

512

EFFECT OF TIDAL VOLUME INFORMATION AND TARGETED VENTILATOR TRAINING ON THE INCIDENCE OF HYPOCARBIA IN THE EARLY NEONATAL PERIOD

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Background: Hypocarbica is associated with adverse neurodevelopmental outcome in ventilated preterm infants. Most neonatal blood gas (BG) sampling is performed by pediatric trainees. We have previously shown that the monthly incidence of hypocarbica is affected by trainee experience.

Aims: To compare the incidence of significant hypocarbica in infants < 1500g, or < 32 weeks gestation, and < 8 days old before (Audit 1, 2004-6) and after (Audit 2, 2008-9) equipment and training changes.

Method: BG results were retrieved from the electronic patient data management system for all eligible patients. Audit 1 was performed with ventilators (SLE 2000) without tidal volume information. In January 2008, new ventilators (Engstrom Carestation) providing continuous tidal volume information were introduced supported by a regular targeted ventilation training package. The percentage of BG with hypocarbica (< 4kPa) was calculated. Monthly percentages were calculated for new trainees (months 1-2) and the rest of the training period (months 3-6).

Results:

	Number of infants	Total BG	% hypocarbica (all months)	% hypocarbica (months 1-2)	% hypocarbica (months 3-6)
Audit 1	401	8323	5.4 (1.7-12.4)	5.9 (3.5-12.4)	4.3 (1.7-9.7)
Audit 2	358	9628	3.1 (1.0-6.5)**	3.9 (2.7-6.5)*	2.5 (1.0-3.4)**

[Table 1: Hypocarbica rates (%) median (range)] Table 1 shows that the monthly incidence of hypocarbica (%) has been reduced (*p< 0.01; **p< 0.001) following the intervention. There is still a higher incidence of hypocarbica when new trainees start (P< 0.001).

Conclusion: Tidal volume information and targeted neonatal ventilation training is associated with a

reduction in the incidence of hypocarbica suggesting this risk factor for adverse outcome is amenable to intervention

513

TIMING OF SURFACTANT TREATMENT IN EXTREMELY PREMATURE INFANTS - EFFECTS ON MORTALITY AND DEVELOPMENT OF BRONCHOPULMONARY DYSPLASIA (BPD)

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Background and aims: The effect of early surfactant treatment is uncertain. The aim of this study was to evaluate mortality and moderate/severe BPD in relation to timing of surfactant treatment.

Methods: All 452 admitted infants with gestational age (GA) ≤ 30 weeks from a national cohort of infants with GA 22⁰-27⁶ weeks and/or birth weight (BW) 500-999 g were studied.

Results. Only minor differences in mortality or BPD was found between infants given surfactant in delivery room (S-DR) only, NICU (S-NICU) only or both in DR and in NICU (S-DR/NICU) (Table 1).

		S-DR	S-NICU	S-DR/NICU
Entire cohort	n=452	n=91	n=132	n=145
GA (wks)	26.2±1.7	26.0±1.6	26.1±1.6	25.6±1.5§
BW (g)	832±180	801±190	852±172	799±181§
Died	83 (18.4%)	13 (14.3%)	27 (20.5%)	36 (24.8%)#
BPD cohort	n=376	n=78	n=110	n=109
GA (wks)	26.4±1.6	26.2±1.6	26.5±1.5	25.7±1.4*
BW (g)	853±176	813±190§	875±163	822±180§
BPD	170 (45.2%)	37 (47.4%)	52 (47.2%)	63 (57.8%)#

[Table 1]

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.