

PS-273 THE RELATIONSHIP BETWEEN INFANT BIRTH WEIGHT AND NEONATAL BODY COMPOSITION

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Background and aims Birth weight has been used as a marker of adiposity in neonates. Ponderal index incorporates infant length and is used in place of body mass index (BMI) in infants. Skin-fold thickness and anthropometric measurements can be unreliable in the first few days of life. Infant body composition can be measured using air displacement plethysmography. Our aim was to explore the relationship between birth weight and neonatal body composition.

Methods Infant birth weight and anthropometry were recorded. Infant body composition was measured within 3 days of delivery using air displacement plethysmography (PEA POD, Cosmed, Rome, Italy). Term infants born between 37–42 weeks were included in analysis. Data were analysed using SPSS Statistics 19.

Results Measurements were performed on 467 (227 (49%) male and 240 (51%) female) term neonates (37–42 weeks) within the first 72 h of life. Mean birth weight and percentage body fat was 3.58 kg and 9.7% in males and 3.42 kg and 11.3% in females. Infants in the top quartiles of birth weight had higher body fat percentage. A multiple regression was run to predict body fat percentage from birth weight, gestation and gender. 35.7% of variance could be explained by these variables.

Conclusions Birth weight, gestation and gender only have a moderate effect size on infant body fat percentage at birth, therefore birth weight is not a reliable marker of infant adiposity.

PS-274 LACK OF ASSOCIATION BETWEEN BRONCHOPULMONARY DYSPLASIA AND GASTRO-ESOPHAGEAL REFLUX AT ESOPHAGEAL PH-IMPEDIMENTOMETRY: A PROSPECTIVE STUDY IN SYMPTOMATIC PRETERM INFANTS

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Background and aims The role of GER in the pathogenesis and recovery from BPD in preterm infants is controversial; some Authors suggested symptomatic GER treatment for BPD infants. We tested the hypothesis that BPD predisposes to GER (due to increased respiratory effort, coughing and crying).

Methods We prospectively studied 44 infants born 2-analysis and t-test/Mann-Whitney test were performed to look for differences among the two groups; P value of

Results Demographic and clinical characteristics between BPD and controls were similar: GA 201 vs 202 days, male sex 66.7 vs 46.9%, age at study 51 vs 39 days, orogastric tube feeding 83.3% vs 75%, caffeine administration 33.3% vs 50% (all P > 0.05). The analysis of 1056 h of Ph-MII tracings showed no significant difference between BPD and controls regarding the median number of these parameters: acid (3 vs 2), weakly acid (11 vs 16), non-acid (0 vs 0), gas (7 vs 10) refluxes, ph-only

events (21 vs 9), GER >5 min (1.5 vs 3.5); longest GER (11.2 vs 16.5 min), lower ph (1.5 vs 2.1), acid exposure (ph 0.05).

Conclusions In our experience, BPD was not associated with higher reflux parameters as measured by 24 h Ph-MII examinations among preterm infants. Symptomatic GER treatment with drugs should be reserved for confirmed pathologic Ph-MII tests in order to avoid adverse events.

PS-275 CAN HIGH ENTERAL FEEDING VOLUMES PREVENT POSTNATAL GROWTH RESTRICTION IN VERY PRETERM INFANTS?

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Background and aims Postnatal growth restriction is common among very preterm infants (VPI). Optimising enteral feeding is of critical importance to improve neurodevelopmental outcome. We assessed the effect of a feeding regimen with a high enteral volume intake.

Design Retrospective population based study of all VPI (GA < 30 weeks) discharged from a single NICU between 2005–2010. Baseline clinical data, enteral volume intake and postnatal growth data were collected. Weight at birth/discharge and at 1 year of corrected age was converted to standard deviation (SD; Z) scores.

Results 99 infants were included. Infants who died (15/99; 15%) had lower mean GA than infants who survived to discharge (24.9 weeks vs. 27.3 weeks). For all infants enteral nutrition was commenced within first 48 h. Two infants developed surgical NEC, both survived. Daily enteral volume of fortified breast milk was 180–200 ml/kg from 3 weeks of age and until self-regulation. Seven infants were transferred to other units < 34 weeks. Among the other 77 infants the mean (SD) Z-scores for weight were; at birth -0.37 (-0.27), at discharge -0.42 (-0.53) and at 1 year corrected age -0.46 (-0.60). The prevalence of SGA (< 10 centile) at birth (13/77; 17%) was similar to SGA prevalence at discharge (14/77; 18%).

Conclusions The rate of postnatal growth restriction was lower than previously reported in similar patient populations. We believe a high enteral volume intake is a safe method to increase energy and protein delivery and thus improve the nutritional status of very preterm infants.

Oxygen Saturation and Surfactant

PS-276 PRETERM INFANTS EXHIBIT INCREASED PLATELET ADHESION TO VWF UNDER CONDITIONS OF ARTERIAL SHEAR

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Background/aims Preterm infants have higher rates of haemorrhagic diathesis and respiratory complications than terms and adults. Platelets play a key role in haemostasis but detailed

platelet function testing in neonate populations are lacking mainly due to the large blood volume requirements. To address this we developed a physiologically relevant assay on vonWillebrand factor that mimics platelet behaviour *in vivo* at arterial shear conditions.

Methods A prospective clinical study of blood from preterms < 32 weeks (n = 21), terms (n = 12) and adults (n = 48). 200 µl of blood for each donor was labelled with a florescent dye for visualisation of platelets in real-time. The blood was perfused over parallel plate flow chambers coated with purified vonWillebrand Factor (vWF). Platelet interactions with the surface were imaged via video microscopy at high speed (500 frames at 30 frames/second). In-vivo when platelets are exposed to activated vWF they tether, roll and translocate. For the first time ever we managed to image these platelet behaviours using a custom designed platelet tracking algorithm.

Results Preterms had significantly more numbers of static platelets (54 ± 55 vs. 26 ± 4 and 28 ± 2 SEM, p < 0.0001). In the preterm cohort there were increased numbers of platelets translocating on the vWF surface (359 ± 25 vs. 277 ± 25 and 307 ± 10 SEM, p = 0.05) compared with the terms and adults. Clinical outcomes showed significantly high levels of RDS (76.19%), CLD (38.09%) IVH (28.57%) and pulmonary haemorrhage (23.8%).

Conclusions The behaviour of platelets on vWF is significantly different in preterms and could explain the increased tendency to bleeding and development of RDS and CLD in premature neonates. The tiny volume of blood needed to perform this test has major implications for its use in a clinical setting.

PS-277 FULLY AUTOMATED CONTROL OF INSPIRED OXYGEN BASED ON OXYGEN SATURATION IN PRETERM LAMBS

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Background Oxygen under- and overexposure has detrimental effects on preterm infants. Controlling the oxygen saturation manually within strict targets is a notoriously difficult and time consuming task which can be facilitated by automated control.

Aims To evaluate the performance of a closed loop fraction of inspired oxygen (FiO₂) controller based on oxygen saturation (SpO₂) targets when compared to dedicated manual control.

Methods Prematurely delivered lambs (128–132 days of gestation, term 150 d) were intubated and ventilated with volume guaranteed ventilation (Fabian HFO, Acutronic®) adjusted to arterial pCO₂. SpO₂ was measured via pulse oximetry (Radical 7, Masimo®). After a stabilisation period of 30 min, lambs were randomised to three hours of ventilation with automated or manual FiO₂ control (caretaker-lamb ratio 1:1). Saturation targets were 90–95% according to European guidelines. Data is represented as median [IQR].

Results Twenty-two lambs were included, 11 in each group. Time spend within the target range was significantly better when the automated controller was used (93.2% [80.6–98.9%] vs. 84.0% [63.8–89.4%], p₂ adjustments per hour was higher when

the automated controller was used (13.0 [3.0–16.4] vs. 5.7 [2.3–9.8], n.s.).

Conclusions Automated FiO₂ control was effective in this model. These results are especially promising as we compared our device to animals receiving 1:1 care in the manual control group. In a clinical setting, the combination of automated control and dedicated caretakers might even be more effective.

PS-278 AUTOMATED VERSUS MANUAL FIO2 CONTROL AT DIFFERENT SATURATION TARGETS IN PRETERM INFANTS

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Background Preterm infants spend only 50% of time within the target oxygen saturation (SpO₂) during manual FiO₂ control (M-FiO₂). Automated FiO₂ control (A-FiO₂) improves SpO₂ targeting but it is uncertain if this applies to different SpO₂ target ranges and during non-invasive support (NIVS) and mechanical ventilation (MV).

Objective To compare the efficacy of A-FiO₂ vs M-FiO₂ in keeping two different SpO₂ targets during NIVS or MV.

Design/methods Preterm infants on FiO₂ >0.21 receiving NIVS or MV were randomised to SpO₂ targets 89–93% or 91–95% and underwent M-FiO₂ and A-FiO₂ for 24 h each, in random sequence.

Results 80 infants (GA:26 w, age:18 d) were included (NIVS = 48, MV = 32). Time within target increased and below target decreased during A-FiO₂ compared with M-FiO₂, especially in the lower target range. There was a reduction in time and hypoxemia episodes with SpO₂ < 80% during A-FiO₂. Outcomes did not differ between NIVS or MV.

Conclusions Automated FiO₂ control improved SpO₂ targeting across different SpO₂ ranges and reduced hypoxemia with less workload during both NIVS and MV.

Abstract PS-278 Table 1

	Target 89–93%		Target 91–95%	
	A-FiO ₂	M-FiO ₂	A-FiO ₂	M-FiO ₂
%-time in target	62 (17)	54 (16)*	62 (17)	58 (15)*
%-time >target	21 (13)	25 (10)*	22 (13)	19 (8)
%-time < target	17 (11)	21 (8)*	17 (10)	23 (9)*
%-time SpO ₂ >98%	0.2 (0.0–0.8)	0.7 (0.1–1.6)*	0.7 (0.2–2.1)	1.7 (0.7–4.3)
%-time SpO ₂ < 80%	1.2 (0.2–2.2)	2.6 (1.0–4.3)*	0.8 (0.3–2.1)	2.0 (0.9–5.0)*
Episodes < 80%,				
>1 min/24 h	4 (1–12)	15 (5–24)*	4 (1–11)	13 (3–24)*
Manual FiO₂				
adjustments/24h	1 (0–3)	102 (72–173)*	1 (0–3)	109 (79–156)*

* p < 0.05