A RETROSPECTIVE AUDIT ON CANNULA-ASSOCAITED DEEP VEIN THROMBOSIS AFTER EXTRACORPOREAL MEMBRANE OXYGENATION

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Introduction: Catheter-associated deep venous thrombosis (CaDVT) is a recognised complication of central venous catheters and is associated with further complications including pulmonary embolism. Of importance the development of DVT is associated with higher mortality rates in thoracic transplant patients. Whilst data exists on commonly used CVCs, there is little published data on CaDVT in relation to patients receiving ECMO. Published data has incidence rates between 20 and 85%, with further uncertainty in the true incidence rate given the age of these studies, the changes in cannula technology, and changes in heparinisation practices. However, it is assumed ECMO cannula would be higher risk due to the large lumen, interference with physiologic haemostasis and prolonged duration of use.
Objectives/Aims: The primary purpose of this audit was to establish the number that received screening doppler ultrasound post decannulation and the number with evidence of DVT.
Methods: We performed a retrospective audit of patients that survived decannulation from VA and VV ECMO in our unit between 2016 and 2018. Patients were identified from our unit ECMO database, and a notes review was conducted to identify those who had USS performed.
Results: Of the 75 survivors of decannulation, 26 had a femoral vein USS with 17 identifying DVT, 6 patients had an IJ USS, 5 of which demonstrated DVT. Thirty-five percent of patients had USS performed on the femoral vein, with a DVT rate of 23% in the total population. USS was performed on the IJ vein in 8% of patients, with a DVT rate of 6.7%.
Conclusion: The identified DVT incidence was in the lower end of reported ranges from international literature, however due to small sample size and less than 35% of patients having ultrasound scans performed this rate could be significantly higher.

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REFRACTORY SHOCK POST TELMISARTAN OVERDOSE

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Introduction: Angiotensin receptor blockers are commonly prescribed medication to treat hypertension. However, toxicity by this medication can be life threatening.
Case description: A 31-year-old woman married with children with no previous co-morbidities presented with alleged history of consumption of Telmisartan 400mg. In the emergency room, she was found to be hypotensive BP- 60/30mmHg and required fluid resuscitation. She was started on vasopressor support (Noradrenaline) and transferred to the intensive care unit (ICU) for further care. In ICU, she continued to be hypotensive requiring high-dose vasopressors support in view of refractory hypotension. Bedside 2D ECO showed good left ventricular contractility. Arterial blood gas analysis showed worsening metabolic acidosis. She was intubated and mechanically ventilated and initiated on renal replacement therapy due to refractory metabolic acidosis. Over the next few hours she continued to require high vasopressors support. She was initiated on high dose insulin, methylene blue, ascorbic acid and thiamine as rescue therapy in view of refractory vasodilatory shock. Over the next 48-72h her BP stabilised, and she was gradually weaned of vasopressors and extubated on day 5 of ICU stay. She made an uneventful recovery and was discharged home.
Discussion: Mortality in refractory vasodilatory shock may be as high as 94% and the assessment and management of these patients requires a much more aggressive approach for survival. Use of rescue therapies as desperate measure can help to tide over the crisis.
Conclusion: Angiotensin receptor blocker's toxicity leads to refractory vasoplegic shock. With limited published literature and guidelines, aggressive resuscitation and use of rescue therapies helped in successful management of this life-threatening condition.

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DOSING ERRORS DUE TO FLOW RATE VARIABILITY IN MULTI-INFUSION THERAPY SETUPS: COMPARISION BETWEEN A SYRINGE PUMP AND A CYLINDER PUMP

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Introduction: In critically ill patients, multiple drugs or fluids are often infused through the same line simultaneously. Several previous studies reported on dosing errors due to flow interactions when multiple drugs with various flow rates are infused through the same line. However, a newly developed cylinder pump, which combined the advantages of infusion pump and syringe pump, can prevent free flow or siphoning phenomenon, allowing more accurate drug delivery without being affected by the surrounding environment.
Objectives/Aims: The aim of this study was to compare a new generation cylinder pump with a conventional syringe pump to check for dosing errors of slow-rate drug when infused through the same line with the rapid-rate drugs.
Methods: The visible dye indigo carmine infused at a rate of 0.5 ml/h was used as a model drug. The experiment was setup to model a clinical drug delivery system through a four-stopcock linear manifold and a catheter lumen. The rate of carrier fluid was fixed at 15ml/h. After first drug reached a steady-delivery state, second drug with a 2ml/h rate was initiated. The dye delivery was measured quantitatively using a spectrophotometry. Experiments were conducted with the conventional syringe pump (Injectomat MC Agilia, Fresenius Kabi) and a new generation cylinder pump (H-100, Meinntech, Korea), respectively.
Results: Starting second drug infusion in the multi-infusion setups caused a transient unintentional bolus of the first drug. Stopping a second drug infusion caused a transient reduction in the first drug delivery. However, in case of cylinder pump, its own cartridge acted as an anti-reflux valve to prevent free-flow and siphoning phenomenon.
Conclusion: Regardless of the used infusion device, delivery of one infused drug was transiently affected by starting or stopping a second drug infusion in the same line. Accidental free-flow and siphoning phenomenon may be reduced in the cylinder pump.

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A SIMULATION STUDY ON THE PERFORMANCE AND SAFETY OF VARIOUS INFUSION DEVICES IN CLINICALLY POSSIBLE VIBRATION SITUATIONS

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Introduction: Infusion devices are frequently used when transferring critically ill patients using various measures including moving cart, ambulance, or helicopter. However, the performance of various infusion devices has not been explored under these circumstances.
Objectives/Aims: We aimed to evaluate the performance of the infusion devices under clinically possible vibration conditions.
Methods: Experiments were conducted using four different types of pumps; two conventional syringe pumps (Injectomat MC Agilia, Fresenius

Kabi) and one conventional infusion pump (Volumed VP 7000, Arcomed), and a new-generation cylinder pump (H-100, Meinntech) which is a convertible infusion and syringe pump. The flow rate was measured using the infusion pump analyser (IDA 4 Plus, Fluke biomedical) on the stable table for 1 hour with 1ml/h and 5ml/h. Experiments were repeated in the mild vibration ($2m/s^2$), which is vibration in the patients moving cart or ambulance, and in moderate vibration ($6m/s^2$), which is vibration in the helicopter transport. Vibration level of the vibrating table was measured using a vibrating meter (VM-6360). In addition, experiment with accidental bolus in extreme vibration situations was done.
Results: In the resting state without vibration and the mild vibration condition, all the pumps showed comparable results within clinically acceptable error range. However, in moderate vibration condition, it was observed that an inadvertent bolus dose of the drug was injected accidentally in both conventional syringe pumps. In the case of the infusion pump, overall less amount was injected than the specified amount. For a new generation cylinder pump, it was possible to prevent accidental bolus injection in vibration and inject the desired amount.
Conclusion: In mimicking clinical vibration situations, most of infusion devices worked well. However, the conventional infusion pump was infused less than the desired amount, and the conventional syringe pump was infused unintentionally in a strong vibration, which required a careful attention.

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A PROTOCOL FOR A PILOT RANDOMIZED TRIAL OF AN INTEGRATIVE INTERVENTION TO IMPROVE CRITICALLY ILL PATIENTS' DELIRIUM AND RELATED OUTCOMES

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Introduction: Delirium is a common complication of critical illness, associated with negative patient outcomes. Preventive or therapeutic interventions are mostly ineffective. Although relaxation-inducing approaches may benefit critically ill patients, no well-designed studies target delirium prevention as a primary outcome.
Objectives/Aims: The objective of this study is to assess feasibility and treatment effect estimates of a multimodal integrative intervention incorporating relaxation, guided imagery, and moderate pressure touch-massage for prevention of critical illness delirium and for related outcomes. The primary clinical outcome is incidence of delirium (ICDSC $\geq$4). Secondary outcomes include pain scores, inflammatory biomarkers, heart rate variability, stress and quality of life (6 weeks; 4 months) post-ICU discharge.
Methods: Randomised, controlled, single-blinded trial with 2 parallel groups (1:1 allocation: intervention and standard care) and stratified randomisation [age (18-64, $\geq$65), presence of trauma) with blocking, involving 104 patients with Intensive Care Delirium Screening Checklist (ICDSC): 0-3 recruited from three academic ICUs. Intervention group participants receive the intervention in addition to standard care for up to 5 consecutive days (or until transfer/ discharge); control group participants receive standard care and a sham intervention. We will assess pre-defined feasibility outcomes, i.e., recruitment rates, protocol adherence. Feasibility measures will be analysed descriptively, and outcomes longitudinally. Estimates of effects will be calculated. The study has received approval from the Human Research Ethics Board, University of Alberta.
Results: Recruitment is ongoing. The major feasibility challenge is low recruitment due to high numbers of patients already exhibiting signs of delirium at screening. Results will inform the design of a future multi-center trial.
Conclusion: This pilot clinical trial integrates a low-risk, patient-centred strategy, translational research and psychological outcomes to allow an evaluation of non-pharmacological delirium management. Implications of the trial include the potential to reassure patients, decrease the incidence of frightening delirium experiences, and improve longitudinal outcomes.

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NEUROPEPTIDE Y LEVELS ARE INCREASED DURING PAIN IN CRITICALLY ILL CHILDREN: DATA FROM A PAEDIATRIC INTENSIVE CARE UNIT IN GREECE

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Introduction: Neuropeptide Y (NPY) is one of the most common investigated neuropeptides. Increased levels of NPY have been found in children with migraines while endothelial NPY administration seems to improve the symptoms of neuropathic pain. The exact mechanism of NPY in pain is not completely understood and its investigation is complicated by many factors including the severity of illness.
Objectives/Aims: Assessment of NPY levels during painful procedures in critically ill children and their association with the pain scales ComfortB and FLACC.
Methods: A prospective correlation study was conducted (July 2015-January 2016) with a convenience sample of 48 paediatric patients [mean age= 6.79 ($\pm$5.88)]. Blood samples were obtained before and after the painful procedures via a pre-placed arterial catheter. NPY levels were quantified via ELISA. Pain levels were measured at rest and during the painful procedure through the Comfort B and FLACC scales. Non-parametric statistic tests and a mixed linear model analysis were performed using SPSSver25.0 ($p \leq 0.05$).
Results: The painful procedures investigated were suctioning (39.6%), bath (16.7%), physiotherapy (8.3%), cannulation (16.7%), wound care (14.6%) and extubation (4.2%). A significant correlation was observed between NPY levels at rest and after the painful procedure with NPY levels being elevated during pain (mean= 0.8$\pm$0.3ng/ml, $p<0.001$). Significant differences were also found in pain scales, with pain scores being elevated during the painful procedure for both the Comfort B (mean 16.75$\pm$5.04, $p<0.001$) and FLACC (mean= 3.83$\pm$3, $p<0.001$). NPY levels were positively correlated with pain levels according to Comfort B ($p=0.002$) and FLACC ($p=0.05$) scores using mixed linear model analysis.
Conclusion: Our results confirms the role of NPY in pain in critically ill children. Further research is needed regarding the use of NPY as a biomarker for the assessment of pain, in order to improve pain management in critically ill children.

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THE CLINICAL SEVERITY OF PEDIATRIC PATIENTS IS ASSOCIATED WITH INCREASED NURSING WORKLOAD IN PEDIATRIC INTENSIVE CARE UNITS

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Introduction: Increased nursing workload (NW) is associated with increased incidence of adverse events. In critically ill adult patients, one of the factors that increase NW is the severity of illness; however, this has not been adequately investigated in Pediatric Intensive Care Unit (PICU).
Objectives/Aims: The aim of this study was to test the hypothesis that the clinical severity of children is associated with the nursing workload in PICU.