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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= 0.0000000038). 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) (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

HZ (II-6: 3.04 vs 2.55pg/ml, $p=0.003$; MIP-2: 23.99 vs 11.19, $p=0.007$).

Summary: Our data suggest that lung mechanics and inflammation in HZ are not affected a priori. However, ventilation or oxygen exposure resulted in a phenotypical difference between genotypes.

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A SPECIFIED TYPE OF APGAR - RESULTS OF THE INTERNATIONAL TEST-APGAR STUDY

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Background: There is considerable variation in assigning Apgar scores. Definitions are required to apply Apgar score under clinical conditions such as preterm delivery or resuscitation [Rüdiger et al. ActaPaed'09:98;1433-36]. American Academy of Pediatrics suggested an additional form for resuscitated infants [Ped'06:117;1444-47], however, its predictive value was not tested until now.

Aim: Test the prognostic value of a specified Apgar score and the AAP-suggestion to predict short term neonatal outcome of preterm infants.

Methods: Comparison of the conventional Apgar with the specified Apgar score and AAP-suggestion in an international prospective study. Inclusion criteria: gestational age below 33 weeks, born within participating centres. Following data were obtained: perinatal characteristics; the infant's condition during first 10 minutes; discharge data on mortality and morbidity.

Results: Of the 2169 infants that were screened, 1930 were included with the following birth characteristics: GA 28 ± 2.5 , birthweight 1164 ± 400 g, umbilical artery pH 7.3 ± 0.1 . The specified Apgar score was significantly higher than the conventional score. Mortality of included infants was 11%. Comparison of infants who died or survived showed no differences in conventional Apgar score [median (range) 7(5-8) vs. 8(7-9)], however, significant differences in the specified score [6(4-7) vs. 9(8-10)]. 6% of infants did not require any support (according to AAP-form) during the first 10 minutes, infants who did not survive the neonatal period required significantly more support during the first 10 minutes.

Discussion: It is the first presentation of the TEST-APGAR study-results providing data to improve the usage of Apgar-Score in infants requiring support in the delivery room.

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ISOLATED OPTIC NEURITIS IN INFANCY AS A PREDICTOR OF MS?

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Optic neuritis [ON] is generally identified as the most frequent potential risk factor associated with future development of multiple sclerosis [ms]. Whereas coherency in case of the adult disease is proved, findings concerning ms after childhood ON could not be demonstrated so far. The aim of this study consists of the identification of risk factors predicting later ms.

After a mean follow-up period of 18 years, 42 patients with ON in infancy participated on a standardized study including ophthalmologic, neurologic, electrophysiological and radiological examination.

6 out of 42 [14,3%] patients show radiological definite signs of ms, 10 out of 42 [23,8%] suspect and 26 out of 42 [61,9%] feature no evidence of ms. Subgroup analysis based on radiological data shows that male gender, early onset of ON, additional neurologic symptoms, positive lesions in mri and neurologic dysfunction in coordination in clinical follow-up significantly raise the risk of future ms. In contrary, female gender, severe lost of visual acuity combined with fundoscopic findings [prominence >1dpt, hyperaemia] cause risk reduction of later ms.

In conclusion, ON in childhood is rare in comparison to ON in adulthood. Therapy with cortisone has a positive effect on progress of ON and minimizes the risk of later ms. Therefore treatment with cortisone is strongly indicated and recommended by proven diagnosis of ON.