Background The antioxidant defenses are poorly developed in preterm infants. Oxygen and parenteral nutrition (PN) which is contaminated with peroxides are two major sources of oxidants. Objective To assess the effect of early oxygen (on day 7 and 28) and the PN duration on oxidative stress markers at 36 weeks post menstrual age (PMA) and on the incidence of neonatal morbidities.

Design/methods A prospective observational study including 120 infants less than 29 weeks gestational age without major congenital anomalies. Consent for blood sample at 36 weeks PMA was obtained for 51 infants. GSH and GSSG (nmol/mg protein) were measured by capillary electrophoresis and were used for redox potential (mV) calculation using Nernst equation, and expressed as mean (± sem), BPD was defined as the need of O2 suplement at 36 weeks PMA. ROM that required either laser or anti-VGF treatment and NEC grade 2 or higher according to Bell’s criteria were included. Student’s t test or Chi squared were used as appropriate, *= p<0.05, ***= p<0.01.

Results FiO2 ≥ 25% on day 7 and 28 of life and PN duration > 14 days resulted in higher GSSG concentration, more oxidised redox potential at 36 weeks PMA and increased the incidence of BPD, ROP and NEC.

Conclusions Early life exposure to oxidants is associated with prolonged oxidative stress and higher incidence of neonatal morbidities. These results suggest that strategies targeting judicious O2 use and either decreasing the duration or using safer formulation PN will help decreasing the incidence of BPD, ROP and NEC.

Abstract PS-279 Table 1

<table>
<thead>
<tr>
<th>FiO2</th>
<th>GSH</th>
<th>GSSG</th>
<th>Redox potential</th>
<th>BPD or Death</th>
<th>ROP</th>
<th>NEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25%</td>
<td>7.6 (0.5)</td>
<td>0.18 (0.02)</td>
<td>-198 (2)</td>
<td>26/54</td>
<td>26/60</td>
<td>17/56</td>
</tr>
<tr>
<td>≥25%</td>
<td>7.4 (0.6)</td>
<td>0.29 (0.04)</td>
<td>-191 (2)</td>
<td>26/54</td>
<td>26/60</td>
<td>17/56</td>
</tr>
<tr>
<td>P</td>
<td>NS</td>
<td>*</td>
<td>**</td>
<td>NS **</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>≥25%</td>
<td>8.3 (0.8)</td>
<td>0.17 (0.02)</td>
<td>-201 (4)</td>
<td>9/36</td>
<td>0/37</td>
<td>4/37</td>
</tr>
<tr>
<td>≥25%</td>
<td>7.3 (0.5)</td>
<td>0.26 (0.03)</td>
<td>-193 (2)</td>
<td>55/60</td>
<td>14/60</td>
<td>7/60</td>
</tr>
<tr>
<td>P</td>
<td>NS</td>
<td>NS</td>
<td>**</td>
<td>NS</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>24h</td>
<td>7.5 (1.2)</td>
<td>0.13 (0.02)</td>
<td>-203 (5)</td>
<td>16/42</td>
<td>0/44</td>
<td>2/44</td>
</tr>
<tr>
<td>&gt;24h</td>
<td>7.5 (0.4)</td>
<td>0.26 (0.03)</td>
<td>-193 (2)</td>
<td>58/64</td>
<td>14/65</td>
<td>22/65</td>
</tr>
<tr>
<td>P</td>
<td>NS</td>
<td>*</td>
<td>**</td>
<td>NS</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

**Background** Essential surfactant properties include transfer to gas-liquid interface, reduction of surface tension and film replenishment during respiratory cycles.

**Objective** To compare component-specific film formation properties of infant and therapeutic surfactants.

**Design/methods** Using a multirwell fluorescence assay, we compared maximal fluorescence (Max), time to reach Max (tMax) and phospholipid concentration for ½ maximal signal (½Max) for calfactant (CAL), poractant (POR), beractant (BER), colfosceryl palmitate (COL), with surfactant from immature infants with RDS. Dose-response studies were performed for addition of SP-B, albumin and budesonide.

**Results** Max and ½Max values for CAL were higher/similar to those of rat surfactant. There were significant differences between CAL and other therapeutic surfactants for Max (CAL > COL > POR > BER) whereas ½Max were similar except for COL.

**In** surfactant from 39 infant tracheal aspirates, ½Max was inversely correlated with SP-B content (p = 0.001). Addition of SP-B to samples with low endogenous content (<0.1%) decreased ½Max in a dose-dependent way. Addition of 1.25% SP-B to BER (SP-B content 0.04%) increased Max by 324%. Addition of albumin to CAL (0.75 μg/g PL) increased ½Max by 110% and reduced Max by 13%. By contrast, addition of budesonide to CAL at 2% and 10% increased Max by 51 ± 26% and 93 ± 19%, with no effect on ½Max.

**Conclusions** This assay reveals differences in film formation efficiency for therapeutic surfactants reflecting differences in SP-B content and lipid composition. Film formation by infant surfactant is strongly influenced by SP-B content. The findings support the key physiological role of SP-B and the safety of surfactant as anti-inflammatory drug vehicle.
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gestational and postnatal age. LUS score shows high reliability for surfactant need (AUC = 0.82; p = 0.005; best cut off 11.5 [sensitivity 75%, specificity 90%]).

Conclusions LUS score is well correlated with oxygenation status and shows enough reliability to predict surfactant need. LUS can be used to monitor serially the course of respiratory conditions in critically ill neonates.

Reference
1 Via G, Lung ultrasound in the ICU: from diagnostic instrument to respiratory monitoring tool. Minerva Anestesiol 2012;78:1262–96

PS-282 RESTRICTED USE OF REPEAT DOSES OF SURFACTANT AFTER THE PROPHYLACTIC DOSE DOES NOT INCREASE THE RISK OF BPD OR DEATH IN PRETERM INFANTS

Recent data showed that repeat doses of surfactant after the prophylactic dose for treatment of RDS are currently recommended by the manufacturers to be administered at minimal levels of respiratory support. Reducing the number of unnecessary repeat doses will represent a significant cost-saving.

We determined if restricting repeat doses of Survanta by using high-threshold criteria for respiratory support increased the risk of the composite primary outcome of BPD or death before hospital discharge.

Methods A total of 140 infants of ≤28 weeks gestation who received prophylactic Survanta soon after birth were reassessed 12 h after the initial dose for retreatment if the infant remained intubated and required at least 40% inspired oxygen with a MAP > 10 cm H2O, and compliance of < 0.5 ml/cm H2O.

Multivariate analysis identified which risk factors from a set of a priori predictors including the need for Survanta retreatment could predict the primary outcome.

Results Eighty-eight (59%) of 140 infants reached the retreatment criteria and received repeat doses of Survanta. Sixty-eight (49%) infants developed BPD or died. Infants who developed BPD or died were younger and smaller; were more likely to have PDA, NEC or sepsis, longer (>28 days) stay on mechanical ventilation, and receive retreatment with Survanta. On forward stepwise logistic regression analysis of a priori risk factors only the need of ventilation > 28 d (p < 0.001, OR 7.3, 95% CI 2.7–19.3) was independently associated with increased risk of primary outcome.

Conclusions Restricting repeat doses of Survanta did not increase the risk of BPD or death in preterm infants with RDS.

Background and aims We evaluated the efficacy of nasal continuous positive airway pressure (nCPAP) treatment following the administration of surfactant using the INSURE (InTubation Surfactant Extubation) approach. We aimed to compare the efficacy of INSURE during nasal CPAP application and post-surfactant mechanical ventilation in extremely low birth weight (ELBW) infants.

Methods A total of 182 ELBW infants with a diagnosis of respiratory distress syndrome admitted to the neonatal intensive care unit during January 2012 and 2014 were retrospectively screened. Of these 74 received INSURE during nasal CPAP application (INSURE-nCPAP group) and 108 received mechanical ventilation following endotracheal surfactant application (MV group). The rate of mortality, intraventricular haemorrhage (IVH), repeat doses of surfactant, pneumothorax, pulmonary haemorrhage, necrotizing enterocolitis (NEC), sepsis, bronco pulmonary dysplasia (BPD) the duration of hospitalisation were compared between the two groups.

Results Infants in the INSURE-nCPAP group had significantly lower rates of IVH and pulmonary haemorrhage (p = 0.02 and 0.01; respectively). The need for mechanical ventilation, VIP, BPD and the rate of mortality was lower in infants in the INSURE-nCPAP group. While there was no significant difference in the rates of bloodstream infection and ROP between the groups; the duration of hospitalisation was shorter in infants in the INSURE-nCPAP group.

Conclusions In the current study we found that the INSURE-nCPAP approach in preterm infants with respiratory distress syndrome was effective. Additionally, we found that the rate of mortality, IVH, pulmonary haemorrhage and BPD was lower in infants treated with INSURE approach.

PS-284 EARLY INTUBATE-SURFACTANT-EXTUBATE (INSURE) VERSUS NON-INVASIVE CONTINUOUS POSITIVE AIRWAY PRESSURE (NCPAP) TO PREVENT BRONCHOPULMONARY DYSPLASIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

Background and aims In preterm infants, early non-invasive continuous positive airway pressure (NCPAP) use decreases "bronchopulmonary dysplasia (BPD) or death" compared with early intubation. However, it was not yet clear whether early intubation-surfactant followed-by-Extubation to NCPAP (INSURE) is more effective to prevent BPD or Death or "BPD or Death" or either than keeping infants on NCPAP. This systematic review aimed to investigate this question.

Methods This systematic review included randomised control trials comparing the INSURE and NCPAP for preterm infants with or at high risk of respiratory distress syndrome who had never been intubated before the study entry. Primary outcomes included BPD at 36 weeks postmenstrual age, Death, and "BPD or Death". A systematic literature search was conducted of MEDLINE, EMBASE, CENTRAL, and CINAHL as well as conference proceedings and trial registrations. Two reviewers independently selected studies and extracted data. Meta-analyses were conducted with a random-effect method using Review