and its relative concentration with significative differences in the acquired spectra, to obtained the so called specific Phe NIR fingerprint of the sample These observation open the exciting possibility to design a chemiometric model to assay the amount of Phe in DBS without elution and the expensive chromatographic procedures.

GP16 EFFECT OF DROPLET SIZE ON AEROSOL DELIVERY DURING SIMULATED NEONATAL MECHANICAL VENTILATION

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Introduction Invasive mechanical ventilation is a mainstay in neonatal intensive care and co-administration of aerosolised therapeutics is commonly prescribed. Considering their rapid breathing rate, low tidal volumes, small airways and interfaces, neonates present unique challenges for aerosol therapy. The objective of this study was to assess the effect of droplet size on aerosol delivery during simulated ventilation of a neonate.

Methods Simulated neonatal mechanical ventilation assessed the lung dose beyond the endotracheal tube (ETT) across two potential nebuliser placement positions within the circuit; at the dry side of the humidifier and between the Wye and ETT. 2ml of 2 mg/ml salbutamol was nebulised using two vibrating mesh nebulisers (Aerogen Solo, Aerogen, Ireland) of varying droplet size (2.76µm and 4.30µm respectively). A vibrating mesh nebuliser was chosen as it does not add flow or pressure to the ventilator circuit. A neonatal ventilator (VN500, Dräger, Germany) (V_T10mL, 60BPM, I:E ratio 1:2) in combination with a 2.5 mm ETT and humidified circuit was used. Lung dose was quantified after capturing aerosol on an absolute filter (RespirGard II 303, Baxter, Ireland) positioned between the ETT and test lung. The mass of drug eluted was determined using UV Spectrophotometry at 276nm. Results were expressed as a percentage of the nominal dose placed in the nebuliser medication cup.

Results

Abstract GP16 Table 1 Lung dose (%) using two nebulisers of varying droplet size, at two positions within the circuit. P-values are included to indicate significance.

Nebuliser position	Lung dose (%)	Lung dose (%)	P-value
	2.76µm	4.30µm	
Dry side of the humidifier	1.93 ± 0.20	1.39 ± 0.11	0.02
Between Wye and ETT	3.88 ± 1.24	2.75 ± 0.77	0.25

Discussion Increasing droplet size was associated with a significantly reduced lung dose when the nebuliser was positioned at the dry side of the humidifier (p-value = 0.02). Increasing droplet size was associated with a reduced lung dose when the nebuliser was placed between the Wye and ETT. However, this difference was not found to be statistically significant (p-value = 0.25). In conclusion, these findings demonstrate that droplet size affects aerosol delivery during neonatal mechanical ventilation.

GP17 DISTRIBUTION OF NON-FUNCTIONAL ALLELE OF CYP2D6 GENE (RS1065852) AMONG BURYAT ADOLESCENTS

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Introduction Individual reaction to medicine is determined by genetic factors. The CYP2D6 gene is involved in the metabolism of 20–25% of medication. The carriage of CYP2D6*10 determines the synthesis of a defective protein with a reduced activity of the CYP2D6 isoenzyme, which determines the difference in interindividual medicine variability and an increased risk of undesirable drug reactions. Distribution of CYP2D6*10 varies in different races and ethnic groups.

Methods In 151 Buryat adolescents, DNA was isolated from whole venous blood, the allelic composition was determined by the CYP2D6*10 gene polymorphism (rs1065852). The average age of the subjects was 16.02±2.05 years. Buryats belong to the indigenous people living on the Asian part of Russia. They belong to the Mongoloid race and are part of the small North Asian race. When forming the samples, ethnicity was taken into account in at least three generations.

Result Identified carriers of two genotypes rs1065852 CYP2D6*10: SS (70.19%) and CT (29.81%). The prevalence of functional C-allele was 85.1%; non-functional T-allele - 14.9%. When comparing the prevalence of non-functional T-allele rs1065852 CYP2D6*10 with the same indicator in other populations of the world, significant differences with the Mongols (T-allele frequency 55.0%, p<0.001), Japanese (T-allele frequency 44.7%, p<0.001), Filipinos (5.4%, p<0.001), Bedouins (4.7%, p=0.0146), representatives of the Mbuti tribe (0%, p=0.0366). No significant differences in the prevalence of non-functional T-allele rs1065852 CYP2D6*10 with Caucasians (12.5–22.5%), Yakuts (17.5%), Japanese (15.0%), African Americans (9.9–13%) and some residents of the Middle East (7.9–25.9%).

Conclusions The presence of significant differences in distribution of non-functional T-allele CYP2D6*10 (rs1065852) in the Buryat population was shown in comparison with some populations of the Mongoloid and Negroid races.

GP18 NEONATES BORN TO RHESUS POSITIVE WOMEN WITH PERINATALLY-DETECTED RED CELL ANTIBODIES: A CASE SERIES

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Background Haemolytic Disease of the Fetus & Newborn (HDFN) results from maternal IgG red cell allo-antibodies crossing the placenta & binding to their corresponding antigen on red cells in the fetal circulation. Immune haemolysis can cause varying degrees of anaemia & unconjugated hyperbilirubinaemia in the fetus & neonate.

At present, all women have bloods drawn for group & antibody screen at booking. For expectant mother who test RhD positive, repeat antibody screening is *not* carried out in the absence of antibodies at booking.

We sought to determine if our unit was failing to identify neonates at risk of HDFN who were born to RhD positive mothers with negative antibody screening at booking who developed antibodies later during their pregnancy.

Methods We carried out a retrospective chart review of babies born to women who booked with a negative antibody screen who subsequently produced a *clinically significant* antibody in that pregnancy, from 2011 to 2017 inclusive.

The development of antibodies was detected incidentally via repeat maternal sampling or via repeat maternal testing following a positive Direct Coomb's test on their baby.

Results We identified 18 babies born to Rhesus D positive women who produced at least 1 of 8 clinically significant antibodies *after* their booking bloods were taken. 2 women tested positive for 2 antibodies. Any pregnancy where an immune Anti-D was produced was excluded.

2/3rd of the at-risk infant population were male and 1/3rd female.

All tested DCT positive 14% of at-risk babies in the study group were diagnosed with jaundice;

2 due to Anti-E antibodies,

2 due to Anti-c antibodies &

1 each due to Anti-Jka, - Jka & -Jk3, Anti-Wra and Anti-Cw antibodies.

3 jaundiced neonates had no treatment.

4 needed phototherapy, of whom 2 also needed top-up red cell transfusion.

1 of these infants was later identified later as having Hereditary Spherocytosis accounting for his marked haemolysis and transfusion requirement.

Discussion Based on the retrospective review of this small cohort of neonates in a single centre, a lack of routine repeat screening for their RhD positive mothers did not increase the risk of HDFN-associated morbidity nor mortality.

We do not recommend routine repeat screening of Rhesus positive mothers for clinically-significant red cell allo-antibodies at 28–32 weeks in the absence of concern regarding haemolytic anaemia or jaundice in their babies. This would also confer a further 9,000 samples per year in our unit at a significant financial & workload cost with no evident gain for our neonatal population.

GP19

METHOTREXATE NEUROTOXICITY: MRI CHANGES IN CHILDREN WITH ALL

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Background Acute lymphoblastic leukaemia (ALL) is the commonest childhood malignancy in Europe. The survival rate has dramatically increased due to advances in treatment and it is of extreme importance to optimise and individualise treatment for each child. A crucial drug in this treatment is methotrexate. This can be given through the oral, intravenous and intrathecal route. However, methotrexate has various side effects, particularly neurotoxicity. MRI typically shows white matter changes known as leukoencephalopathy. The aim of this study was to look at the MRI changes in these patients and to determine persistence of neurological effects.

Method A retrospective study looking at patients, treated for ALL, on UK ALL 2003 and 2011 trials in a single centre who developed Methotrexate Neurotoxicity were selected. Parameters

including type of symptoms, length of symptoms, and timing from last Methotrexate dose were correlated with MRI findings.

Results There were 6 patients out of 138 enrolled on study who were diagnosed with neurotoxicity following MTX treatment. The age ranged from 4–11 years old with a mean age of 7. All 6 patients had MRIs. 2 patients had changes on their scans. White matter changes were displayed consistent with leukoencephalopathy. Both patients have been followed up in clinic and have no further neurological deficit. There have been no reports of further neurological deficit in the other 4 patients. Novel findings in this study found that patients with MRI changes also showed generalised changes on their EEG.

Conclusions This study describes the clinical course and radiological findings of patients with Methotrexate-induced Leukoencephalopathy. This appears to be a reversible entity without any apparent long-term effects. Long term follow-up and evaluation will be necessary to confirm this. Prospective add-on studies are warranted to evaluate this issue in a more robust manner.

GP20

RETINOBLASTOMA JOURNEY FROM A TERTIARY CENTER: FROM 1981 TO 2017

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Introduction Retinoblastoma is the most common intraocular tumor in childhood originating from sensory epithelium of retina. This tumor, which is seen one in 15,000 live births, has unilateral involvement in 2/3 cases and bilateral involvement in 1/3 cases. There is no difference between male and female cases in terms of gender. In the past, while primary therapy was enucleation, currently chemotherapy protocols and focal therapies are preferred. We aimed to obtain the changes in terms of enucleation rates over the years and compare survival data with literature.

Methods Patients diagnosed with retinoblastoma between 1981 and 2017 were enrolled in the study. Gender, laterality, age at diagnosis, initial complaint, spread of tumor, treatment modalities, enucleation rates, overall survival data of 221 patients obtained retrospectively. Vital status and missing medical data were achieved by phone calls. Regular physical examination, blood counts, systemic and local side effect evaluations performed every month before chemotherapy. Analysis was done using SPSS software for Windows 11.0. Survival rates were calculated by means of Kaplan-Meier and log-rank tests. Statistical significance was inferred at $p < 0.05$.

Results From 1981 to 2000, the enucleation rate was 96.9%, after 2000 it decreased to 66.3%. The rate of enucleation in ICRB(International Classification of Retinoblastoma) group E patients was 82.3%. The rate of enucleation was higher in group E than in group D. Overall 5-year survival was 88%. This rate was 98% for unilateral cases and 72% for bilateral cases. Overall survival in metastatic patients was 56.4%. Fifteen cases were lost in follow-up. Bilaterality and extraocular presentation at first were found to be inversely proportional to survival, while sex and age did not differ significantly.

Conclusion Retinoblastoma survival rates are gradually increasing with widely used focal and systemic therapies. Innovations in retinoblastoma treatment should focus not only on saving lives but also sparing the globe and vision.