Tracheotomy reason and technique used (surgical or percutaneous) were also collected, as were ICU and hospital length of stay and mortality. Descriptive data shown as median [IQR]. For all results, N = 79 unless specified.

Results: Preliminary results. 79 patients (29.1% of women) were included. Median age was 60 [52 - 71] years. SAPS II score was 46 [39 - 62]. Reason for ICU admission were respiratory distress (27.8%), post-operative care (21.5%), neurological disease (20.2%), shock (11.4%), trauma (7.6%), cardiac arrest (5.1%) and other causes (6.3%). 61% of patients were tracheotomised for prolonged weaning, 22.8% for neurological reasons, 8.9% for swallowing disorder and 6.3% for other reasons. Tracheotomy was more often performed surgically (83.5%) than percutaneously. Time from intubation to tracheotomy was 15 [10 - 20] days. Time from tracheotomy to weaning was 6 [4 - 12] days for a total duration of MV of 22 [16 - 31] days (N = 72). Seven patients (8.9%) were not weaned before ICU discharge (weaning dates unavailable). ICU and hospital length of stay were 29 [20 - 44] and 55 [43 - 78] days respectively. ICU and hospital mortality were 7.6% and 19.3%.

Conclusion: In the Lausanne Adult ICU, tracheotomy is performed 15 [10 - 20] days after intubation mainly for prolonged weaning. The surgical technique is more often used. After tracheotomy, median time to MV weaning is 6 days but with wide variations. Seven patients (8.9%) were not weaned from MV before ICU discharge. Mortality was similar to values reported in recent literature.

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P17

Compliment Inhibition for the Treatment of COVID-19 Triggered Thrombotic Microangiopathy with Cardiac Failure: A Case Report

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BACKGROUND: COVID-19 has been increasingly recognized as a multisystem disease. SARS-CoV-2 can infect literally any cell type that expresses its target receptor angiotensin-converting enzyme 2 (ACE2). However, COVID-19 associated organ dysfunction is not only mediated by direct viral effects but also by the interaction between the host's immune response, endotheliopathy and microvascular coagulopathy. It has been proposed that the activation of the complement system plays a central role in the pathophysiology of severe COVID-19 and the associated endotheliopathy.

CASE SUMMARY: A 76 year-old male COVID-19 patient with unclear cardiogenic shock was admitted to our ICU after coronary angiography. A few days later, the patient developed renal failure, neurological symptoms, severe thrombocytopenia, and a Coombs-negative hemolytic anemia with schistocytes. All together the clinical picture was highly suggestive of a thrombotic microangiopathy (TMA) with microvascular cardiac involvement. Conventional therapeutic strategies including high-dose steroids and seven sessions of therapeutic plasma exchange were all unsuccessful. After interdisciplinary discussion, a single dose of 900mg Eculizumab was applied.

RESULTS: In our case, administration of complement inhibition with Eculizumab as rescue approach led to a rapid clinical and laboratory improvement. Importantly, cardiac and renal function improved clinically, and the patient was finally discharged into rehabilitation after 36 days.

CONCLUSIONS: The etiology of cardiogenic shock observed in this patient was not simply explained by his focal and chronic coronary findings. Although, we did not formally exclude viral myocarditis, both the clinical features of TMA and the rapid resolution of all clinical signs and symptoms after pharmacological complement inhibition suggests a SARS-CoV2-driven microangiopathic origin of his heart failure. This case highlights the importance of recognizing complement-related TMA in the context of SARS-CoV2 as a potential pathophysiologic mechanism of myocardial dysfunction. Due to the availability of a specific treatment strategy, consideration of this rare differential diagnosis might save lives. In conclusion, prospective studies are desirable to better understand the mechanisms of complement activation in SARS-CoV-2 infections, the relationship with COVID-19 triggered TMA, and the efficacy of complement inhibition.

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P18

The bromodomain and extra terminal domain protein inhibitor (BET-Inhibitor) DYB-41 reduces pulmonary inflammation and pulmonary cytokine levels in an experimental Acute Respiratory Distress Syndrome rat model

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Background and objectives: Acetylation of histones is a key epigenetic regulatory process of gene expression. Bromodomain and Extra Terminal domain proteins (BET) stabilize acetylated histones, enhancing and sustaining gene expression [1]. Small molecules preventing protein binding between histones and BET proteins (BET-I) have shown to reduce the expression of cytokines in-vitro and in-vivo [2]; and prevent radiation-induced lung fibrosis in rodents [3]. These properties make them of particular interest for the treatment of the acute respiratory distress syndrome (ARDS). The aim of our proof-of concept study is to evaluate the efficacy of the BET-I DYB-41 for early treatment of liposaccharides (LPS) -induced acute lung injury in a rat model of ARDS.

Methods: Induction of ARDS in 22 Wistar rats was performed with intratracheal and intravenous (IV) LPS administration and non-protective mechanical ventilation. Ten rats were assigned to DYB-41 and 12 to placebo. On day one an intraperitoneal (IP) injection of 50 mg/kg of DYB-41 or placebo was performed. Two hours later rats were intubated and ventilated 15 minutes with a tidal volume of 10 mL/kg, 0 cmH₂O of PEEP, respiratory rate of 55-60/min on 100% FiO₂ for intratracheal instillation of 500 mcg/kg of LPS from E. coli O55:B5. On day two the rats received a second IP injection of DYB-41/placebo. A slow IV LPS infusion of 5 mg/kg was administered and animals were ventilated as described before for 8 hours. Blood sampling was performed, and rats were euthanized before dissection and lung extraction.

Lung injury was assessed with the semiquantitative histopathologic scoring system for lung injury (HSSL). Cytokine levels in lung tissue and in blood (IL1b, IL6, IL10 and TNFa) were performed with ELISAs. Differences between groups were determined using the Mann Whitney test.

Results: The total HSSL showed similar results in both groups. However, there was a significant difference in the perivascular edema component with less severe inflammation in the DYB-41 group (mean score 3 vs 2, p < 0.005). Pulmonary cytokines levels were lower in DYB-41 rats for IL1b (443 vs 810 pg/mg, p < 0.05), IL6 (214 vs 330, p = 0.28), IL10 (489 vs 1061, p < 0.05) and TNFa (310 vs 3010, p < 0.05). Preliminary analysis of blood cytokines showed significantly reduced TNFa blood levels in DYB-41 rats.

Conclusion: Early treatment with DYB-41 reduced pulmonary inflammation and pulmonary cytokine levels in our experimental ARDS model.

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P19

Verteilung knapper Ressourcen während der Pandemie – Nutzenmaximierung versus Gleichbehandlung

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Einleitung: Werden intensivmedizinische Behandlungskapazitäten knapp, wie im Fall der Coronapandemie, stellen sich Fragen nach einer fairen Verteilung bei grundsätzlich noch vorhandenen Ressourcen bis hin zu tatsächlichen Triageentscheidungen, welche mit dem Ausschluss aus einer prinzipiell indizierten Therapie verbunden sind.

Hintergrund: Bei Verteilungsfragen knapper Ressourcen besteht der Konsens, dass Ressourcen effizient eingesetzt werden sollen, ohne einen Anwärter auf die Ressource zu diskriminieren.

Mit einer effizienten Verteilung soll ein grösstmöglicher Nutzenzuwachs erzielt werden, dies folgt einer utilitaristischen Sichtweise. Als eine Variable des zu maximierenden Nutzens können die Anzahl geretteter Lebensjahre herangezogen werden, wodurch ältere Menschen benachteiligt werden, auch wenn sie die gleiche Kurzzeitprognose aufweisen. Demgegenüber steht die Forderung, dass keine Diskriminierung, also keine ungerechtfertigte Ungleichbehandlung, erfolgen darf. Dazu gehört, dass nicht nach Alter, Geschlecht oder sozialem Status ungleich behandelt werden sollte. Folgt man diesen Kriterien, kann dies einer effizienten Verteilung entgegenstehen, da bei einer COVID-19 Erkrankung das Alter, das männliche Geschlecht und z.B. auch eine Adipositas mit einer schlechteren Prognose einhergehen. Sollen demnach ältere Menschen, Männer und Adipöse von einer Intensivbehandlung ausgeschlossen werden, wenn eine Triageentscheidung getroffen werden muss? Der Ausschluss von Männern und Adipösen erscheint absurd, der von Älteren ist immer wieder in praktischer Diskussion, nicht nur in Bezug auf COVID-19.

Die Idee, in Triagesituationen effizient und unter Wahrung der Nicht-Diskriminierung zu verteilen, zeigt keine Lösung, sondern vielmehr Kollisionsmöglichkeiten. Da Triageentscheide praktisch getroffen werden müssen, muss es Orientierungshilfen geben, anhand welcher Kriterien zwischen Nutzenmaximierung und einer Nichtdiskriminierung abgewogen werden sollte. Weltweit wurden entsprechende Triagerichtlinien erarbeitet.

Schlussfolgerung: Auch wenn Einigkeit besteht, dass knappe Ressourcen effizient und ohne Diskriminierung verteilt werden sollen, kann eine allgemeingültige Balance zwischen Nutzenmaximierung und Gleichbehandlung nicht erreicht werden. Entworfenen Richtlinien für Triageentscheide helfen bei der ethisch schwierigen Entscheidungsfindung, können ein ethisches Dilemma aber nicht vermeiden.

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P22

Role of physiotherapy team in critically ill COVID-19 patients pronation: can a multidisciplinary management reduce the complications rate?

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Background and Objectives: Critically ill COVID-19 patients affected by acute respiratory failure often required mechanical ventilation (MV) support. For ICU nursing staff, COVID-19 patients' management presented an increased workload, especially during pronation maneuvers, with high complications rate. In this emer-

gency scenario Clinica Luganese Moncucco, identified as a COVID-19 Center by the Swiss Health Department, decided to introduce a specialized ICU Physiotherapy Team (IPT) to support nursing staff during pronation. Study aim was to analyze rate and characteristics of complications related to pronation, systematically performed by a specialized IPT.

Material and Methods: A retrospective analysis on consecutive critically ill COVID-19 patients; sampling analysis was carried out from March 16th to April 30th, 2020.

Results: Forty-two patients were treated by the IPT; average age was 67.5 years (56.7 - 73) with an average BMI of 28.3 Kg/m² (18.6 - 41.1, SD 5.1). At admission, the median NEMS score was 34.5 (18 - 39), significantly increased compared to previous year ($p < 0.001$). Pronation maneuvers were performed on 81% of patients, with 296 technical gesture and an average of 3.52 cycles per patient. One (0.3%) major complication was observed; despite pronation 14 (33.3%) patients developed minor complications such as pressure sores. The presence of pressure sores was related to ICU LOS ($p = 0.029$) and MV days ($p = 0.015$); the number of pressure sores ($n = 27$) was significantly correlated with ICU LOS ($r = 0.467$, $p = 0.001$) and MV days ($r = 0.475$, $p = 0.001$). The propensity matching score analysis didn't show any protective factor of pronation regarding

presence of pressure sores ($p = 0.448$). No other significant correlations were found.

Conclusion: Specific pronation team resulted in a lower rate of major complications. The persistent high amount of minor complications appeared to be related rather to the disease severity than to pronation gesture, suggesting that minor complications were not protected by pronation.

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EPOSTER SGI PFLEGE | SSMI SOINS

P05

Isoliert sein auf der Intensivstation

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Die Zunahme multiresistenter Keime und die Anfälligkeit von Intensivstationen für Ausbrüche von Erregern machen zunehmend Isolationsmassnahmen bei der Pflege von Patienten*innen erforderlich.

Ziel ist es, aufzuzeigen, wie Patienten*innen die Isolation erleben und welche pflegerischen Behandlungsschwerpunkte und Unterstützungsmassnahmen sich daraus ergeben.

Zur Bearbeitung der Fragestellung wurde eine Literaturrecherche durchgeführt, sowie Erfahrungen in der Betreuung eines isolierten Patienten eingebracht.

Patienten*innen auf der Intensivstation sind aus ihrem gewohnten Umfeld herausgerissen und von ihrer Alltagswelt isoliert. Intensivtherapie und eine hygienisch induzierte Isolation lösen zusätzlich negative Empfindungen aus. Eine Isolation bedeutet weniger Besuchskontakte. Dies kann zu einem Gefühl der Einsamkeit führen. Patienten*innen berichten über ein Stigmatisierungserleben, das die Sicherheit und den Selbstwert der Identität gefährdet. Sie haben bis zu 50% weniger Kontakt mit dem therapeutischen Team. Neben der reduzierten Versorgung führt dies zu einer Desinformation. In der Wahrnehmung ist „isoliert sein“ eng mit der Erfahrung von Todesangst verknüpft. Es besteht ein doppelt so hohes Risiko, Wahnvorstellungen und Delirien zu erleiden und ein 40% höheres Risiko, an Depressionen zu erkranken. Patienten*innen, die gut über die Notwendigkeit der Massnahmen aufgeklärt sind, empfinden diese aber auch durchaus als Schutz. Um die Beeinträchtigungen einer Isolation zu reduzieren, sollten Pflegefachkräfte die Pflegegeschwerpunkte erkennen. Aus den Pflegegediagnosen Relokationsstresssyndrom, soziale Isolation und Stigma können pflegerische Massnahmen abgeleitet werden. Patienten*innen profitieren von umfassenden Informationen, Orientierungsgabe und Kontakt zu Bezugspersonen, persönlich und per Telefon. Sie miteinzubinden in einen Tagesplan gibt zusätzlich Unterstützung. Die Besuchszeit sollte möglichst ungestört genutzt werden können. Ein zuhörendes Gesprächsverhalten, damit Patient*innen sich aussprechen können, hilft, Stigmatisierung und damit verbundene Scham zu reduzieren.

Es gilt, die Situation isolierter Patienten*innen auf der Intensivstation besser zu verstehen und ihnen die Adaption an veränderte Umstände zu erleichtern.

P06

Routinemässiges Anspülen bei endotrachealen Absaugen – ja oder nein – ein Praxisbeispiel

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Einleitung: Das endotracheale Absaugen ist ein häufiger und invasiver Vorgang, der bei intubierten, beatmeten Patienten auf der pädiatrischen Intensivstation (PICU) notwendig ist. Durch das Entfernen von Sekret, kann die Lunge mehr Volumen pro Atemzug aufnehmen und die Oxygenierung und Ventilation positiv begünstigen. Studien und der Austausch mit Fachexperten zeigen, dass ein endotracheales Absaugen mit routinemässigem Anspülen mit NaCl 0.9% nur durchgeführt werden soll, wenn Zeichen für Sekret, welches die Atemwege verlegt, vorhanden ist. Aufgrund dieser Datenlage wurde auf der PICU das Vorgehen beim endotrachealen Absaugen entsprechend angepasst. In der Umsetzung kam es bei mehreren Patienten auf der PICU zu Tubusobstruktionen mit kritischem Reanimationsereignis.

Methode: Die Patientendaten wurden analysiert, um zusammen mit einer weiteren Literaturrecherche Hauptsymptome zu identifizieren, von welchen Kriterien zur Indikation des endotrachealen Absaugens abgeleitet werden können.

Ergebnisse: Die Analyse der aufgezeichneten Patientendaten hat gezeigt, dass es bereits mehrere Stunden vor einem kritischen Ereignis Trends für eine unzureichende Belüftung gab. Von einem routinemässigen Absaugen und dem Anspülen mit NaCl 0,9% wird in der Literatur abgeraten. Es wird jedoch empfohlen, die Entscheidung anhand von klaren Kriterien und Assessments zu treffen. Um die Patientenversorgung zu verbessern und lebensbedrohende Ereignisse zu vermeiden, werden auf der PICU Assessments getestet. Diese sollen Pflegefachpersonen in ihren klinischen Überlegungen und der Entscheidung zum endotrachealen Absaugen, mit oder ohne anspülen, unterstützen. Die Assessments sollen unter dem Fokus der Beurteilung der Atemwegssituation und unter Einbezug der Beatmungswerte und dem Krankheitsbild angewendet werden.

Schlussfolgerungen: Der routinemässige Einsatz eines sensiblen und hochspezifischen Assessments zur Beurteilung der individuellen Patientensituation in Bezug auf das endotracheale Absaugen ist auf der PICU unerlässlich, damit Leitsymptome für ein kritisches Ereignis frühzeitig erkannt werden und die pflegerische Handlung für die Patienten sicher durchgeführt werden kann.

P20

Postoperatives Management nach Glenn- und Fontanoperation

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Einleitung: Komplexe Herzvitien, welche aufgrund der Anatomie eine Unifokalisation zur Folge haben, faszinieren, fordern und beschäftigen uns.

Im ersten Weiterbildungsjahr zur diplomierten Expertin Intensivpflege arbeiteten wir auf der kardialen Intensivstation im Universitäts-Kinderspital Zürich.

Fragestellung:

- Welche Komplikationen zeigen sich im postoperativen Management bei Kindern nach herzchirurgischem Eingriff zur Unifokalisation im Rahmen der Glenn- und Fontanoperation?
- Welche pflegerischen Schwerpunkte resultieren aus den postoperativen Komplikationen nach einer Glenn- und Fontanoperation?

Methode / Design: Unsere Vorgehensweise zur Entstehung dieser Arbeit setzt sich aus drei Teilen zusammen. Wir greifen einerseits auf unsere eigene pflegerische Erfahrung zurück, andererseits setzen wir uns intensiv mit der Fachliteratur auseinander. Wir hatten ebenfalls noch die Möglichkeit, ein Interview mit dem damaligen leitenden Arzt und Leiter der kardialen Intensivstation des Kinderspitals Zürich zu führen.

Resultate: In der vertieften Auseinandersetzung mit unserer Fragestellung zeigt sich klar, dass es grosse lokale und zentrumsspezifische Unterschiede bezüglich des postoperativen Managements nach Glenn- und Fontanoperationen gibt. Die Schwerpunkte unserer Arbeit gliedern wir in pulmonale, kardiale, systemische, renale sowie neurologische Bereiche. Bei jedem dieser Punkte erarbeiten wir ein für uns relevantes Fazit. Spannend zu sehen ist, dass in den zwei grossen Themenbereichen der postoperativen Beatmung und Diuretikatherapie je nach Quelle grosse Diskrepanzen zu finden sind.

Schlussfolgerungen / Empfehlungen: Aufgrund der nun erhaltenen theoretischen Grundlagen dieses Themas wird uns einmal mehr bewusst, wie stark eine solche Operation in den gesamten Organismus eingreift und wie komplex diese Vorgänge sein können. Dies macht die Betreuung solcher Patienten extrem herausfordernd und zeigt klar auf, dass eine situationsbezogene Prioritätensetzung unumgänglich ist. Nach der ganzen Theoriebearbeitung stellen wir uns die Frage, was uns in dieser Situation geholfen hätte. Wir entschieden uns folglich, ein Merkblatt / Fact Sheet für die Pflegenden zu erstellen. Es soll als Hilfestellung dienen, um einen ersten kurzen Gesamtüberblick über die wichtigsten Punkte und häufigsten Komplikationen zu erhalten.

P21

La prise en charge infirmière de la mobilisation précoce du patient intubé et ventilé aux Soins Intensifs.

C Candan

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Introduction: J'ai observé une discordance dans mon service dans la mise en pratique des recommandations scientifiques concernant la mobilisation précoce des patients intubés sous ventilation artificielle. Je me suis alors questionnée sur les origines à cette différence de prise en charge.

Méthode: J'ai recherché plusieurs articles scientifiques traitant du sujet et apportant de hauts niveaux de preuves. Mes recherches m'ont conduite à des études démontrant l'intérêt de la mobilisation précoce ainsi que la faisabilité et la sécurité de celle-ci. D'autres ont été menées dans des services de Soins Intensifs pour évaluer l'application de ces recommandations. J'ai par ailleurs rédigé puis distribué des questionnaires à l'ensemble du personnel infirmier de mon service. J'ai ensuite analysé les réponses obtenues. Le but étant de comparer les freins à la mise en pratique de la mobilisation précoce énoncés dans la littérature et ceux relevés dans mon unité de Soins Intensifs.

Résultats: Il s'avère que les obstacles décrits dans la littérature scientifique sont sensiblement les mêmes que ceux retrouvés dans l'analyse des résultats des questionnaires. A savoir, les caractéristiques liés au patient lui-même (conditions d'instabilité des patients), liés à la structure du service (ressources humaines et techniques, protocoles), à la culture de la mobilisation précoce dans le service (habitudes, attitudes du personnel) et enfin ceux liés aux processus (clarté des rôles établis, responsabilité de chacun).

Conclusion: La mobilisation précoce du patient intubé sous ventilation mécanique représente un défi quotidien pour les unités de Soins Intensifs. Chaque intervenant de l'équipe pluridisciplinaire a son rôle à jouer dans ce processus et l'équipe des Soins Intensifs a la capacité d'opérer un changement dans sa pratique.

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