research where there is exposure to background radiation and no therapeutic benefit to participants.
Methods The ethical and regulatory issues encountered in the ERA-NET PRIOMEDCHILD project 'Paediatric Accelerator Mass Spectrometry Evaluation Research Study (PAMPER)' were analysed. These included the project design, scientific and ethical reviews, informed consent and recruitment processes. Infants 0–2 years were recruited in Estonia and the UK to study the pharmacokinetics (PK) of acetaminophen using accelerator mass spectrometry (AMS) bioanalysis. The study was considered in the context of the scientific, regulatory, and ethical frameworks guiding Phase 0 studies in adults and children.
Results The science and ethics were developed in the protocol design and informed consent process, which resulted in approval of the study by research ethics committees in the UK and Estonia. Fifty-two babies were recruited into the study, with an acceptance rate of 50% among the parents approached. The study results demonstrated PK comparability between microdosing and therapeutic dosing in young children.
Conclusions The PAMPER study showed the feasibility and validity of microdosing AMS PK studies in children, This methodology may provide a safer and more ethically robust approach for paediatric PK studies in certain drug models than more traditional PK study designs. The parameters and validation methods for microdosing AMS PK studies need to be reflected in regulatory guidance from the EMA, FDA and other authorities.

Intensive Care I

PS-129 CONTINUOUS SUBCUTANEOUS GLUCOSE MONITORING (CGM) DURING PAEDIATRIC CRITICAL CARE

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Background and aims The last decade gave clear evidence that hyper/hypoglycemia and glucose variability are associated with increased mortality in critically ill patients. Continuous glucose monitor (CGM) is a new device in paediatric critical care units (PICU) with clear advantages in glucose monitoring. The aim of our study was to survey the incidence of glucose regulation disorders in our PICU and specify the association between the PRISM III score and the glycemic variability [mean amplitude of glycemic action (MAGE)].
Methods We evaluated 22 children: mean age: 1.3 years, mean length of PICU stay: 18 days; 20/22 patients were on invasive mechanical ventilation; 6/22 needed vasoactive agent therapy. CGM duration: 1–12 days. Interstitial glucose level was monitored by Guardian® REAL Time CGM (Medtronic®). Reference glucose values were obtained from blood gas analyzer or point-of-care glucose analyzer. We used Spearman correlation to evaluate the association between PRISM III and the MAGE.
Results Hypo- and hyperglycemia (CGM glucose < 55 mg/dl / CGM glucose > 180 mg/dl) were detected in 4.6% and 2.5% of measurements, respectively. The mean MAGE (meaningful excursion >45 mg/dl) and PRISM III were 78 mg/dl and 19. We found a significant correlation between PRISM III and MAGE ($r = 0{,}55$; $p < 0.05$). Pearson's correlation coefficient (0.82) and Clarke Error Grid analysis (96% clinical accuracy) proved a good reliability of the CGM.
Conclusions Glucose homeostasis disorders are frequent in the PICU; hypoglycemia being more commonly detected. Increased PRISM III score contributes significantly to the elevation of glucose variability.

PS-131 HEMOLYSIS IN NEONATAL PIGLETS RECEIVING CENTRIFUGAL-PUMP EXTRACORPORAL RESPIRATORY SUPPORT: AN IN-VIVO COMPARATIVE BENCH STUDY

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Background The challenge of non-cardiac, neonatal extracorporal membrane oxygenation (ECMO) is the need for miniaturised circuits, small cannulas and low flow rates. Novel small rotating pump devices with diagonal blood flow have a reduced priming volume and circuit surface area. Bench studies in different in-vitro models are encouraging. However, little data exist on hemolysis, coagulation and fibrinolysis in defined in-vivo models.
Setting Twelve newborn piglets were randomly assigned to receive either veno-arterial ECMO with a novel diagonal pump system or to serve as controls. The ECMO circuit was prefilled with 70 ml packed red blood cells from adult swine. Blood was drained through 8 Fr venous and reinfused through 6 Fr arterial cannulas. ECMO was applied on 75% total cardiac output (80–100 ml/kg). The effect of the diagonal pump system on required circuit settings, heparin-use, plasma-free haemoglobin (fHb), lactatdehydrogenase and coagulation/fibsinolysis were studied.
Results Mild hemolysis was diagnosed within the first hour in all ECMO-piglets [mean fHb 49.7 mg/dl [9.0; 90.3; 95% CI]. After 8 hrs on ECMO mean fHb decreased, but was still significantly higher as compared to controls (25.5 mg/dl [8.7; 42.5] vs 4.7 mg/dl [0.8; 8.6], $p = 0.02$). Median mean flow rate, venous inlet pressure, and revolutions per hour were 222 ml/min (197; 313, Range), -20 cm H_2O (-36; -6), and 5295 rpm (4906; 6816) respectively. Fibrin degradation products and fibrinogen levels remained normal in ECMO and control piglets throughout the study period.
Conclusion The use of a novel diagonal pump system for ECMO in our in-vivo model generates a comparable amount of fHb as previously observed under in-vitro conditions.

PS-132 IMPACT OF STANDARDISED CONCENTRATIONS ON DRUG INFUSION PROCESS IN NICU/PICU: A SIMULATION STUDY FROM PRESCRIPTION TO ADMINISTRATION

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Background and aims Transition to standardised concentrations (StdC) is advised to reduce risks with IV infusions in PICU/NICU. In our unit, infusion rate is standardised and concentration varies (VarC). We performed a simulation study to evaluate the impact of StdC on prescription, preparation and administration.

Methods Simulation of electronic prescription (10 physicians), preparation/administration (10 paediatric/8 adult intensive care nurses) of 5 drugs (midazolam, fentanyl, noradrenaline, ketamine, furosemide) for 15 fictive patients (different dosage/weight). Two-sessions study (VarC vs StdC, each 150 prescriptions/270 preparations). Issues: time (mean ± SD in seconds); precision (target deviation in%, mediane [IQR]) of drug concentration (quantitative analysis), dose and rate (calculated by nurses).
Results With StdC, prescription time was significantly longer (72 ± 36 vs 86 ± 32, $p < 0.001$) and preparation/administration time shorter (286 ± 98 vs 216 ± 93, $p < 0.0001$). Precision of drug concentration was increased (4.4% [2.0 to 11.5] vs 4.1% [1.6 to 8.4], $p = 0.004$) with a reduction of concentrations >20% (44/270 (16.3%) vs 23/270 (8.5%), $p = 0.005$). Precision of dose was decreased 4.4% [2.0 to 11.1] vs 11.8% [5.1 to 23.3], $p < 0.0001$) with an increase of dose >20% (42/270 (15.6%) vs 83/270 (30.7%), $p < 0.0001$). Precision of rate was decreased (0.0% [0 to 0] vs 6.8% [3.2 to 20.6], $p < 0.0001$). No association with age, years of experience, number of worked hours before study, paediatric or adult ICU nurses was observed on precision.
Conclusions Preparation time and drug concentration precision was strongly improved with StdC. Strategies to deal with prescription time and poor dose and rate precision should be considered before moving to StdC.

PS-133 THE CARDIAC OUTPUT (CO) MONITORING IN CHILDREN WITH ACUTE CIRCULATORY FAILURE (ACF) IN PAEDIATRIC INTENSIVE CARE UNIT (PICU): OESOPHAGEAL DOPPLER (OD) VERSUS TRANSTHORACIC ECHOCARDIOGRAPHY (TTE)

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Background and aims CO monitoring has an important role for management of ACF in PICU. This monitoring device tracks the changes in CO induced by volume expansion or inotropic drugs. In this way CO can be measured noninvasively using aortic blood flow (ABF), continuously at the descending thoracic aorta with OD or discontinued in ascending thoracic aorta with TTE.

The aim of this study is to compare the CO obtained by TTE and OD in the management of ACF in PICU.
Methods A prospective and comparative study conducted in PICU between march 2012 and march 2014.

We investigate 16 mechanically ventilated children less than 1 year who had tachycardia, hypotension, oliguria, delayed capillary refilling or haemodynamic instability despite vasopressor drugs, we compare the measurements of the CO and strong volume (SV) obtained by OD 'ATYS-WAKI 2' and TTE 'SCHIMADZU SDU 2200 PRO' before and after volume expansion (VE).
Results 32 paired (CO and SV) measurements were obtained: a strong correlation was found between CO obtained by OD and by TTE before and after VE (Index of Pearson: $R^2 = 0{,}983$, $R^2 = 0.977$). The same correlation between the SV obtained by OD and by TTE was observed before and after VE respectively (Index of Pearson: $R^2 = 0.982$, $R^2 = 0.983$).
Conclusion OD is an appropriated, very simple and noninvasive method to measure CO. This technique remains reliable and reproducible comparative to TTE to guide VE.

PS-134 PRISM SCORE AND NONINVASIVE VENTILATION (NIV) FOR ACUTE RESPIRATORY FAILURE

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Introduction PRISM score (Paediatric risk mortality) is widely used to determine the risk of mortality in children in PICU. Recent studies had found correlation between the low values of PRISM with the success of noninvasive ventilation (NIV) and the high values with failure, but without clearly defined who will be called higher or lower value of PRISM score.
Objective To evaluate the predictive value of PRISM score for NIV success in acute respiratory failure (ARF).
Methods This is a prospective study. Are included all children admitted at PICU during January–December 2011. NIV was used as the primary support for ARF. We analysed the predictive value of the PRISM score using ROC curves and the trend of success change by Chi-square trend.
Results A total of 42 patients were included. NIV success rate was 73.8%. Prism score in the success group was 9.5 ± 3.9 vs. 14.5 ± 6.6 points in the failure group ($p = 0.0184$). Max value was 27 points, min value 3 points. By ROC curves, PRISM < 10 points before NIV results significant predictive factor for NIV success with predictive positive value 87.5%. By Chi-square trend it was found a significant trend of success reduction with increasing value of PRISM. For PRISM score = 10 up to 15 points, OR = 0.3 (95% CI 0.05–2.0) $p = 0.2$. For PRISM score >15 points, OR = 0.08 (95% CI 0.01–0.5) $p = 0.01$. ($\chi^2_{\text{for linear trend}} = 7.6$, $p < 0.01$).
Conclusion PRISM score <10 points is a significant predictive factor for NIV success. For PRISM score >15 points the likelihood to have success is decreased significantly.

PS-135 CONSENSUS DEFINITIONS, LIMITING VALUES AND RECOMMENDATIONS ON INTRA-ABDOMINAL HYPERTENSION THERAPY (IAH) AND ABDOMINAL COMPARTMENT SYNDROME (ACS) IN CHILDHOOD PUBLISHED BY THE WSACS-PAEDIATRIC GUIDELINES-COMMITTEE

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Background and aim Hitherto, neither evidence-based definitions nor age-related recommendations existed on the diagnosis and treatment of Intra-Abdominal Hypertension (IAH) and Abdominal Compartment Syndrome (ACS) in childhood. Following their 7th World Congress 2011 in Orlando (Florida), the World Society of the Abdominal compartment ayndrome (www.WSACS.org) instructed a paediatric expert committee to develop appropriate guidelines.
Methods Based on a systematic database search relevant literature was identified related to neonatal and paediatric IAH/ACS. Using a modified Delphi methodology according to the GRADE model (A to D), all papers were checked with respect to their validity and evidence. Afterwards, paediatric consensus definitions and recommendations were framed.
Results Results were published in intensive care medicine together with the revised 2013 consensus guidelines for adults (ICM 2013; 39(7):1190–206). Besides general definitions, risk factors and critical IAP thresholds (IAP: intra-abdominal