

Aim: To compare six different potential bedside indicators of ETT malposition in a piglet model of neonatal lung injury.

Methods: Six anaesthetised and muscle-relaxed piglets with saline lavaged surfactant-deficient lungs ($AaDO_2 > 350\text{mmHg}$ in $F_{IO_2} 1.0$) conventionally ventilated were studied. Transient periods (30-120s) of ventilation with the ETT placed in the oesophagus and a single main bronchus (MB) were compared with an appropriately placed ETT. During each period, colorimetric end-tidal CO_2 (Pedi-Cap®), flow at the airway opening (Florian), global/regional lung volume and tidal ventilation (electrical impedance tomography; EIT), Sp_{O_2} and heart rate were continuously measured.

Results: Compared to ventilation via a correct placed ETT; *Oesophageal ventilation:* Sp_{O_2} decreased from 96% to 74%, without heart rate change. Pedi-Cap® demonstrated absence of tidal color change, and no expired tidal volume was seen on the Florian. EIT confirmed absence of any lung inflation.

MB ventilation: There was no significant difference between the Sp_{O_2} , heart rate, Pedi-Cap® and peak inspiratory/expiratory tidal flows, EIT demonstrated a significant change in tidal volume ventilation with 97% occurring in the ventilated lung and 3% in the unventilated lung.

Conclusion: The Pedi-Cap and RFM were able to distinguish between endotracheal and oesophageal ventilation. EIT alone correctly identified all adverse events and might have a role in bedside monitoring of ventilated infants.

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EFFECT OF SURFACTANT AND PARTIAL LIQUID VENTILATION TREATMENT ON CEREBRAL HAEMODYNAMIC AND OXYGENATION IN PREMATURE LAMBS

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Background: Surfactant (SF) therapy in RDS has reduced mortality and morbidity in preterm infants. Although adverse-effects seem to be moderate,

fluctuation in cerebral circulation has been observed. Cerebral haemodynamic changes during partial-liquid-ventilation (PLV) have not been well described.

Aim: To evaluate the effect of SF and PLV treatment on oxygenation and on cerebral haemodynamic in premature lambs with RDS.

Methods: 18 preterm lambs (80-90%GE) were randomly assigned to: SF-Group, received Curosurf®(175mg/kg), PLV-Group, treated with perfluorocarbon(30ml/kg) or Control-Group. Systemic-arterial-pressure (SAP), heart rate(HR), oxygenation-index (OI) and arterial/alveolar-index (a/ADO_2) were determined during 3hours. Regional-cerebral-blood-flow (RCBF) was determined by microspheres-technique at foetal point (F), 1h and at 3h. Cerebral cortexes and periventricular zones (striatum, thalamus, hypothalamus, hippocampus) were grouped. Mean±SEM;Two-factor-ANOVA, $p < 0.05$

Results: Fetal blood gases were similar between groups ($pH: 7.30 \pm 0.07$, $PaCO_2: 47 \pm 9\text{mmHg}$, $PaO_2: 27 \pm 6\text{mmHg}$). After 5-min of conventional-mechanical-ventilation a severe RDS was developed in all groups ($IO > 70$, $a/ADO_2 < 0.1$), that was maintained stable in Control-Group throughout the experiment. SF and PLV treatments showed significant improvement of gas exchange ($IO: 6 \pm 2$ and $a/ADO_2: 0.38 \pm 0.05$, at 1h). However, only SF treatment sustained this improvement along the time. HR and SAP remained stable.

| | COR-TEX (F) | PERIVEN-TRICULAR (F) | COR-TEX (1 HOUR) | PERIVEN-TRICULAR (1H) | COR-TEX (3H) | PERIVEN-TRICULAR (3H) |
|----------|-------------|----------------------|------------------|-----------------------|--------------|-----------------------|
| CON-TROL | | | 98±13 | 156±30 | 102±9 | 158±15 |
| PLV | 135±8 | 204±18 | 102±17 | 178±30 | 167±23 # | 305±46 |
| SF | | | 67±10 | 89±8 | 68±36 % | 65±13#% |

[RCBF (ml/100g/min)]

(#)vs.Control-group;(%)vs.PLV-group;

Conclusion: In SF and PLV treatment careful monitoring of pulmonary and cerebral haemodynamic status and cautious corrections of ventilator settings are mandatory to avoid alterations of RCBF. Supported:GV2007111046-FIS070733