

to ensure high quality research. Specifications for the validation process, but also for the assessment of data, acquired in a study setting, are given by the EMA and FDA to ensure highest quality of the data.^{1,2}

Methods A multi-level analytical quality system was established. Data of the calibration standards (CSs), quality control samples (QCs), and incurred sample reanalysis (ISR) were evaluated according to the specifications given by the EMA and FDA guidelines.[1,2] For a run to be considered valid ≥ 6 levels or 75% of the CSs and 67% of the QCs ($\geq 50\%$ per level) had to vary $\leq \pm 20\%$ (LLOQ $\leq \pm 25\%$) from their nominal concentration.[1,2] For the ISR analysis at least 67% of the ISR samples have to lay in $\pm 30\%$ to the nominal concentration of the mean of the original and reanalysed value.[1]

Results Seventy analytical runs were conducted, applying the quality measures, 79% runs were classified as valid and were used to determine unknown samples in a paediatric study. The high quality of the acquired data is reflected in the high conformity of the CSs and QCs to the EMA and FDA guidelines, 99% of the CSs and 95% of the QCs were accepted. Further underlining the high quality of the acquired data, 85% of the IRS have also been accepted. The assay was successfully used over a time period of 29 months.

Conclusion The results of the quality assessment confirmed the robustness of the aldosterone assay throughout the whole study duration. Thus, the samples measured by this assay are reliable and facilitate the high quality research in the paediatric population.

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2. Guidance for Industry: Bioanalytical Method Validation. US Department of Health and Human Services, US FDA Rockville, MD, USA (2018).

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DIFFERENTIATING ALPROSTADIL ASSOCIATED FEVER FROM INFECTIOUS FEVER: A RETROSPECTIVE CASE-CONTROL STUDY OF NEONATES WITH DUCTUS DEPENDENT CONGENITAL HEART DISEASE IN A TERTIARY CARE CENTER

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Background Alprostadil is used to maintain ductus patency in neonates with ductus dependent congenital heart disease (CHD), until corrective surgery. Fever is a common side effect of alprostadil and may also be a sign of infectious disease. We aimed to identify potential parameters that may differentiate infectious from alprostadil fever.

Methods Retrospective case-control study included all neonates with ductus dependent CHD, who were admitted at the Children's Hospital in Ramat-Gan, Israel, from August 2003 to

August 2017 and developed fever on alprostadil. Cases were defined as neonates with a positive bacterial culture and controls were defined as neonates with a negative culture. Multivariate cox-regression was conducted to identify potential parameters that may differentiate alprostadil from infectious fever.

Results Three hundred and four neonates developed fever under alprostadil. Fifty five (18%) had a positive bacterial culture and 249 (82%) had a negative culture. In univariate analysis, the duration of alprostadil infusion was 95 hours (IQR 45–116) in the case group and 72 hours (IQR 49–215) in the control group ($p=0.011$). The time between alprostadil initiation and fever was longer for the case group: 14.13 hours (IQR 6.5–47.5) versus 12.96 (IQR 5–30.51), ($p=0.039$). In multivariate cox-regression, a more than 10% increase in neutrophil count before fever was significantly associated with an increased risk for infection (HR 6.14, 95% CI 1.94–19.42). A trend towards an association was observed with CRP ≥ 10 mg/dl before fever (HR 2.5, 95% CI 0.66–9.47) and in an increase ≥ 1000 micromol/L in WBC before fever (HR 1.74, 95% CI 0.58–5.21).

Conclusions In neonates with CHD on alprostadil therapy, an increase in neutrophil count before the appearance of fever is associated with infection. Full sepsis work-up and is still warranted in neonates who develop fever under alprostadil. Further larger studies are needed to fully establish these results.

Disclosure(s) The authors have no conflict of interests to disclose.

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CHARACTERIZATION OF THE PHARMACOKINETICS OF ACETAMINOPHEN AND ITS METABOLITES IN THE FETUS THROUGH INTEGRATION OF PLACENTAL TRANSFER IN A PHYSIOLOGICALLY BASED PHARMACOKINETIC MODEL

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Background Little is known about fetal acetaminophen (paracetamol) pharmacokinetics and its potential for toxicity, despite the frequent use of acetaminophen during pregnancy. The aim of this study was to develop a feto-maternal physiologically based pharmacokinetic model (f-m PBPK) to predict placental transfer and PK of acetaminophen and its metabolites in fetus at term pregnancy.

Methods Previously, a pregnancy PBPK model was developed for prediction of maternal PK of acetaminophen and its metabolites. This model was structurally extended with the fetal liver, and quantitative information on the maturation of relevant enzymes was integrated. Three different approaches (ex vivo placenta perfusion experiments, scaling of passive diffusion transfer rates, and the Mobi[®] default method) to describe placental drug transfer were tested. Predicted

maternal and fetal acetaminophen concentrations were compared with those observed in the literature. umbilical cord data at birth.

Results The 3 different approaches to predicted acetaminophen PK in the umbilical vein were found to yield broadly similar results. Acetaminophen exposure was similar in maternal blood compared to venous umbilical cord blood. Prediction of the median dose fraction of acetaminophen converted to its metabolites (f_m) revealed higher maternal acetaminophen-glucuronide formation clearance and sulphate formation compared to that in the fetal liver ($f_{m_glucuronide}$ 52.2 vs 0% and $f_{m_sulphate}$ 30.4 vs 0.8%, respectively) and higher fraction of acetaminophen converted to the reactive metabolite N-acetyl-*p*-benzoquinone-imine (f_{m_NAPQI} , 6.5 vs 0.06%) in pregnant women compared to their fetus.

Conclusion No differences were observed in the 3 approaches for integration of placental drug transfer. Differences in acetaminophen biotransformation to its metabolites between pregnant women and their fetuses were quantitatively predicted.

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P67 IMPACT OF ENANTIOMER-SPECIFIC MATURATIONAL CHANGES IN PHARMACOKINETICS ON THE RACEMIC KETOROLAC TARGET TROUGH CONCENTRATION

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Introduction Ketorolac is a racemic drug with analgesic effects specific to its S-enantiomer. This study aimed to describe enantiomer-specific maturational pharmacokinetics (PK). Simulations were performed to describe how S-ketorolac exposure in infants differs from adults, and how this affects the adult racemic analgesic trough threshold EC_{50} ($EC_{50_thr_adult}$ 0.37 mg/L) in infants ($EC_{50_thr_infant}$) when the same S-target is applied.

Methods A population PK analysis (NONMEM 7.3) was performed based on 1020 plasma samples from 5 studies including 80 patients (adults, children, infants) following single intravenous ketorolac administration.

Results S-ketorolac PK was best described with a 2-compartment model in infants and 3-compartment model in adults, while R-ketorolac PK was best described with a 2-compartment model in all. S-ketorolac clearance [mean population value: 3.45 L/h/56 kg] and central volume of distribution (V1) [4.27 L/56kg] increased exponentially with bodyweight (0.75, 0.59 respectively). R-ketorolac clearance [0.93 L/h/56kg], peripheral volume of distribution (V2) and inter-compartmental clearance (Q) increased exponentially with bodyweight (0.62, 1.20, 0.76 respectively), V1 [4.11 L/56kg] linearly with

bodyweight. Simulations revealed $EC_{50_thr_adult}$ (0.37 mg/L) contained 0.048 mg/L S-ketorolac as mean in typical adults (BW 48.6–99.6 kg), while $EC_{50_thr_adult}$ contained 0.032–0.036 mg/L S-ketorolac in typical infants (BW 5.3–10.6 kg). To reach adult S-enantiomer concentration (0.048 mg/L) in typical infants (BW 5.3–10.6 kg), $EC_{50_thr_infant}$ should be 0.49–0.46 mg/L, respectively.

Conclusion Enantiomer-specific maturational PK of ketorolac were described. Subsequent simulations displayed differences in proportion of S- and R-ketorolac on the racemic threshold EC_{50} . A The same S-ketorolac concentration necessitates a higher $EC_{50_thr_infant}$ to $EC_{50_thr_adult}$.

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P68 SIGNIFICANT ORAL DRUG USE IN CRITICALLY ILL CHILDREN: RATIONAL THERAPY OR A BLACK BOX?

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Background The disposition of orally prescribed drugs in critically ill children may be affected critical illness in addition to age, resulting in erratic effects and safety. We aimed to study oral drug prescribing in the neonatal and pediatric intensive care unit (NICU and PICU).

Methods A one-year retrospective cohort study of all drug prescriptions, including route of administration for all children admitted to the NICU and PICU of the Erasmus MC-Sophia's children's hospital.

Results 1723 children with 2091 unique admissions received per admission (median [IQR]) 5 (3–10) drugs; 1 (0–2) orally and 3 (1–7) intravenously (IV). During mechanical ventilation 15% and 75% of drugs were given orally and IV, respectively. In non-ventilated patients, 27% of drugs were given orally and 60% IV. The 5 most frequently orally prescribed drugs were: vitamin K, spironolactone, oral probiotics, amphotericin B (prophylaxis) and trimethoprim.

Discussion Critically ill infants receive a considerable proportion of drugs orally. Considering that critical illness may significantly impact intestinal drug absorption, this may expose them to an increased risk of ineffective or unsafe drug therapy.

Disclosure(s) Nothing to disclose

P69 PHARMACOKINETICS OF A CONTINUOUS INFUSION OF PIPERACILLIN/TAZOBACTAM TO CHILDREN USING AN ELASTOMERIC PUMP (POPPET STUDY): PILOT DATA FROM DOUBLE LUMEN CENTRAL LINES

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Background Piperacillin/Tazobactam is the first-line antibiotic for the treatment of febrile neutropenia in the UK. There is