

# Influence of gestational age on lung volume response to a sustained inflation at birth in preterm lambs

*D Tingay, K McCall, A Waldmann, SH Böhm, R Dellaca, P Dargaville; 13th European Conference on pediatric and neonatal mechanical ventilation, Montreux, Switzerland, May 25-28, 2016*

# Oral Presentations

## Oral Presentations

Friday, May 27, 11:00 – 12:00

### OP-08: INFLUENCE OF GESTATIONAL AGE ON LUNG VOLUME RESPONSE TO A SUSTAINED INFLATION AT BIRTH IN PRETERM LAMBS

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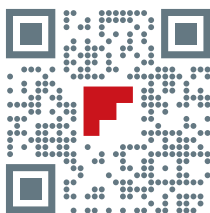
**BACKGROUND:** In preterm lambs time to aeration during a sustained inflation (SI) is variable and determined by the intrinsic mechanical state of the lung. Gestational age (GA) influences mechanics and regional volume behaviour. Thus, a standardised SI time may not optimise lung aeration across different GA groups.

**OBJECTIVE:** To investigate the relationship between GA and time to reach lung volume stability ( $T_{\text{stable}}$ ) within the lung during a SI at birth.

**DESIGN/METHODS:** A 40 cmH<sub>2</sub>O SI was delivered to 49 lambs in five GA groups (Term~142d). Real-time changes in lung volume were displayed at the bedside using a new electrical impedance tomography system (Swisstom Pioneer Set). The SI was applied until 10s after visual volume stability, or a maximum 180s.  $T_{\text{stable}}$  within the whole lung, gravity-dependent and non-gravity-dependent hemithoraces were determined from exponential modelling of the SI volume-time relationship.

**RESULTS:**  $T_{\text{stable}}$  was inversely proportional to GA and significantly higher in all regions in lambs  $\leq 125$ d; from a mean (SD) of 257 [103]s (118d) and 276 [81]s (125d) to 53 [13]d at term ( $p < 0.01$ , one-way ANOVA). Global lung volume ( $V_{\text{SI}}$ ) at  $T_{\text{stable}}$  increased with GA from 20 [17] ml/kg at 118d to 55 [13] ml/kg at term ( $p < 0.01$ ). The dependent regions received 63% of aeration in all GA groups, but  $T_{\text{stable}}$  did not differ between the hemithoraces.

**CONCLUSIONS:** Time to lung volume stability during a SI is significantly longer and more variable in extremely preterm lambs. Individualised SI approaches should be considered in the development of clinical SI protocols.



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