Surfactant missing for 23 infants in entire cohort, for 17 infants in BPD cohort

*p < 0.05 versus S-DR and S-NICU, #p < 0.05 versus DR, §p < 0.05 versus S-NICU

Conclusions: Infants with a high rate of surfactant treatment still have a high incidence of BPD. Timing of surfactant treatment has only minor effects on mortality and morbidity in extremely premature infants.

514

EFFECTIVENESS OF FETOSKOPISCH TRACHEAL BALLOON OCCLUSION IN NEONATES WITH CONGENITAL DIAPHRAGMATIC HERNIA (CDH)

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Background and aims: In fetuses with prenatally known CDH can be made a prognosis of the expected lung volume by ultrasound and intrauterine MRI. In patients with poor prognosis the, fetoskopisch tracheal balloon occlusion' (TO) may have a positive influence over the lung volume and can potentially improve the outcome.

We have matched patients with and without TO and compared the survival.

Methods: 21 patients were included. A relativated fetal lung volume (RFLV) of under 25% in MRI was elected for inclusion of fetal TO. Excluded were bothsided CDH and syndromes.

As matched pair was the patient selected with CDH and the RFLV, which was closest to the value of the TO patient.

Results: 13 patients had a left sided and 9 a right sided CDH. Gestational age was 35 +2weeks(37+0), birth weight 2463g(2712g). The mean RFLV rate in the intervention group was 19.1% (19.9%) in the 29+0 week (29+6). ECMO was not performed in 4children because of protracted asphyxia, not necessary in 11 children and because of preterm delivery not possible by 2 children.

The ECMO rate among the children in the intervention group was 81%(67%), the ECMO duration was 10,8days (10,0days). Survival rate was 57% (52%).

Conclusions: The late TO is certainly feasible without relevant prematurity and procedure associated mortality. The effect of TO on survival in a standard post-natal setting, including the ECMO treatment option is so far not clearly demonstrated. TO should be done ideally in a large-scale randomized controlled studys.

515

SELECTIVE BRONCHIAL INTUBATION IN PRETERM INFANTS WITH BULLOUS EMPHYSEMA - A SERIES OF 9 CASES

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Background and aims: Acquired bullous emphysema occurs in preterm infants as a sequela of BPD or of a mechanical valve gear mechanism. The characteristics is generalized air trapping or uneven distribution of gas with hyperlucent areas due to overdistended bronchioli or alveoli. There are only few case reports on selective one-sided lung ventilation as a therapeutic option.

Methods: Medical charts of preterm infants born between 1993 and 2010 with acquired bullous emphysema treated with selective bronchial intubation in our Division of Neonatology were reviewed. Gestational age, clinical history, clinical presentation, associated treatment methods, duration of ventilation and outcome of one-sided lung ventilation was recorded. Therapy was deemed successful if thereafter chest X ray showed a BPD < grade III according to Weinstein.

Results: Overall, 9 preterm infants with gestational age between 24 and 35 weeks and birth weight between 500 and 3170 g underwent one-sided lung ventilation. This was started between day 12 and 35 and was continued for 24 h to 7d. Selective intubation in 3 cases was done on the left side. 2 patients needed 2 courses of unilateral ventilation and 1 had 3 courses. Therapy was successful in 7 patients, who had no recurrence of the lobar emphysema.

Conclusion: Selective intubation, especial of the left bronchus, is technically challenging but seems to be practicable and helpful. If the affected lung lobe shows complete atelectasis for more than 48 h the overdistension of airways probably will resolve.

516

FIRST INTENTION N-SIPPV VS. N-CPAP IN PRETERM INFANTS COMPLICATED BY RESPIRATORY DISTRESS SYNDROME

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Background and aims: Nasal intermittent positive pressure ventilation (N-SIPPV) can constitute a new ventilatory mode for RDS treatment. In this regard, N-SIPPV has been shown to be safe and more effective than N-CPAP when used in the weaning from MV. However, data comparing the effectiveness of N-CPAP versus N-SIPPV as best first intention therapeutic strategy for RDS treatment of ELBW/VLBW infants are to date lacking. The present study investigates whether first intention N-CPAP or N-SIPPV can constitute a valid option of ventilation in the respiratory management of RDS.

Methods: From January 2005 to January 2009 we performed a prospective case-control study in 92 infants (< 32 wks) complicated by RDS of whom 23 cases were supported by N-SIPPV and matched for gestational age and weight at birth with 69 VLBW newborns supported by N-CPAP (1 N-SIPPV vs 3 N-CPAP). The effectiveness of the two ventilatory strategies was evaluated by primary (failure of respiratory support, death in the first week) and secondary (length of respiratory support and of staying in hospital; incidence of air leak, sepsis, PDA, NEC, IVH, PVL, ROP, PPHN, CLD; need of post-natal glucocorticoids) end-points.

Results: No significant differences in primary and secondary end-points ($P > 0.05$, for all) have been shown in the two different ventilatory strategies. However, the length of nasal ventilation support was higher in N-SIPPV group, although not statistically significant ($P > 0.05$).

Conclusions: The present data provide evidence that first intention non-invasive ventilatory strategy could be successful in ELBW/VLBW infants independently from N-SIPPV and/or N-CPAP devices.

517

CHARACTERISATION OF LUNG MECHANICS AFTER FETAL TRACHEAL OCCLUSION IN NEWBORN RABBITS WITH LUNG HYPOPLASIA INDUCED BY DIAPHRAGMATIC HERNIA (CDH)

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Aim: To assess the effects of tracheal occlusion (TO) on lung mechanics in a sham controlled newborn rabbit model of CDH.

Methods: On day 23/31, CDH was induced by ex-utero surgery. Controls received a sham thoracotomy (SHAM-CDH). On day 28 fetuses were randomly assigned to TO or SHAM-TO. Non-operated littermates served as controls (NOP). Fetuses were delivered on day 31 for mechanical ventilation and measurement of lung mechanics (dynamic and static compliance (C, Cst), resistance (R), total lung capacity (TLC), and impedance (forced oscillation technique)), and lung to body weight ratio (LBWR). Airway resistance (R_{aw}), elastance (H(L)), tissue damping (G(L)) and hysteresivity (G(L)/H(L)) were calculated from impedance data.

Results: There was no difference in birth weight but LBWR was significantly increased by TO in CDH and SHAM-CDH animals as compared to fetuses without TO or NOP. The parameters of lung mechanics after 30min of ventilation are shown below (mean, * $p < 0.05$ as compared to NOP).

	CDH+ TO (n=6)	CDH+ SHAM- TO (n=6)	SHAM- CDH+TO (n=5)	SHAM- CDH+ SHAM- TO (n=8)	NOP (n=16)
TLC/BW (μ l/g)	48.2	31.1	48.2	44.8	41.9
Cst/BW [ml/ cmH ₂ O*kg]	1.50	1.23	1.82	1.80	1.91
Rn [cmH ₂ O*s/ ml]	0.25	0.17	0.18	0.16	0.16
G [cmH ₂ O/ ml]	5.52*	4.55	4.51	4.06	2.76
H [cmH ₂ O/ ml]	29.23*	19.10	23.97	14.13	9.87

[respiratory mechanics]

Summary: In this rabbit model of lung hypoplasia, TO had a substantial effect on lung volume and TLC.