

<sup>1</sup>J Mazela, <sup>1</sup>T Szczapa, <sup>1</sup>K Chmura, <sup>2</sup>M Kulza, <sup>2</sup>E Florek, <sup>3</sup>T Sosnowski, <sup>3</sup>A Moskal, <sup>1</sup>J Gadzinowski. <sup>1</sup>Department of Neonatology; <sup>2</sup>Environmental Toxicology Lab, Poznan University of Medical Sciences, Poznan; <sup>3</sup>Warsaw University of Technology, Warsaw, Poland

**Background and Aims** Helium-oxygen gas mixture (heliox) has been utilized for ventilatory support of infants with respiratory failure. Therapies which potentially could improve aerosol delivery to ventilated infants are needed. The aim of the study was to assess heliox utilization in delivery of aerosolized albuterol sulfate to a model of ventilated newborn.

**Methods** A neonatal system was assembled utilizing an Avea ventilator, test lung and vibrating mesh nebulizer Aeroneb placed within inspiratory arm of the ventilator circuit. Pressure controlled mode (SIMV) was used with a rate of 40 bpm, IT of 0.35s and inspiratory pressures of 20cmH<sub>2</sub>O with two different ET tubes: 3.0 and 2.0. The study was conducted with heliox and air-oxygen gas mixtures at FiO<sub>2</sub>=0.21. Albuterol sulfate (0.25mg/mL) was aerosolized and captured on HME low volume filter located at the end of the ET tube and upstream from the test lung. Emitted dose of the nebulizer was determined by exposing 3 filters to the aerosolized albuterol at the 'Y' and end of the ET tube. Filters were collected, extracted and albuterol quantified using high performance liquid chromatography.

**Results** No significant difference between heliox and air-oxygen was found in albuterol sulfate delivery at the Y-connector and ET tube 3.0. For smaller tube heliox was inferior to air (p<0.05).

**Conclusions** Due to its lower density, heliox flow rate at a given driving pressure will be higher than the air-oxygen flow rate. Increased inspiratory flow rate in a patient ventilated using artificial airway may not be beneficial for aerosol delivery. Differences in flow rates between heliox and air-oxygen in the study might have outweighed the previously reported beneficial effects of heliox on aerosol delivery.

#### 1792 DIFFERENT ENDOTRACHEAL TUBES, DIFFERENT CONNECTORS, DIFFERENT LENGTHS: IMPACT ON RESISTANCE AND DEAD SPACE

doi:10.1136/archdischild-2012-302724.1792

E Kazanci, F Kulali, N Altuntas, S Unal, S Aktas, E Ergenekon. *Pediatrics, Newborn Medicine, Gazi University Hospital, Ankara, Turkey*

**Background and Aims** During ventilation, size and length of endotracheal tube affects the dead space (DS) and resistance which is considered important for preterm infants. We aimed to investigate impact of the tube type, length, connector and size on DS and resistance when all variables are controlled on a manikin.

**Methods** We ventilated a newborn manikin with Draeger Babylog 8000 using regular and surfactant tubes, regular and closed system aspiration connectors. Pressures, inspiratory time and flow were kept constant. Measurements were made at full length of the tubes and after shortening (11 and 13 cm for 2.5–3.0 and 3.5–4.0 mm tubes respectively) when tidal volume (TV) and resistance displayed on the ventilator were recorded. Differences in TV represented differences in DS.

**Results** With the use of closed system aspiration connector resistance was elevated by 12 % in all tubes and DS of all tubes except 3.0 mm tube were increased by 10 %. Shortening the tube reduced DS by 1–10 % in all sizes except 2.5 mm tube. Resistance was higher in long tubes by 4–27 % however this was less than expected. Resistance of 2.5 and 3.5 mm regular tubes were 2–48 % higher and 3.0 mm tube was 1–17.6 % lower than surfactant tubes. Resistance was higher in smaller tubes but the magnitude of difference was not as big as the theoretical assumption about the impact of radius to the 4<sup>th</sup> power.

**Conclusion** Many variables impact DS and airway resistance during ventilation some of which may be important for preterm newborn.

#### 1793 EFFECT OF CHEST COMPRESSIONS ON MASK LEAK DURING NEONATAL RESUSCITATION: A MANIKIN STUDY

doi:10.1136/archdischild-2012-302724.1793

<sup>1</sup>B Schwabegger, <sup>1,2</sup>GM Schmöler, <sup>1</sup>C Binder, <sup>1</sup>W Müller, <sup>1</sup>B Urlesberger, <sup>1</sup>G Pichler. <sup>1</sup>Department of Paediatrics, Medical University of Graz, Graz, Austria; <sup>2</sup>Department of Pediatrics, University of Alberta, Edmonton, AB, Canada

**Background** Chest compressions during neonatal resuscitation are an infrequent event during neonatal resuscitation.

**Objectives** To investigate if chest compressions (CC) during simulated neonatal cardio-pulmonary resuscitation affect percentage of mask leak.

**Methods** 21 neonatal staff members (11 Neonatal nurses, 10 Neonatologists) delivered positive pressure ventilation (PPV) to a modified, leak-free manikin via face mask using a Neopuff T-piece device. After 90 seconds of PPV-only (baseline) an assistant provided chest compressions (CC) at a ratio of 3:1 chest compressions to inflations for further 90 seconds (PPV+CC). Mask leak was measured with a Florian respiratory function monitor. Results between PPV-only and PPV+CC were compared using dependent t-test for paired samples.

**Results** A total of 2726 ventilations and 3058 chest compressions were analyzed. Overall the mean (SD) mask leak during PPV-only and PPV+CC was similar 35 (±30)% versus 40 (±33)% (p=0.2). However, in the neonatal nurse group mask leak significantly increased from 27 (±26)% in the PPV-only group to 43 (±35)% in the PPV+CC group (p=0.04). In comparison, mask leak was similar in the neonatologist group in the PPV-only and PPV+CC group 42 (±33)% and 37 (±34)% (p=0.65), respectively.

**Conclusions** Overall, mask leak did not change once chest compressions were started. However, mask leak significantly increased in the neonatal nurse group once chest compression were provided, but remained similar in the neonatologist group.

#### 1794 DOES SITE OF PULSE OXIMETER PROBE PLACEMENT AFFECT OBSERVED SATURATION VALUES IN BABIES WITH PDA OR RESPIRATORY SUPPORT?

doi:10.1136/archdischild-2012-302724.1794

<sup>1</sup>P Suresh, <sup>2</sup>W Cheadle, <sup>2,3</sup>S Gupta. <sup>1</sup>Medical School, Newcastle University, Newcastle-upon-Tyne; <sup>2</sup>Neonatology & Paediatrics, University Hospital of North Tees; <sup>3</sup>School of Medicine & Health, Durham University, Stockton-on-Tees, UK

**Background** Pulse oximetry is routinely utilised for monitoring oxygen saturations in newborn babies. The site for pulse oximeter probe placement is randomly selected and saturations targeted according to the unit policy.

**Aim** To study whether site of pulse oximeter probe placement would affect observed saturation values in preterm babies on respiratory support and or having patent ductus arteriosus (PDA)?

**Methods** Babies born < 32 weeks gestation and admitted to the tertiary level neonatal unit were randomly included in this prospective pilot study. They were allocated to one of 4 groups (Figure 1). One probe was placed on right upper limb (pre-ductal) and other on lower limb (post-ductal). Simultaneous continuous saturation recording was done for at least 6 hours using Radical-7, Masimo® pulse oximeters that recorded data every 2 seconds. At the end of the recording period data was downloaded using the software and analysed using SPSS® version 19.

**Results** Twenty babies were enrolled in this study and ~500,000 data points recorded.