in relation to the children. Children's behaviour will be measured on selected days after surgery and followed up six months after.

1327

EXPIRATORY RESISTANCE OF CPAP DEVICES FOR PRETERM INFANTS

M. Wald¹, A. Kribs², V. Jeitler¹, D. Lirsch¹,
A. Pollak¹, L. Kircher¹

¹Department of Pediatrics and Adolescent Medicine, Medical University of Vienna, Vienna, Austria, ²University of Cologne, Department of Neonatology, Children's Hospital, Cologne, Germany

Introduction: CPAP systems for preterm infants work with conventional ventilators or use a jet ventilation system. It is assumed that the most important advantage of jet-CPAP systems is a lower expiratory resistance. We investigated the expiratory resistance of seven different CPAP systems.

Methods: We studied two primary-care CPAP systems, 3 jet-CPAP generators and 2 conventional CPAP devices. All devices were adjusted at 6 mbar and connected with a test lung simulating a standardized expiration volume. Maximum pressure increase during expiration was measured and maximum expiratory resistance was calculated.

Results: In primary-care CPAP devices the maximum expiratory resistance of the Benveniste valve was 9.7mbar/l/s (SD 1.2) while that of the Neopuff was 102.8mbar/l/s (SD 7.9) ($p < 0.01$). In jet-CPAP devices the expiratory resistance of the Infant Flow was 6.8mbar/l/s (SD 1.7), the one of the Medijet REF 1000 was 43.5mbar/l/s (SD 1.5) and that of the Medijet REF 1010 was 36.7mbar/l/s (SD 0.3) ($p < 0.01$). In conventional CPAP systems the expiratory resistance of the Baby-Flow was 29.7mbar/l/s (SD 1.1) and that of the Bubble-CPAP was 37.1mbar/l/s (SD 4.3) ($p < 0.01$).

Conclusion: All CPAP devices created an expiratory resistance. Jet-CPAP devices did not produce lower expiratory resistance than conventional CPAP devices.

1328

ADJUSTMENTS OF SPO₂ ALARM LIMITS AND CORRESPONDING SPO₂ LEVELS IN VERY PRETERM INFANTS

A.C. van der Eijk^{1,2}, J. Dankelman¹, S. Schutte¹,
B.J. Smit²

¹Department of BioMechanical Engineering, Delft University of Technology, Delft, ²Department of Neonatology, Erasmus MC – Sophia Children's Hospital, Rotterdam, The Netherlands

Background and aims: To prevent excess levels of pulse oximetry saturation (SpO₂) in very preterm infants (VPIs), alarms are used. These alarms sound frequently, which causes a burden on patients and staff. Preset alarm limits may deviate from the protocol for several reasons. We investigated adherence to the protocol and the relation between alarm limits and corresponding SpO₂ levels.

Methods: Inclusion criteria were: gestational age < 30 weeks, birth weight ≤ 1250 grams, and FiO₂ > 21% at start of data-recording. Alarm limits, SpO₂, and FiO₂ were collected for 3 days continuously. The protocol prescribes alarm limits of 88 and 94 (when FiO₂ > 21%) or 88 and 100 (when FiO₂ = 21%).

Results: Twelve VPIs were included: (median (min-max)) gestational age was 26^{2/7} (24^{2/7}-28) weeks, birthweight was 760 (545-935) grams, postnatal age was 4 (2-12) days. Data was collected for 658 hours (~1 Hz).

When FiO₂ was > 21% (566 hrs.) alarm limits were set according to the protocol in 64% of time. In 26% the upper alarm limit was set up to 99. In 10% the upper limit was set to 100. Commonly used alarm limits and corresponding SpO₂ levels are shown in Figure 1 and Figure 2.

Conclusions: Alarm limits deviate from the protocol frequently. No relation was found between preset alarm limits and the distribution of SpO₂ levels. We advice to check alarm limits regularly, and register (reasons for) alarm limit adjustments.

1329

EARLY LUNG RECRUITMENT AT BIRTH IN A PRETERM LAMB MODEL: A PILOT STUDY

D. Tingay^{1,2,3}, R. Bhatia^{1,4}, G. Schmolzer^{1,4}

¹Neonatology, Murdoch Childrens Research Institute, Parkville, ²Neonatology, Royal Children's Hospital, ³Paediatrics, University of Melbourne, ⁴Neonatal Research, Royal Women's Hospital, Melbourne, VIC, Australia

Background: The importance of achieving lung recruitment at birth is well recognised but the optimal strategy unclear.

Aim: To determine the feasibility of measuring regional lung mechanics during three lung recruitment strategies at birth, and their outcomes, in a preterm lung model.

Method: Nine 127d old lambs (mean weight 2.7kg) were studied. During delivery of head and thorax the fetus was intubated and electrical impedance tomography (EIT) electrodes applied. Once delivered one of three ventilation strategies was applied:

1. Sustained Inflation (SI+Surfactant): 20-sec 30cmH₂O SI then PPV+Targeted Tidal Volume (TTV;7mL/kg) at PEEP 6cmH₂O and surfactant at 10-min.
2. Surfactant+SI: As per SI+Surfactant but surfactant pre-delivery.
3. Escalating PEEP: PEEP increased by 2cmH₂O every 10-breaths from 4 to 20cmH₂O during PPV+TTV, then decreased to PEEP at maximal C_{rs}. Surfactant at 10-min.

In all strategies, F_{IO₂} and TTV were adjusted to maintain Sp_{O₂} 88-92% and Pa_{CO₂} 45-55mmHg. Gas exchange, lung mechanics and regional lung volume/tidal volume (EIT) measured until 70-min life.

Results: There was no difference in regional EELV but at 8-min more uniform aeration occurred with escalating PEEP than Surfactant+SI; mean(SD) anterior:poster hemithorax aeration 0.6(0.4):0.7(1.2) vs 0.7(0.4):0.4(0.3) impedance units. Surfactant+SI and escalating PEEP improved oxygenation compared to SI+Surfactant (Fig). There were no sustained differences in C_{rs}, Pa_{CO₂} and V_T.

[Figure 1]

[Figure 2]