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ORAL PRESENTATIONS

Exploration of critical care nurses' challenges in caring for patients with enterocutaneous fistula as a complication of an open abdomen: A qualitative study

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Background. Enterocutaneous fistula (ECF) is a severe complication of an open abdomen, which poses devastating challenges for critical care nurses.

Objectives. To explore and describe the challenges faced by critical care nurses caring for patients with ECFs in a tertiary public hospital in Gauteng Province, South Africa.

Methods. A qualitative, exploratory, descriptive and contextual study design was utilised. Four semi-structured focus group interviews were conducted, with six participants in each group. Ethics clearance was obtained (ref. no. HDC-01-77-2014).

Results. The interviews revealed two overarching themes: challenges with regard to difficult nursing care, and lack of resources to provide quality patient care. The study highlighted that nurses were not coping with the care of patients with ECFs.

Conclusion. Collaboration of a multidisciplinary team involving dieticians, surgeons and enterostomal therapy nurses could improve the management of ECF without surgical intervention, increase the knowledge and skills of nurses, alleviate the challenges they face, and provide good patient outcomes. Standardised and updated protocols will ensure best practices, resulting in quality patient care that facilitates healing and closure and reduces mortality and morbidity rates. The key principles of caring for patients with an open abdomen presenting with ECF are based on correcting fluids and electrolytes, nutritional optimisation and support, control of abdominal sepsis, wound care management, pain control, and emotional support to critical care nurses and ward nurses.

Considerations of the relationship between respiration, swallowing and voicing in patients in critical care units: A file review

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Background. The relationship between respiration and swallowing needs to be well co-ordinated to prevent penetration and aspiration. Patients in critical care units often present with respiratory compromise leading to the need for short- or long-term ventilation, complications of which can result in short- or long-term difficulties with airway protection. Dysphagia can have serious medical consequences and negatively affect quality of life, which can extend the hospital stay of the patient. In resource-restricted healthcare settings such as those in Africa, lengthy hospital stay needs to be avoided.

Methods. Fibreoptic endoscopic evaluation of swallowing (FEES) was conducted on 35 patients in various critical care units at Netcare Alberton Hospital in Johannesburg, South Africa. The data from these files were evaluated retrospectively using descriptive statistics as well as a qualitative analysis to describe the presentation of patients with respiratory difficulties in critical care with regard to dysphagia and voicing complications, and their medical presentation and subsequent management.

Results. A high proportion of patients (45%) were admitted because of trauma, and 71% of the patients in the sample needed a tracheostomy. Most (75%) required dysphagia intervention, and 30% of these patients required intervention for vocal cord pathologies. Significantly, none of the patients presented with aspiration pneumonia once assessment had taken place.

Conclusion. Early identification of and intervention for dysphagia in critical care are imperative, as this patient population is at risk for development of dysphagia. Early identification and assessment are vital to prevent complications and thus shorten patient length of stay in critical care.

Return to work of major trauma survivors from a private level 1 trauma centre in South Africa

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Background. Trauma is known to be a leading cause of mortality and injury-related disability globally. In South Africa (SA), the socioeconomic burden of trauma is magnified because people of working age are most affected.

Objectives. To describe the proportion of major trauma survivors who returned to work (RTW) during a 6-month period after hospital discharge, and identify the factors associated with the RTW outcome.

Methods. Institutional ethics approval was obtained (ref. no. HREC S21/04/061), and all participants provided informed consent. A prospective observational cohort study involving major trauma survivors from a trauma intensive care unit (TICU) at a private level 1 trauma centre in SA was conducted between January 2022 and September 2022. RTW status was assessed using the Employment Questionnaire. Univariate and multivariate Cox proportional hazards regression was used in analysis.

Results. Sixty-four of the 86 participants (74.4%) had RTW by 6 months after hospital discharge. The median time to RTW was 16 weeks. After adjusting and backwards analysis, Chelsea Critical Care Physical Assessment Tool scores (adjusted hazard ratio (AHR) 1.06; 95% confidence interval (CI) 1.01 - 1.10; p=0.007) and having applied for/received any form of grant (AHR 2.26; 95% CI 1.35 - 3.77; p=0.002) were the only factors that were associated with the RTW outcome.
Conclusion. The cumulative probability of not RTW was 25.6% among participants after 24 weeks. Higher physical function at TICU discharge and not seeking any form of compensation were associated with a higher probability of RTW. This study has highlighted the complexities of RTW and the socioeconomic burden following major trauma.

Evaluation of the similarity of antimicrobial resistance patterns in clinical isolates and intensive care unit (ICU) built environment isolates in two ICUs in Cape Town, South Africa

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Background. The physical environment of the intensive care unit (ICU) is an under-appreciated reservoir of resistant organisms growing on surfaces as biofilms. The ICU acts as an incubator for resistant pathogens and may play a role in antimicrobial resistance (AMR).
Objectives. To evaluate whether the AMR patterns in clinical isolates are similar to those of viable microbes in the ICU built environment.
Methods. Ethics approval was obtained from the Stellenbosch University Human Research Ethics Committee. A prospective study was conducted in two ICUs (public and private, ICUs A and B) in Cape Town, South Africa. Patient culture results from 1 February to 31 March 2022 were included. Microbiological samples were collected from 'high-frequency' touch surfaces, water sources, faucet outlets and wastewater drains in the ICUs on two occasions during the study period.
Results. ICU A admitted 328 patients: 119 patient specimens, 63 surface swabs and 14 water specimens (sampling (S) 1) and 66 surface swabs and 17 water specimens (S2) were collected. ICU B admitted 128 patients: 374 patient specimens, 47 surface swabs and 10 water specimens (S1) and 48 surface swabs and 9 water specimens (S2) were collected. In ICU A, antibiotic susceptibility testing (AST) for methicillin-resistant *Staphylococcus epidermidis* was not identical, non-multidrug-resistant (MDR) *Serratia marcescens* and MDR *Klebsiella pneumoniae* were near identical, and *Pseudomonas aeruginosa* was identical. In ICU B, AST for *K. pneumoniae* was near-identical, and MDR *Acinetobacter baumannii* and *Acinetobacter* spp. and non-MDR *S. marcescens* were identical.
Conclusion. AMR profiles of clinical isolates implicated in hospital-acquired infections matched those of environmental isolates in some but not all instances.

Nosocomial infections and risk factors in a COVID intensive care unit: A retrospective study

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Background. The COVID-19 pandemic exposed critical healthcare system deficiencies globally, with over 772 million cases and nearly 7 million deaths recorded by December 2023. Nosocomial infections, common in intensive care units (ICUs), significantly contribute to patient morbidity, influenced by various risk factors.
Objectives. To investigate nosocomial infections, associated risk factors and outcomes among critically ill patients admitted to our COVID-19 ICU during the peaks of the pandemic waves.
Methods. Data from 100 patients admitted to the COVID ICU between 1 July 2020 and 15 May 2021 were collected, including demographic information, pathogen types, infection sites, and risk factors for nosocomial infections.
Results. Nosocomial infections had a 53% prevalence (95% confidence interval (CI) 48 - 58). Significant risk factors included ICU length of stay (p=0.000) and Simplified Acute Physiology Score (SAPS) II (p=0.003). Bloodstream infections were most common (41%), with Gram-negative organisms predominant. Ventilation and vasopressor use increased the risk of developing nosocomial infections (relative risk (RR) 1.35; 95% CI 1.15 - 5.39 and RR 2.84; 95% CI 1.88 - 4.28, respectively). The median (interquartile range) time to identifying pathogens was ICU day 4 (2 - 8). Patients with nosocomial infections had longer ICU stays (median 12 v. 6 days; p=0.000) and higher mortality risk at discharge (RR 1.99; 95% CI 1.63 - 5.48) compared with those who did not have nosocomial infections.
Conclusion. Our data demonstrate a very high prevalence of nosocomial infections during the peaks of the first and second waves of the COVID-19 pandemic. Bloodstream infections were the most common form of nosocomial infection, and severity of illness and length of ICU stay were independent predictors of mortality.

Early screening for post-intensive care unit (ICU) syndrome in a tertiary ICU follow-up clinic in Eastern Cape Province, South Africa

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Background. There is a paucity of South African (SA) research on post-intensive care unit (ICU) syndrome (PICS), a condition that comprises impairments in physical, cognitive and/or psychological health in ICU survivors.
Objectives. To determine the incidence and impact of PICS symptoms in ICU survivors in Eastern Cape Province, SA.
Methods. Prospectively enrolled patients who had been critically ill were assessed at 6 weeks and 6 months after hospital discharge. Physical impairment was measured by the 6-minute walk test. Psychological symptoms were screened for with the Hospital Anxiety and Depression Scale and the Impact of Event Scale – Revised. Neurocognitive function

was screened with the NeuroScreen application and compared with a matched control group. The RAND Short Form-36 questionnaire was used to determine health-related quality of life (HRQOL), including at baseline.
Results. At the 6-month follow-up, among 107 patients, half of whom had had COVID-19, 5 out of every 10 suffered from physical impairment, 4 out of every 10 reported significant psychological symptoms, and 3 out of every 10 were affected by both. Six out of every 10 patients reported significantly lower HRQOL at 6 months compared with their baseline. Three out of every 10 patients had not returned to previous activities. There was significant improvement in neurocognitive functioning between study visits. Of the patients, only 15% received rehabilitation therapy after hospital discharge. Female sex, comorbidity and trauma were predictors of PICS symptoms, but COVID-19 was not.
Conclusion. ICU survivors demonstrated a high prevalence of physical and psychological impairment 6 months after hospital discharge, and this affected their functioning, life roles and HRQOL. Few patients accessed rehabilitation therapy.

Intensive care unit outcomes at a tertiary government academic institution in South Africa using a cloud-based international electronic registry

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Background. South Africa lacks a critical care registry for case mix, service delivery and benchmarking across intensive care units (ICUs). APACHE II (Acute Physiology and Chronic Health Evaluation) is a commonly used scoring system that has been challenged because of high dataset information required. The Tropical Intensive Care Score (eTropICS) is a novel clinical scoring system developed specifically for low- and middle-income countries for prognosticating critically ill patients.
Objectives. To use an internationally used electronic registry to describe the case mix, ICU course, and outcomes over 6 months.
Methods. In a retrospective study, electronic data from patients admitted to ICUs from September 2022 to February 2023 were analysed. The registry generated automated data reports and calculated mortality ratios for APACHE II and eTropICS. The research protocol of the registry data (ref. no. HREC R009/2021) was approved by the Human Research Ethics Committee, University of Cape Town (ref. no. HREC 236/2023).
Results. Of 758 patients across five ICUs, 61.7% were male, with a median stay of 4 - 9 days. Of the patients, 74.08% required mechanical ventilation and 10.82% required inotropic support. ICU mortality was 10.42% and overall in-hospital mortality was 11.35%. The eTropICS was found to predict higher ICU mortality than observed (standardised mortality ratio (SMR) <1), while APACHE II predicted lower mortality than observed (SMR >1).
Conclusion. Using an electronic registry with dedicated data capturers, this study produced a baseline case mix and SMR. We showed a difference between SMR assessments for the two scoring systems. Ongoing research is needed to benchmark our ICUs against international standards, but a baseline for future quality improvement projects has been established.

Development and validation of an instrument to measure quality end-of-life care after treatment withdrawal in the intensive care unit

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Background. In South Africa (SA), there is no instrument to measure end-of-life care provided for patients and families after treatment is withdrawn in adult intensive care units (ICUs). Western countries have developed existing measurement instruments without considering the SA context.
Objectives. To develop and conduct an initial validation of an instrument to measure end-of-life care provided for patients after withdrawal of life-sustaining treatment in the adult ICU.
Methods. An exploratory, sequential, mixed-methods research design was used. The study was conducted in two phases. The summary of findings from the first phase was used to generate relevant content domains and items for the development of the instrument. An expert panel assessed the content validity. An ethics clearance certificate (ref. no. M210229) was obtained.
Results. The final instrument consisted of 64 items across seven domains. The domains were patient- and family-centred decision-making, communication among the ICU team and with patients and families, continuity of care, emotional and practical support for patients and families, symptom management and comfort, spiritual care, and modifying the ICU environment. The instrument's overall content validity index (S-CVI/Ave = 0.97) was high. The instrument items obtained excellent kappa values.
Conclusion. The study developed and conducted an initial validation of an instrument unique to the SA context. The instrument showed high content validity for the individual items and moderate to high content validity overall. It will assist in providing care for patients and their families following treatment withdrawal, as well as in training and education of healthcare providers.

POSTERS

Characterisation and antimicrobial susceptibility pattern of *Enterococcus* species isolated from an adult intensive care unit in a tertiary care hospital: 10 years' experience

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Background. *Enterococcus* species, particularly vancomycin-resistant enterococci (VRE), are among the leading causes of nosocomial infections, with increasing antimicrobial resistance. These infections are difficult to manage, particularly in cases of VRE and ampicillin resistance.
Objectives. To characterise and determine the antimicrobial susceptibility patterns of pathogens isolated from different clinical samples from intensive care unit (ICU) patients with nosocomial infections.

Methods. This was a retrospective observational study based on 10 years (2012 - 2021) of data on *Enterococcus* species in a tertiary care hospital in Saudi Arabia.
Results. A total of 1 034 isolates of *Enterococcus* species were collected among all hospital admissions; 305 of these specimens were from ICU patients. We identified eight different species, namely *Enterococcus avium*, *E. casseliflavus*, *E. durans*, *E. faecalis*, *E. faecium*, *E. gallinarum*, *E. hirae* and *E. raffinosus*. These strains shared the highest population burden among total study samples. Of the isolates, 25% were VRE and 75% vancomycin-sensitive enterococci. *E. faecalis* was the most prevalent species, with 54.3% of the total population burden and 2.7% VRE prevalence, followed by *E. faecium* with 33.6% total sample load and 41.2% VRE prevalence. The female population carried the heaviest resistance burden, with a VRE prevalence of 30.8% in the ICU cohort. Over the study period, there was a notable increase in VRE and *E. faecalis*. The mortality rate was 32% in the infected ICU population.
Conclusion. This 10-year study provides a comprehensive picture of *Enterococcus* resistance patterns, characterisation and mortality burden in the ICU population.

The relationship between cough strength and pectoralis major muscle strength in intensive care unit patients

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Background. Respiratory muscle weakness is a complication of mechanical ventilation and prolonged intensive care unit (ICU) stay, which negatively affects cough strength. Cough strength is a necessity for successful extubation. The pectoralis major muscle showed electromyographic activity during forced expiration and coughing efforts. However, the nature of the relationship between pectoralis major muscle strength and cough strength is not clear.
Objectives. To determine the relationship between pectoralis major muscle strength and cough strength in ICU patients in a South African hospital.
Methods. This was a cross-sectional study. Ethics approval was obtained from the Research Ethics Committee, Faculty of Health Sciences, University of Pretoria (ref. no. 664/2022). Over 4 months, 114 participants were screened for eligibility, of whom 14 were conveniently sampled. Cough strength was measured with a peak flow meter and pectoralis major muscle strength with a hand-held dynamometer in ventilated and non-ventilated haemodynamically stable patients. We examined the relationship between pectoralis major muscle strength and cough strength using the Pearson correlation coefficient.
Results. There was a statistically significant positive correlation between cough strength and pectoralis major muscle strength on the left (r=0.743; p<0.05) and right (r=0.643; p<0.05). There was no statistically significant difference in cough strength between ventilated and non-ventilated patients (t=–1.702; p>0.05).
Conclusion. Cough strength may be predicted using pectoralis major muscle strength.

Strengthening the paediatric intensive care unit nursing workforce in South Africa and the region: Bridging the knowledge gap for pre-specialisation nurses

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Background. New paediatric intensive care units (PICUs) are being established across sub-Saharan Africa, yet specialist nurse training is extremely limited. No training programmes are currently accredited in South Africa, with only one training facility in the rest of the region – in Nairobi, Kenya.
Objectives. The Children's Nursing Development Unit, University of Cape Town, recognised the need for training and aimed to design and develop an online professional development course with the objective of improving the knowledge, skills and confidence of nurses in the complex paediatric critical care environment. It would also bridge the training gap created by the 4-year experience requirement for PGDip access.
Methods. The Unit team's nearly 2 decades of experience in PICU education contributed much to utilising the Backward Design methodology, starting with an extensive knowledge of clinical nurses' needs to planning learning activities. The course could not be face to face, so we also used the Community of Inquiry design model to design the educational experience.
Results. A 16-week (60-hour) asynchronous online course was launched in August 2023, and made available to nurses working with critically ill children. Applications have exceeded available places, and 94% of participants, from seven countries, successfully completed the first two intakes. Participant evaluations have been encouragingly positive, expressing confidence in applying new-found knowledge to practice.
Conclusion. The reach and impact of the course are seen across sub-Saharan Africa. The course is offered biannually and provides much-needed educational input for nurses where training opportunities are scarce and for those not yet eligible for postgraduate programmes for specialisation.

Content validation of the Measures of Process of Care for Service Providers tool in adult intensive care units

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Background. The Measures of Process of Care for Service Providers (MPOC-SP(A)) tool, developed by the CanChild Centre for Childhood Disability Research in Canada, assesses service providers' perceptions of family-centred care in adult rehabilitation. It consists of 27 items, categorised into four domains. Each domain reflects a distinct aspect of family-centred care, applicable also in intensive care units (ICUs). While an earlier version of the tool was validated for neonatal ICUs, validation for adult ICUs is lacking.
Objectives. To validate the content validity index (CVI) of the MPOC-SP(A) tool for healthcare professionals in adult ICUs.
Methods. Following ethics approval, a multidisciplinary group of six experienced ICU healthcare professionals was invited to review the MPOC-SP(A) tool, rating each item's relevance on a four-point scale to avoid neutrality. CVIs were calculated for each item (I-CVI) and domain (S-CVI/Ave) using Microsoft Excel. Acceptable thresholds were set at I-CVI ≥0.83 and S-CVI/Ave ≥0.9. Items falling below these thresholds were discarded.
Results. The S-CVI/Ave for every domain was ≥0.9, which is acceptable. Two items in domain A and one item in domain B were deleted owing to low I-CVI values. Two items were revised to improve the item's clarity. This resulted in a 24-item MPOC-SP(A) tool tailored for adult ICUs.
Conclusion. Expert assessment of the tool's items is crucial for ensuring

validity. This study has finalised the MPOC-SP (A) tool, which is now ready for the next phase of validation, focusing on construct and internal consistency.

Bleeding complications in critically ill COVID-19 patients on anticoagulants admitted to a tertiary hospital intensive care unit

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Background. COVID-19 is linked to a heightened inflammatory response, leading to a rise in thromboembolic events that influence patient outcomes. To improve outcomes from these thromboembolic complications, complex anticoagulation methods are needed. However, severe illness combined with such anticoagulation strategies may be associated with bleeding at multiple sites.
Objectives. To determine the incidence and describe the occurrence of bleeding events in critically ill confirmed COVID-19 patients admitted to the intensive care unit (ICU) on anticoagulants.
Methods. Approval to conduct this quantitative, retrospective, descriptive contextual study was obtained from the Human Research Ethics Committee, University of the Witwatersrand (ref. no. M220553). Confirmed COVID-19 polymerase chain reaction-positive adult patients admitted to the ICU from 1 April 2020 to 30 April 2021 were included. Stata software was used to analyse data. Statistical analysis was done in consultation with a statistician. A p-value <0.05 was deemed statistically significant.
Results. The study population comprised 103 patients. Cardiovascular disease was a dominant COVID-19 risk factor. The anticoagulant of choice was low-molecular-weight heparin at therapeutic doses (median dose 80 mg). Bleeding occurred in 39.8% of the patients (n=41). Two patients (1.9%) developed grade 1 deep-vein thrombosis. Median length of ICU stay was 7 days. Survival dropped below 50% (n=51) after 10 days of admission, and 25% of patients (n=25) survived beyond 28 days. Mortality was high at 65.0% (n=67).
Conclusion. COVID-19-positive critically ill patients on therapeutic anticoagulation exhibited an increased incidence of bleeding that was accompanied by a high mortality rate.

Case presentation: Finding the 'sweet spot' for immunosuppression in a critically ill patient with autoimmune vasculitis and septic shock

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Background. Polyangiitis granulomatosis (PG) is a rare autoimmune vasculitis. We treated a 14-year-old patient with newly diagnosed PG, based on pathognomonic multisystem involvement plus positive anti-neutrophil cytoplasmic antibodies. He presented with alveolar haemorrhage, complicated by pneumonia and septic shock (SS). The therapeutic dilemma was how to induce immunosuppression (IS) in the face of active autoimmune disease and SS.
Objectives. Presentation of case, description of PG, induction strategies for IS, difficulties encountered with implementation of IS in critical care, decision-making regarding choice and timing of IS.
Methods. Hospital ethics clearance was obtained, and patient details were anonymised. A literature review was done. Our management was described and compared with current treatment guidelines. Difficulties with timing and choice of IS were described.
Results. Induction options for PG include rituximab as first-line therapy, followed by cyclophosphamide (non-inferior effect), together with glucocorticoid therapy. Attempts at plasmapheresis failed, and intravenous immunoglobulins were administered while waiting for a window for IS. We opted to use cyclophosphamide and pulsed methylprednisolone, based on their side-effect and tolerability profiles. IS was commenced after shock resolution, and became imperative in the face of new autoimmune organ effects.
Conclusion. Induction of IS was successful, and the patient was discharged after 8 weeks in the intensive care unit. This proved to be a therapeutic dilemma in a rare medical condition, complicated by a common critical care diagnosis (SS). We applied critical care strategies to treat sepsis and its sequalae, while using a multidisciplinary approach to decide on timing and choice of IS therapy.

The characterisation of paediatric patients admitted to paediatric intensive care with acute gastroenteritis in a low- to middle-income setting

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Background. Limited data are available on children with acute gastroenteritis (AGE) requiring paediatric intensive care in low- to middle-income (LMIC) settings.
Objectives. To describe the demographic and clinical profiles of children admitted to a paediatric intensive care unit (PICU) with AGE over a 6-year period.
Methods. Medical records of 195 patients admitted to the Tygerberg Hospital PICU, Cape Town, South Africa, with a primary diagnosis of AGE between 1 January 2015 and 31 December 2020 were retrospectively reviewed. Demographic, clinical and laboratory data, with complication events and mortality, were analysed. Ethics approval was obtained (ref. no. HREC S21/10/203).
Results. Sixty-one percent (n=120/195) of the cohort were male, with a median (interquartile range) age of 6 (3.0 - 11.0) months and a median weight of 6 (4.0 - 8.4) kg. Twenty-eight percent (n=55/195) were underweight or severely underweight, and 34.9% (n=68/195) were either HIV infected or HIV exposed. Hypernatraemia was documented in 47.2% (n=92/195) and hyponatraemia in 17.4% (n=34/195). Eighty-nine percent (n=174/195) initially presented with shock, with 49% (n=96/195) still shocked on admission. Further complications included acute kidney injury (n=53/195; 27.2%), seizures (n=45/195; 23.1%), hypocalcaemia (n=27/195; 13.8%) and hyperglycaemia (n=13/195; 6.7%). The majority (77.4%) required invasive ventilation upon admission. The median length of PICU stay was 3 days. The mortality rate was 7.2% (n=14/195), 4.3% (n=4/92) in those with hypernatraemia and 17.6% (n=6/34) in those with hyponatraemia. Refractory shock was present in 71% (n=10/14) of children who died.
Conclusion. These findings emphasise the critical need for preventive and early medical interventions to improve outcomes in paediatric patients with AGE, especially in LMIC settings with scarce intensive care resources.

Mixed-methods rapid evaluation of sedation in the intensive care units of a public tertiary academic hospital in South Africa

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Background. Sedation is commonly administered to critically ill, mechanically ventilated patients. The use of validated sedation scales such as the Richmond Agitation and Sedation Score (RASS), as well as Spontaneous Awakening Trials (SATs) and Spontaneous Breathing Trials (SBTs), can reduce harm.
Objectives. To evaluate the quality of these processes in the intensive care unit (ICU). We also sought to identify contextual factors determining their delivery and assess the organisational capacity for future improvement.
Methods. This was a mixed-methods rapid evaluation, comprising stakeholder-led qualitative data from focus group discussions, observations, process mapping, and quantitative data from an electronic ICU registry. Barriers to and facilitators for care were described using the Consolidated Framework for Implementation Research. Quality improvement (QI) capacity was analysed using the Model for Understanding Success in Quality questionnaire.
Results. The RASS was not used consistently or effectively to target or monitor sedation. SATs and SBTs were performed according to individual doctors' judgement. Communication was informal, and incomplete documentation impeded accurate routine collection of data to monitor quality. Barriers to high-quality sedation included lack of familiarity with sedation management, staffing limitations, and lack of prioritisation. Facilitators for improvement include recognition of the need for improvement by senior doctors and nursing management, previous success with similar QI topics, and supportive QI infrastructure.
Conclusion. This study shows the need for improvement of current sedation practices. An electronic registry, strong leadership and QI expertise will facilitate future improvement efforts. Further research should focus on evaluating the implementation and effectiveness of improvement interventions related to sedation in the ICU.

Hyper-concentrated infusion strategy in adolescent calcium channel blocker overdose management

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Background. Calcium channel blocker (CCB) overdose in adolescents poses cardiovascular risks, including iatrogenic fluid overload. High-dose insulin euglycaemia therapy (HIET) is crucial, yet fluid management remains challenging. This review explores the efficacy of a hyper-concentration strategy for infusion therapies in adolescents with CCB overdose.
Objectives. To assess the effectiveness and safety of hyper-concentrated infusions in a fluid-restrictive approach to the management of adolescents with CCB overdose.
Methods. This retrospective chart review included four adolescents with CCB overdose. Ethics clearance was obtained from the Biomedical Research Ethics Committee of the University of KwaZulu-Natal, South Africa. Patients were managed using a hyper-concentration strategy via two central lines, each with three lumens infusing 80 mmol/L potassium, 160 µg/mL adrenaline, 50% dextrose, 8.3 mg/mL ketamine + propofol, 100 U/mL insulin, and lipid emulsion therapy. Primary endpoints were the time to stop adrenaline and HIET, the duration of additional dextrose infusion post HIET, cumulative fluid balance, and any adverse event related to the infusions.
Results. All patients were successfully weaned off adrenaline and HIET within 48 hours. Three required an additional 48 hours of dextrose infusion after HIET discontinuation. No significant complications related to hyper-concentrated infusions were observed.
Conclusion. Hyper-concentrated infusions appear effective in preventing iatrogenic fluid overload in adolescents with CCB overdose. This strategy may reduce risks associated with fluid overload in younger, smaller patients. The potential risks of highly concentrated infusions need careful management. Further research is necessary to validate these findings. This strategy is restricted to the confines of an approved clinical study.

The use of intravenous immunoglobulin for the treatment of severe COVID-19 in intensive care at Chris Hani Baragwanath Academic Hospital, Johannesburg, South Africa

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Objectives. To compare disease progression in critically ill patients with COVID-19 pneumonia receiving intravenous immunoglobulin (IVIg) therapy with standard of care (SoC), in respect of inflammation, organ dysfunction and oxygenation.
Methods. This was a single-centre, retrospective study of patients admitted to intensive care during the pre-vaccine COVID-19 pandemic. Demographics, inflammatory markers (C-reactive protein (CRP)), organ function (Sequential Organ Failure Assessment (SOFA)), oxygenation (ratio of partial pressure of oxygen in arterial blood (PaO_2) to fraction of inspiratory oxygen (FiO_2) (P/F ratio)), overall mortality and complications (nosocomial infections and thromboemboli) were recorded.
Results. We included 98 eligible patients in our study. Age and hypertension were significant risk factors favouring IVIg therapy. Although CRP improved in both cohorts, the improvements were not statistically significant. The IVIg cohort had significantly lower P/F ratios than patients who received SoC. The uses of vasopressors were similar at both time points. The duration of mechanical ventilation trended higher in the IVIg cohort. There were no significant differences in measured complications between the two cohorts. On univariate analysis, the relative risk of death was 1.6 times higher (95% confidence interval (CI) 1.1 - 2.3) in the IVIg group; however, a multiple regression model demonstrated that a higher P/F ratio was associated with decreased mortality (odds ratio (OR) 0.991; 95% CI 0.983 - 0.997), while higher mean airway pressure was associated with increased mortality (OR 1.283; 95% CI 1.026 - 1.604).
Conclusion. The use of IVIg in our study was directed at an older population, with significantly worse oxygenation. We found no evidence of adverse effects of immunoglobulin therapy; however, we were unable

to show any clear benefit. The P/F ratio and mean airway pressure were independent predictors of mortality.

Continuous v. intermittent beta-lactam dosing in critically ill patients with sepsis: A randomised controlled trial

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Background. Beta-lactam antibiotics (BLAs) exhibit time-dependent killing characteristics and are commonly prescribed in the intensive care unit (ICU).
Objectives. To determine the effect of continuous infusion (CI) of BLA in critically ill patients with sepsis compared with intermittent bolus dosing (IB).
Methods. This was a prospective, open-label randomised controlled trial comparing IB with CI in a multidisciplinary, university-affiliated ICU. We assessed four BLAs in adult patients meeting the sepsis-3 definition. Ethics approval was obtained (ref. no. M190742).
Results. Baseline characteristics were well matched. The primary outcome, day 14 (D14) clinical cure, was not significantly higher for CI (n=52/64; 81.3%) than for IB (n=43/58; 74.1%) (p=0.19). ICU length of stay (days) was not significantly different for CI (9, 5 - 16) than for IB (9.5, 5 - 13) (p=0.58). D90 mortality trended lower in the CI group (n=12/52; 23.1%) than for IB (n=20/49; 40.8%) (p=0.056). D90 mortality in the culture-negative sepsis group was significantly lower for CI (n=4/24; 16.7%) than for IB (n=9/20; 45%) (p=0.040). D90 mortality among patients with a source of sepsis in non-pulmonary sites demonstrated a trend towards lower figures in the CI group (n=6/28; 21.4%) than for IB (n=11/24; 45.2%) (p=0.062). The trend towards lower D90 mortality in the CI v. IB group was found for amoxicillin-clavulanate (16.7% v. 42.1%), piperacillin-tazobactam (22.2 v. 31.6%) and meropenem/imipenem (31.3% v. 54.5%).
Conclusion. Despite a non-significant difference in D14 clinical cure rates for patients with sepsis receiving continuous BLAs, we found significantly lower D90 mortality in the culture-negative sepsis group receiving CIs and a trend towards lower D90 mortality in the culture-positive group.

Continuous v. intermittent beta-lactam dosing in critically ill children with sepsis: Clinical outcomes of a randomised controlled trial

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Background. Optimising antibiotic usage applying pharmacokinetic principles may improve outcomes in sepsis.
Objectives. To determine the effect of continuous infusion (CI) of beta-lactam antibiotics (BLAs) compared with intermittent bolus dosing (IB) in critically ill children with sepsis.
Methods. This was a prospective, open-label randomised controlled trial comparing CI with IB in a multidisciplinary university-affiliated paediatric intensive care unit (ICU). We assessed four BLAs in patients meeting the 2005 paediatric sepsis definition. Ethics approval was obtained (ref. no. M190742).
Results. Baseline characteristics were well matched. Clinical cure at day 14 (D14) for CI (n=48/57; 84.2%) v. IB (n=45/48; 93.8%) (p=0.13) and ICU length of stay (days) for CI (14, 7 - 20) v. IB (12, 7.5 - 18.5) (p=0.79) were not significantly different. ICU mortality was significantly different between CI (n=11/57) and IB (n=2/48) (p=0.019); however, 6/11 deaths in the CI group were viral, *Pneumocystis jiroveci* pneumonia, fungal or culture negative, and this group represented 52% of the study population. There was no significant difference in ICU mortality (p=0.12) when comparing the culture-positive patients in the two groups. D28 and D90 mortality were 11/54 (CI) v. 5/47 (IB) (p=0.18) and 13/47 (CI) v. 6/45 (IB) (p=0.09), respectively, neither significantly different. D28 mortality stratified by antibiotic type showed no differences between the groups for amoxicillin-clavulanate (p=0.37), piperacillin-tazobactam (p=0.33) and meropenem/imipenem (p=1). There was no difference in the development of new resistance between the two groups (p=0.81).
Conclusion. We did not find a significant difference in D28 mortality when comparing CI with intermittent BD of BLAs. The effect of non-bacterial infections in antibiotic studies needs to be considered when interpreting results.

End-of-life care practices in the acute care setting

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Background. The main focus of healthcare professionals working in the acute care setting is to preserve life. Their initial and ongoing training involves acquisition of skills and knowledge that will assist them in doing so. More often than not, they deal with critically ill or injured patients, who may die without their life-saving interventions. However, this does not mean that patients do not pass away while under their care.
Objectives. To explore current end-of-life care practices in the acute care setting.
Methods. Ethics approval was obtained from the University of Pretoria and consent was given by all participants. A qualitative, descriptive design was used with purposive sampling. Data were collected during two focus groups including doctors and nurses currently working in the acute care setting.
Results. As there is no formal end-of-life care training for healthcare professionals, they manage these situations to the best of their abilities. Practices depend on the healthcare professionals' initiatives and experience. For this reason, the experience of the patients' significant others may be suboptimal, resulting in an even more stressful environment for the healthcare professional.
Conclusion. Current end-of-life care practices do not address person-centred end-of-life care needs. Formal, structured and protocolised end-of-life care practice training programmes are needed to support healthcare professionals in order to render person-centred end-of-life care. This not only leads to an acceptable experience for the patient's significant others, but also assists the healthcare professional in dealing with acute death in their unit.

Invasive mechanical ventilation practices in adult patients in three academic intensive care units

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Background. Patients with, or at risk of developing, acute respiratory distress syndrome (ARDS) should be identified early, and lung-protective ventilation (LPV) instituted.

Objectives. To describe invasive mechanical ventilation practices in adult patients at three academic ICUs in Johannesburg, South Africa, from November 2021 to January 2022.

Methods. This was a point-prevalence, cross-sectional study using consecutive sampling. Ethics approval was obtained (ref. no. WITS (M200268)).

Results. A total of 127 patients were included, with a mean (standard deviation) age of 40 (15) years; 66.1% were male. Trauma-related causes (*n*=51; 40.2%) were the main indications for ventilation. Overall, 107 patients (84.3%) had risk factors for developing ARDS and 78 (61.4%) had a ratio of partial pressure of oxygen in arterial blood (PaO_2) to fraction of inspiratory oxygen (FiO_2) (P/F ratio) <300. The most commonly used ventilatory mode was pressure support ventilation (*n*=62; 48.8%). In the spontaneous ventilation group, 11 patients (17.7%) were ventilated with Vt <6 mL/kg ideal body weight (IBW), 100% had a peak inspiratory pressure (PIP) <30 cmH_2O, 98.3% had an FiO_2 <0.6, and 29% had oxygen saturation (SpO_2) of 88 - 96%. In the controlled ventilation group, 7 patients (12.7%) were ventilated with Vt <6 mL/kg IBW, 92.7% had a PIP <30 cmH_2O, 76.4% had an FiO_2 <0.6, and 27.3% had SpO_2 of 88 - 96%. Those with a P/F ratio <300 had a mean positive end-expiratory pressure (PEEP) of 8.6 cmH_2O and set FiO_2 of 0.45. In patients with a P/F ratio >300, mean PEEP was 8 cmH_2O with set FiO_2 of 0.3. The mean Vt/kg IBW of 5.5 mL/kg IBW in patients who received <6 mL/kg IBW was significantly lower than the 8.3 mL/kg IBW in those ventilated at >6 mL/kg IBW (*p*=0.0001).

Conclusion. A large proportion of patients suffered from acute hypoxaemic respiratory failure, with the majority at risk of developing ARDS. Compliance with the use of recommended LPV strategies was low.