

**Background and aims** Insulin is frequently required to treat hyperglycemia that increases both mortality and morbidity in ELBW infants. Adult and animal studies suggest a link between hypophosphatemia and insulin resistance. Our objective was to define whether hypophosphatemia increases the risk of insulin requirement in ELBW infants.

**Methods** This observational study included ELBW infants admitted in our NICU between 01.01.2010 and 31.12.2011 who survived until DOL14. Laboratory and clinical data were retrospectively collected. According to the NICU policy, phosphatemia was measured before DOL3 and glycemia was checked daily during parenteral nutrition. Insulin was introduced in case of refractory hyperglycemia  $>11\text{mmol/l}$ . Depending on the lowest phosphatemia before DOL3, patients were divided into hypophosphatemic (HP,  $< 1.2\text{mmol/l}$ ) and controls ( $\geq 1.2\text{mmol/l}$ ). Uni- and multivariable analysis compared the time to insulin requirement using survival models.

**Results** In all, 126 patients were included: 39 HP, 87 controls. Mean(SD) gestational age was 27.8 (1.5) in HP and 27.4 (1.5) weeks in controls, birthweight was 770 (140) and 837 (109) grams. Insulin was required in 19/39 (49%) HP and 26/87 (30%) controls with a delay of 17 (10) and 22 (9) days respectively. The unadjusted hazard ratio of insulin requirement in HP was 1.93 (95%CI: 1.07–3.49,  $p=0.03$ ). After adjustment for gestational age, birthweight, sex, IUGR and sepsis, the hazard ratio was still 1.6 (95%CI: 0.86–3.17) but not significant ( $p=0.13$ ).

**Conclusion** Hypophosphatemia may be a risk factor for insulin requirement in ELBW. Multivariable analysis shows that age and birthweight could also influence this outcome. Whether aggressive management of hypophosphatemia can improve glycemia control deserves to be studied.

## 231 A RANDOMISED TRIAL OF VOLUME-TARGETED VERSUS PRESSURE-LIMITED VENTILATION IN PREMATURELY BORN INFANTS

doi:10.1136/archdischild-2012-302724.0231

<sup>1</sup>O Chowdhury, <sup>2</sup>J Peacock, <sup>1</sup>GF Rafferty, <sup>1</sup>S Lee, <sup>1</sup>S Hannam, <sup>1</sup>A Greenough. <sup>1</sup>Division of Asthma, Allergy & Lung Biology, MRC-Asthma UK Centre in Allergic Mechanisms of Asthma; <sup>2</sup>Division of Health and Social Care Research, King's College London, London, UK

**Background and aims** Meta-analysis of randomised trials (RCTs) demonstrated that volume-targeted ventilation (VTV) in comparison to pressure-limited ventilation (IPPV) reduces BPD/death, pneumothorax, hypocarbia and PVL/grade 3–4 IVH in prematurely born infants. Certain RCTs, however, employed different ventilators in the two arms and, overall, a range of VT levels were used. Our aim was to undertake an RCT in prematurely born infants with acute respiratory distress comparing IPPV with VTV, using a VT level of 5ml/kg, which has been shown to reduce the work of breathing.

**Methods** Infants  $< 34$  weeks of gestational age and  $< 24$  hours of age were recruited. The primary outcome was the time taken to achieve pre-specified weaning criteria. Secondary outcomes included the occurrence of PDA, pneumothorax, IVH, PVL and hypocarbia; hypocarbia was defined as a  $\text{PaCO}_2$  of  $< 4.5\text{kPa}$  on any blood gas in the first 72 hours after birth. Infants met failure criteria if they required HFO, peak pressures  $>26\text{cm H}_2\text{O}$  or had a pulmonary haemorrhage. Analysis was by intention-to-treat.

**Results** The planned sample size of 40 infants was achieved, with no significant differences in the two groups' demographics. The time taken to achieve weaning criteria was similar in the two groups [14 hours (VTV) versus 23 hours (IPPV); hazard ratio=0.82 (95% CI 0.42, 1.58)],  $p=0.55$ . Five "VTV" and three "IPPV" infants met failure criteria,  $p=0.69$ . Fewer "VTV" than "IPPV" infants had hypocarbia (8 versus 19),  $p<0.001$ .

**Conclusion** VTV was associated with a significantly lower incidence of hypocarbia.

## 232 THE TIMING OF SURFACTANT PROPHYLAXIS IN VERY-LOW-BIRTH-WEIGHT PRETERMS: IS EARLIER BETTER?

doi:10.1136/archdischild-2012-302724.0232

E Okulu, S Arsan, IM Akin, A Kilig, S Alan, B Atasay. Department of Pediatrics, Division of Neonatology, Ankara University, Ankara, Turkey

**Aim** To determine whether the immediate bolus strategy treatment could decrease the subsequent need for ventilation compared to the administration of surfactant prophylaxis at 15-minutes.

**Methods** All infants born before 29 weeks', and infants born at 29 to 30 weeks' without antenatal steroid(ANS) were randomized. Infants of group-1 were intubated immediately after birth, of group-2 received standard resuscitation measures, than were intubated at 15-minutes. All received 100 mg/kg surfactant. During these managements infants were ventilated with T-piece(NeoPuff). Then infants were extubated to NCPAP(Infant Flow®) if respiratory drive was present. The primary outcome was the need for MV within the first 3-days of life. The secondary outcomes were neonatal morbidities, mortality and duration of hospitalization.

**Results** Total of 80 newborns were enrolled (fourty infants in each group). Prenatal and natal features were similar in groups. Ten infants in group-1, 13 infants in group-2 couldn't be extubated after surfactant. GA and BW of them were lower than the extubated infants. Six infants in group-1, four infants in group-2 needed MV during the first 3-days. Total respiratory support duration was lower in group-1. There were no significant differences between the groups with a respect to PDA, NEC, IVH, sepsis, ROP, BPD, mortality and duration of hospitalization.

**Conclusion** Our study didn't demonstrate a superiority of the immediate bolus strategy of surfactant prophylaxis combined with early-NCPAP to the administration of surfactant at 15-minutes after birth with early-NCPAP. Surfactant prophylaxis at-15 minutes with early-NCPAP seems to be sufficiently effective to yield favorable outcomes in small preterm infants.

## 233 MECHANICAL VENTILATION-INDUCED APOPTOSIS IN NEWBORN RAT LUNG IS MEDIATED VIA FASL/FAS PATHWAY

doi:10.1136/archdischild-2012-302724.0233

<sup>1</sup>A Kroon, <sup>2</sup>V Del Riccio, <sup>1</sup>T Tseu, <sup>2</sup>Z Huang, <sup>2</sup>J Wang, <sup>2</sup>M Post. <sup>1</sup>Erasmus MC - Sophia, Rotterdam, The Netherlands; <sup>2</sup>Lung Biology Research, Physiology and Experimental Medicine Program, Hospital for Sick Children Research Institute, Toronto, ON, Canada

**Rationale** Mechanical ventilation induces pulmonary apoptosis and inhibits alveolar development in preterm infants, but the molecular basis for this apoptotic injury is unknown.

**Objective** To determine the signaling mechanism(s) of ventilation(stretch)-induced apoptosis in newborn rat lung.

**Methods** Seven-day old rats were ventilated with room air for 24 h using moderate tidal volumes ( $8.5\text{mL.kg}^{-1}$ ). Isolated fetal rat lung epithelial and fibroblast cells were subjected to continuous cyclic stretch (5, 10 or 17% elongation) for up to 12 h.

**Measurements and main results** Prolonged ventilation increased significantly the number of apoptotic alveolar type II cells (i.e. TUNEL-labelling, anti-cleaved caspase-3 immunohistochemistry) and was associated with increased expression of the apoptotic mediator Fas Ligand (FasL). Fetal lung epithelial cells, but not fibroblasts, subjected to maximal (i.e. 17%, but not lesser elongation) cyclic stretch exhibited increased apoptosis (i.e. nuclear fragmentation; DNA laddering) which appeared to be mediated via the extrinsic pathway (increased expression of FasL and cleaved caspase-3, -7 and -8). The intrinsic pathway appeared not to be involved (minimal mitochondrial