G114(P) THE EFFECTS OF SLEEPING POSITION ON THE VENTILATORY RESPONSE TO HYPOXIA AND HYPERCARBIA

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Aims The association of a higher rate of sudden infant death syndrome with prone compared to supine sleeping is well documented; the odds ratio for prone versus supine sleeping being 13.9. The mechanisms, however, remain uncertain. Our aims, therefore, were to determine if prone compared to supine sleeping was associated with impaired responses to hypoxia and hypercarbia.

Methods Infants born at 36 weeks post menstrual age or greater without respiratory problems were recruited from the postnatal ward. Physiological measurements were carried out when the infants were in quiet sleep. The hypoxic challenge was delivered via a nasal mask using 15% oxygen. Respiratory flow was measured using a pneumotachograph connected to the mask. Data were acquired and displayed in real time. Tidal volume was determined by digital integration of the flow signal. Minute volume (MV) was calculated on a 10 s average. In both positions, baseline ventilation was measured for five minutes whilst the infant was breathing medical air and then the infant's ventilatory response to inhalation of 15% oxygen was assessed for five minutes. The challenge was stopped if the oxygen saturation dropped to 85%. Infants respond to hypoxia with a biphasic response, first an increase then a decline in ventilation. The maximum MV, the hypoxic decline in MV and the time to the hypoxic decline were calculated. In each position, following a washout period, 4% carbon dioxide (CO_2) in air was delivered for five minutes. The magnitude of increase in MV and the time constant of the increase in MV were calculated.

Results Fifty infants were studied. During exposure to 15% oxygen, the time to the start of the hypoxic decline was shorter in the prone compared to the supine position (81 s (6–295) versus 155 s (2–307)), p = 0.02. The time constant of the response to 4% CO_2 was longer in the prone compared to the supine position (68 s (5–250) versus 36 s (3–220)), p = 0.022.

Conclusion Our results demonstrate a damped response to ventilatory challenges in the prone compared to the supine position.

G115(P) GENETIC AND EPIGENETIC VARIATIONS AND GENE METHYLATION IN INFANTS EXPOSED TO METHADONE *IN-UTERO*

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Aims Maintenance methadone for the treatment of opioid addiction in pregnancy is commonly associated with neonatal abstinence syndrome (NAS). NAS cannot be predicted in individual babies; differences may be explained at least in part by genetic variations. Gene function is also influenced by DNA methylation. We investigated whether single nucleotide polymorphisms (SNPs) in genes involved in methadone metabolism are associated with NAS, as well as methylation of these genes in opioid-dependent mothers and their babies and in controls.

Methods 21 methadone-prescribed opioid-dependent mother/infant pairs and 32 control mother/infant pairs. All babies were >36 weeks' gestation. Controls were selected as either non-smoking, DEPCAT 1–3 (affluent, n = 15) or smoking, DEPCAT 4–7 (deprived, n = 17).

Buccal swabs were obtained for DNA analysis from mother/infant pairs within 5 days of birth. NAS was defined as symptoms severe enough to require pharmacological treatment.

Results Multiple different SNPs were analysed for 5 opioid-related genes. Methadone-exposed infants who required treatment for NAS were more likely to carry the wild type (normal) homozygous genotype at CYP2B6 516GT and 785AG compared to infants who did not require treatment.

	CYP2B6			
	516		785	
	GG	GT	AA	AG
No NAS treatment	1	7	2	8
NAS treatment	8	2	7	2
P value	0.015		0.023	

Infants exposed to methadone *in-utero* had significantly increased methylation of OPRM1 (receptor), ABCB1 (transporter) and CYP2D6 (metabolising) genes compared to controls (p < 0.005). Opioid-dependent mothers had increased methylation in only ABCB1 and CYP2D6 genes compared to controls.

Conclusion Infants with the homozygous CYP2B6 genotype are more likely to require treatment for NAS, consistent with the homozygous normal genotype being associated with faster metabolism of methadone.

We have also shown that opioid dependency in pregnancy is associated with significant increases in methylation of at least three opioid genes in the newborn.

Awareness of infant genotype may predict the severity of NAS and has potential to influence management of the neonate.

G116(P) THE HUMAN GUT IS PROBABLY STERILE AT BIRTH

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Aims Considerable effort has been made to categorise the bacterial composition of the human gut and correlate findings with gastrointestinal disease. The infant gut has long been considered sterile at birth followed by rapid colonisation by pioneer microbiota. We examined first-pass meconium from healthy term infants to confirm/refute sterility.

Methods Healthy mothers were approached following vaginal delivery. First-pass meconium within 24 h of delivery were obtained from healthy, breastfed infants. Antibiotic use was an exclusion criterion- mother within 7 days or infant after birth. Stools were processed in triplicate for fluorescent in-situ hybridisation (FISH) with16S rRNA-targeted probes against all bacteria; *Bifidobacterium*; *Bacteroides-Prevotella*; *Lactobacillaceae/Enterococcaceae*; *Enterobacteriaceae*; *Streptococcaceae*; *Staphylococcaceae* and *Enterococcaceae*. Absolute counts of all bacteria and proportional identification for each bacterial group were calculated. DNA extraction followed by universal bacterial RT-PCR was performed on FISH-positive samples.

Results 15 babies met inclusion/exclusion criteria. All babies were 37–40 weeks gestation. 8/15 were male, mean birth weight was 3.36kg and mean maternal age was 31.9 years. 10/15 (66%) infants had evidence of bacteria on FISH. Of these, RT-PCR was positive in only 1. Positive FISH counts ranged from 2.2 to $41.8*10^4$ cells/g with the mean of positive samples being $15.4*10^4$ cells/g. (Limit of detection for automated counting is 10^6 cells/g). Cell counts were too low to allow formal diversity analysis. Amplification by RT-PCR was not possible despite positive spiked samples demonstrating the feasibility of reaction. Three babies were dominated by a single family, either *Enterobacteriaceae* or *Enterococcaceae*. The others contained 2–5 genera. *Bifidobacterium*, *Enterobacteriaceae* and *Bacteroides-Prevotella* were the most dominant bacteria identified. There was no association between rupture of membrane duration, time to passage of meconium or time to lab with bacterial counts.
Conclusion Evidence of bacteria in first-pass meconium samples from healthy, vaginally-delivered, breastfed term infants is scant with only two-thirds having demonstrable bacteria at levels too low for automated counting. Bacterial RT-PCR failed to amplify 9/10 FISH-positive samples. This study suggests that gut bacterial diversity is extremely limited at birth and supports the hypothesis that the neonatal gut is sterile and colonised rapidly thereafter.

G117(P) IMPACT OF AN EARLY WARNING SYSTEM FOR NURSING OBSERVATIONS IN AT-RISK NEONATES IN THE POST NATAL WARDS

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Aim In line with national recommendations for similar systems in other disciplines, the SSBCNN implemented an Early Warning System (EWS) for nursing observations in the at-risk neonate on the post natal ward. The impact on nursing workload, utility and efficiency of this EWS was audited, as part of an initiative to understand trigger events for intervention in at-risk babies.
Method Case notes of 300 neonates following implementation of EWS, and 240 predating its implementation were reviewed. In the latter a retrospective EWS chart was completed using data extracted from notes. Early warning triggers were observations falling outside the acceptable colour coded range. Observations were analysed in at-risk neonates with meconium stained liquor, maternal history of prolonged rupture of membranes, maternal group B Streptococcus infection and small for gestational age. Feedback from 56 nurses in the network was obtained using a structured questionnaire.
Results A nursing observation that was intended to trigger an intervention was reached in 261(48.3%) at-risk babies. Intervention was recorded in 25%; in the remainder, no action was taken, or none documented. Low temperature (<36.5°C) was the commonest trigger. In subgroup analyses, 41.8% of hypothermia was recorded within the first 2 h of birth. 1.7% babies were admitted to the neonatal unit in response to trigger observations.

Fewer trigger observations were noted in the post-implementation group (144/240 vs 117/300; p= <0.01). This was specifically significant for hypothermia (125/240 vs 88/300; p= <0.001). The EWS did not increase the number of observations per category of stable at-risk neonates. The duration of hospital stay was 10–14 h shorter post-implementation of EWS in those babies delivered vaginally. Nursing feedback was positive in all; 82% had used the chart in >20 with 30% having used it in over 50 babies each, prior to responding.
Conclusion The implementation of EWS was associated with a reduction in trigger observations, implying improved neonatal clinical condition, specifically temperature control. This improvement infers greater attention to detail accompanying systematic recording of observations; however, a direct association between the two cannot be proved. The EWS did not increased nursing workload, and contributed to increased efficiency, measured through shorter hospital stays for those born vaginally.

G118(P) LIVING WITH CHRONIC LUNG DISEASE (CLD); CHILDREN AND PARENTS PERSPECTIVES

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Introduction Caring for a premature baby who is oxygen dependant may result in short-term parental fatigue, anxiety, depression and restrictions to lifestyle, however long-term effects have not been reported.
Aim To investigate children and their parents' longer-term experiences of living with CLD.
Methods This was an exploratory qualitative study which collected interview data from children with CLD aged between 6 and 15 years of age (n = 10) and their parents (n = 12). Families were recruited from a children's hospital in the UK. Data were analysed inductively and thematically.
Results Children and their parents described that CLD was 'easier to live with as you get older'; this was in some cases due to symptoms becoming less severe but was also influenced by the strategies and expertise acquired in managing the condition. CLD was contextualised against other disabilities caused by prematurity and the uncertainty and fear which had overshadowed the first few years of the child's life. Parents had gained proficiency in accessing health services which demonstrated competency in dealing with CLD and bypassing those seen as less helpful. Parents felt anxious when they devolved responsibility for managing their child's condition to others, such as schools, and when they thought about their child's future. Children's concerns related to when CLD made them feel different to their friends by causing them to have to step-back, sit out and miss out on activities or when they were ostracised due to their short stature, respiratory symptoms or fatigue. Despite expertise in recognising and managing symptoms, children and their parents discussed a poor understanding of the nature of the condition and this influenced how they described CLD to friends, family, school and outside agencies. Many chose to call the condition asthma; the descriptor of CLD was seen as unhelpful and implied a contagious condition.
Conclusions Children and parents' accounts were mainly positive with CLD becoming easier to live with and manage over time. Ongoing concerns related to managing CLD outside the family, situations causing children to feel different and a poor understanding of the nature of CLD.