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SURFACTANT TREATMENT OF SPONTANEOUSLY BREATHING PRETERM INFANTS TO AVOID MECHANICAL VENTILATION - A RANDOMIZED CONTROLLED TRIAL

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Background: Surfactant, a standard treatment for respiratory distress syndrome in preterm infants, is usually administered to mechanically ventilated infants via the endotracheal tube. In this randomized controlled trial, we evaluated a new method of surfactant application to spontaneously breathing preterm infants in order to avoid mechanical ventilation.

Methods: 220 preterm infants with a gestational age between 26+0 and 28+6 weeks and a birth weight below 1500 grams were enrolled in the trial. In the intervention group, surfactant was given to spontaneously breathing infants who needed more than 30% oxygen via a thin catheter which was placed in the trachea.

Results: On day two or three of life 30 (27.8%) of 108 infants in the spontaneously breathing group but 51 (45.5%) of 112 infants in the standard treatment group were mechanically ventilated (odds ratio [OR] 0.46, 95% confidence interval [CI] 0.3-0.8, p=0.008). At 28 days, there was a lower need for oxygen therapy in the spontaneously breathing group. If any mechanical ventilation during the stay in the hospital was analyzed, 36 (33%) infants in the spontaneously breathing group but 82 (73%) infants in the standard treatment group needed intubation and mechanical ventilation (OR 0.18, 95%CI 0.1-0.3, p= 0.000000038). The spontaneously breathing

group had considerable fewer days of mechanical ventilation. No differences were observed for overall mortality and serious adverse events.

Conclusions: The application of surfactant to spontaneously breathing preterm infants with a thin catheter reduces the need for mechanical ventilation.

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CHARACTERISATION OF LUNG MECHANICS AND INFLAMMATION IN HETEROZYGOUS ABCA3 MICE AFTER EXPOSURE TO 95% OXYGEN OR ROOM AIR

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Background: Homozygous ABCA3-deficiency is associated with a decreased surfactant function and results in irreversible respiratory failure or in chronic interstitial lung disease. Heterozygous individuals are susceptible for respiratory failure when an additional surfactant-protein-C-deficiency is present.

Aim: Determination of lung mechanics and inflammation in heterozygous ABCA3 mice (HZ) after exposure to 95%-oxygen or room-air as compared to wild type mice (WT).

Methods: HZ and WT were randomly assigned to 95%-oxygen (n=51) or room air (n=40). One set of mice was ventilated for 25 min and conventional mechanics were measured (Crs, Cstat, Rrs, total lung capacity (TLC), additionally lungimpedance was measured by forced oscillation technique (FOT è Rn, HL, GL, eta). Cell count and interleukins in BAL and wet to dry ratio were determined in ventilated and non-ventilated animals.

Results: There was no difference between ventilated HZ and WT mice with regard to respiratory mechanics, impedance measurements and BAL parameters after exposure to room air. After exposure to 95% oxygen TLC was significantly higher in HZ whereas Rn was lower as compared to WT (TLC: 86.6 vs 60.2, p=0.011; Rn: 0.29 vs 0.34, p=0.034). Leucocytes were higher in non-ventilated, room-air housed HZ as compared to WT (310 vs 170/µl, p=0,021). Oxygen exposure followed by ventilation resulted in a significant increase of interleukines in