

September 20th, 2023 08:30 - 9:00

POSTER WALK – RESUSCITATION 1

ID 189. TEACHING OF NEONATAL RESUSCITATION AND ITS IMPACT ON NEONATAL MORTALITY IN THE OUTSKIRTS OF GREATER CONAKRY, GUINEA, WESTERN AFRICA

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Background: Neonatal mortality is still a major public health problem worldwide, mainly in low- and middle-income countries. Guinea indicates a national neonatal mortality rate of 32/1'000 live births, resulting in >14'000 neonatal deaths annually. This project aimed to improve survival by transferring neonatal resuscitation skills and a minimum of required equipment to health care professionals working in peri-urban health facilities in the outskirts of greater Conakry.

Methods: Evaluation was performed in public and private health structures regarding obstetrical and neonatal activities during a 6-month-period before the training intervention and was repeated thereafter. Training included a theory part according to the program «Helping Babies Breathe» and several hands-on sessions with mannequins. At the beginning and the end of training, participants filled in a multiple-choice questionnaire with 17 questions covering neonatal resuscitation. Each center



was then equipped with resuscitation equipment (bag, masks, aspiration bulbs (penguin), etc).

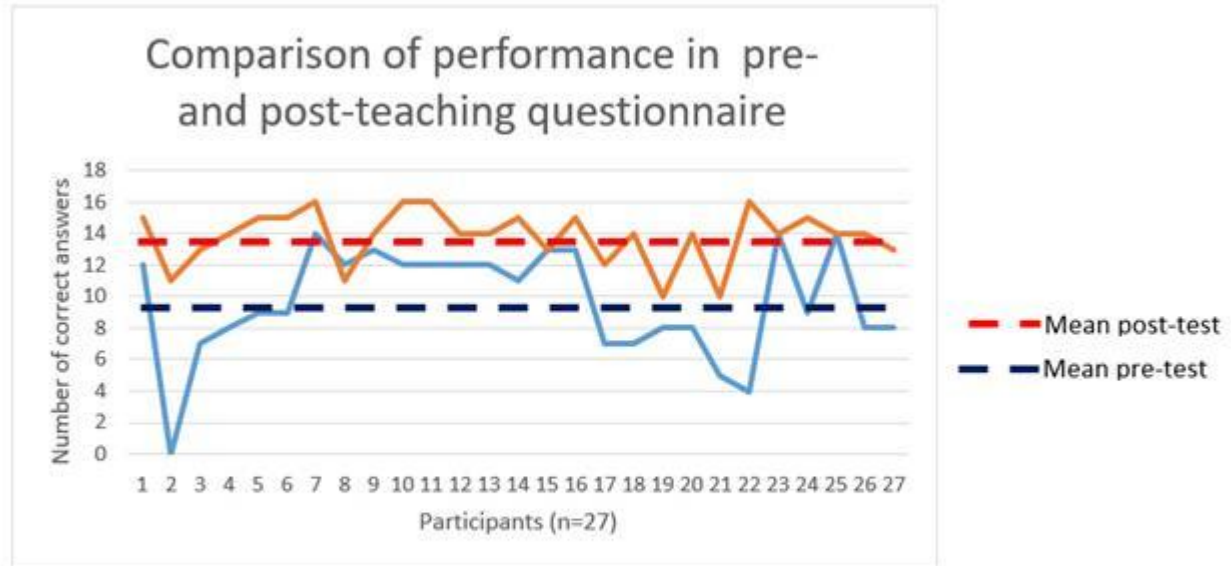
Results: Both questionnaires were filled in by 27 participants of 18 health facilities. The average of correct answers per question increased from 15.9 (58.8%) to 21.9 (81.1%) and per participant from 9.7 (57.1%) to 13.8 correct answers (81.2%) regarding the 17 questions between pre- and post-test (Figure). The audited facilities performed together 575 deliveries during a 6-months pre-teaching period. They deployed 19 stillborns corresponding to a stillborn rate of 33.0 stillborns/1'000 deliveries. Of the 556 live births, 39 (7.0%) showed need for neonatal resuscitation, 15 died within the first hours (early neonatal death rate of 27.0/1'000 live births), and 62 (11.2%) were referred to a higher ranked health care structure. No information about their outcome was available.

During the 5-month post-training period, the stillborn rate remained high with 36.2 stillborns/1'000 deliveries. More newborns underwent resuscitation maneuvers (13.9%) and could successfully be resuscitated (96.4%), compared to 61.5% before training, leading to an early neonatal mortality rate of 5.0/1'000 live births compared to 27.0% before training.

Conclusion:

Thanks to a 2-day training session of health care professionals, the early neonatal mortality rate could significantly be dropped in the outskirts of Conakry. Similar training programs should be performed in the whole country to decrease the high neonatal mortality rate.

Figure



Legend : Comparison of number of correct answers of the 27 participants in the pre- (blue) and post-teaching (red) test with a 17-item questionnaire.

None declared



ID 904. A BEFORE AND AFTER STUDY OF A NOVEL RESPIRATORY FUNCTION MONITOR DESIGNED TO TEACH NEWBORN FACE MASK VENTILATION

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Background: The International Liaison Committee on Resuscitation (ILCOR) has recommended improvements in training for neonatal resuscitation, highlighting the potential role of respiratory function monitors (RFMs).

Objectives: To assess if a newly developed face mask ventilation training intervention using a novel RFM (Monivent NeoTraining, Göteborg, Sweden) designed specifically for use as a training tool, resulted in a reduction in mean face mask leak and improvement in other ventilation parameters following training.

Methods: We developed a face mask ventilation training intervention which commenced with a scripted explanation and instructor led demonstration on how to optimise face mask ventilation technique. We used an RFM (Monivent NeoTraining) with a simplified visual interface to identify and help the active learner correct suboptimal ventilation, leak, excess tidal volume and airway obstruction. Healthcare professionals working or training in a hospital providing maternity services were eligible for participation. All participants underwent a structured, standardised training intervention using a modified, leak free manikin and RFM. The intervention consisted of; 1.Baseline assessment (30 seconds of uninterrupted PPV, participant and instructor blinded to the RFM display), 2.Standardised face mask ventilation training using the RFM (instructor led demonstration on optimal face mask ventilation



technique and RFM interpretation followed by a period of participant deliberate practice [Figure 1.] and 3. Blinded outcome assessment (30 seconds of uninterrupted PPV, participant and instructor blinded to the RFM display). The primary outcome was mean face mask leak after training.

Results: We enrolled 400 participants from 12 hospitals in Ireland. The pre-training mean (SD) leak was 40% (30) compared with 16% (14) post-training, $p = <0.00001$. The mean (SD) expiratory tidal volume was higher post training 19.0 ml (2.6) vs pre training 15.4ml (5.7), $p = <0.00001$. Differences were noted across all other ventilation parameters including improvement in ventilator rate, peak and end expiratory pressures.

Conclusion: Standardised face mask ventilation training using a novel RFM designed for use as a training tool, led to a significant reduction in mean face mask leak and other important respiratory parameters. This is the largest study to date exploring the utility of using an RFM for neonatal face mask ventilation training.

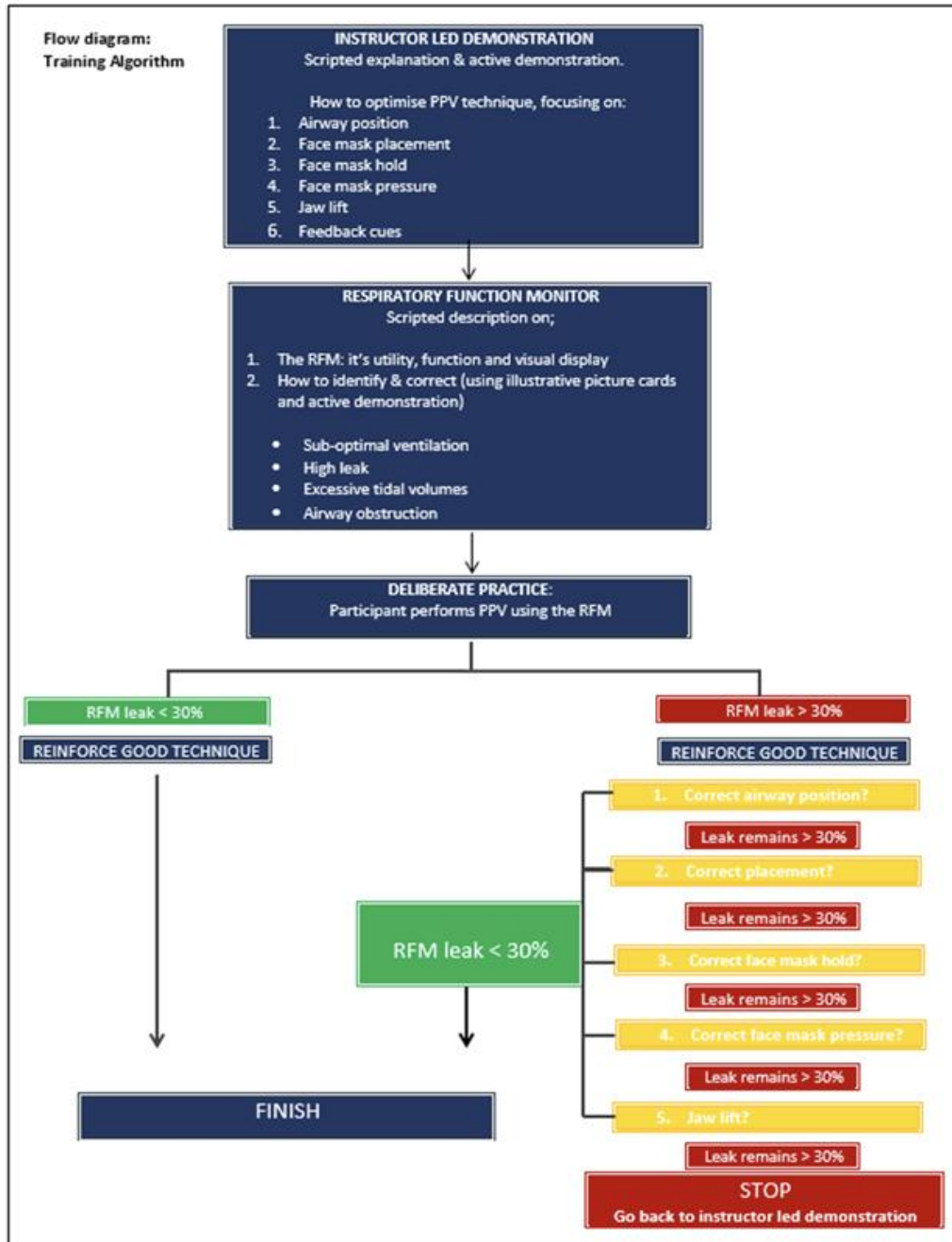


Figure 1: Training algorithm

Figure 1: Training algorithm

None declared

ID 432. Comparison of cognitive load in virtual reality and conventional simulation-based training: A randomized controlled trial

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Background:

Cardiopulmonary resuscitations are stressful situations in which vital decisions must be made within seconds. Lack of routine due to infrequency of pediatric emergencies, can lead to serious medical and communication errors. Virtual reality can fundamentally change the way simulation training is conducted in the future. It appears to be a useful learning tool for technical and non-technical skills. It is important to investigate the use of VR in providing a strong sense of presence within simulations.

Methods:

In this randomized study we will enroll doctors and medical students from the Medical University of Vienna, who will receive learning material regarding resuscitation of a one-year-old child. The study will be conducted in three phases. In the first phase, 20 physicians and 20 medical students from the Medical University of Vienna will be included. They will perform a simulation-based training with a standardized scenario of a critical ill child with a hypovolemic shock. Main goal of this phase is to establish a baseline for the following two phases to generate comparative values regarding

cognitive load and stress. In phase 2 and 3, the same participants will perform the same scenario in a VR setting. In both settings, on three set points of progression, one of three predefined events is triggered. For each event, three different stress levels (easy, medium, difficult) will be defined. Stress and cognitive load will be analyzed using the NASA Task Load Index, eye-tracking parameters, and heart rate. Subsequently, these values will be compared between VR training and traditional simulation-based training.

Hypothesis:

We hypothesize that the VR training and the traditional training groups will not differ in physiological response (cognitive load, heart rate and heart rate variability). We further assume that Virtual reality trainings can be used as a cost-efficient additional training.

Objectives:

The aim of this study is to measure cognitive load and stress level during a real-life simulation training and compare it with VR training in order to show that VR training evokes the same physiological response and cognitive load as real-life simulation training.



Set-up of the scenario in Virtual Reality: Two healthcare providers next to the patient's bed perform tasks distributed by the trainee.

Set-up of the scenario in Virtual Reality: Two healthcare providers next to the patient's bed perform tasks distributed by the trainee.

SomaReality (SR) and our Study team received a grant by the Austrian Research Promotion Agency and the CCP and DDr. Wagner is part of the medical advisory board of SR.



ID 728. The Effect of Histological Chorioamnionitis on Breathing Effort in Premature Infants at Birth: A Retrospective Cohort Study

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Background:Chorioamnionitis, antenatal inflammation of the fetal membranes and umbilical vessels, is a major risk factor for premature birth and potentially depresses breathing by releasing inflammatory mediators that inhibit brainstem-derived respiratory drive. Following our recent finding that clinical chorioamnionitis is associated with reduced spontaneous breathing at birth, we investigated the association between histological chorioamnionitis (HCA) and spontaneous breathing in premature infants at birth.

Methods:In a retrospective cohort from 2016 until 2021, infants <30 weeks' gestation with available placental histology were classified into those with and without HCA. The primary outcome was breathing effort, defined as minute volume (MV) of spontaneous breathing in the first 5 minutes after birth. We also assessed tidal volume (Vt), respiratory rate (RR), heart rate (HR), oxygen saturation (SpO2) and oxygen requirement (FiO2) in the first 5 minutes after birth. Considering that, based on the literature, gestational age, antenatal corticosteroids and general anaesthesia also affect breathing at birth, multiple linear regression analyses were performed to adjust for the effects of these covariates.

Results: A total of 186 infants were included; 75 infants with HCA and 111 infants without HCA. Infants with HCA had lower gestational age (infants with HCA vs. infants without HCA; median (IQR); 26+5 (25+0–28+1) vs. 28+4 (27+0–29+1) weeks, $p < 0.001$), lower birthweight (900 (740–1150) vs. 1012 (820–1227) g, $p = 0.038$) and a lower incidence of general anaesthesia (n (%); 10 (13%) vs. 28 (25%), $p = 0.048$), while exposure to antenatal corticosteroids was higher (55 (73%) vs. 64 (58%), $p = 0.043$) compared to infants without HCA.

Infants with HCA had lower MV (33 (11–88) vs. 84 (21–183) mL/kg/min, $p = 0.001$), Vt (2.9 (1.8–4.0) vs. 4.2 (2.9–6.3) mL/kg/breath, $p < 0.001$), RR (18 (10–28) vs. 25 (14–32) breaths/min, $p = 0.043$), SpO₂ at 5 minutes after birth (86 (65–93) vs. 93 (82–99) %, $p = 0.003$) and SpO₂/FiO₂ ratio (1.02 (0.80–1.53) vs. 1.38 (1.10–1.91), $p < 0.001$). HR did not differ between the groups. After adjustment for the aforementioned covariates, MV (standardised beta coefficient (β) = -0.291, $p = 0.006$), Vt (β = -0.216, $p = 0.007$), SpO₂ at 5 minutes (β = -0.184, $p = 0.034$) and SpO₂/FiO₂ ratio (β = -0.172, $p = 0.030$) remained significantly lower in infants with HCA.

Conclusion: Histological chorioamnionitis is associated with reduced breathing effort and oxygenation at birth.

Table 1: Baseline characteristics, respiratory parameters and physiological parameters

	Infants with HCA (n=75)	Infants without HCA (n=111)	Unadjusted p-value	Standardised adjusted beta- coefficient	Adjusted p-value
Baseline characteristics					
Maternal age (yrs) ¹	31±5	31±5	0.394 ^a		
Multiple gestation ²	21 (28%)	34 (31%)	0.700 ^b		
Gestational age (weeks) ³	26 ^{±5} (25 ^{°0} -28 ^{°1})	28 ^{±4} (27 ^{°0} -29 ^{°1})	<0.001 ^c		
Birthweight (g) ³	900 (740-1150)	1012 (820-1227)	0.038 ^c		
Caesarean delivery ²	22 (29%)	76 (69%)	<0.001 ^b		
General anaesthesia ²	10 (13%)	28 (25%)	0.048 ^b		
Full course of antenatal corticosteroids ²	55 (73%)	64 (58%)	0.043 ^b		
Small for gestational age ²	3 (4%)	9 (8%)	0.263 ^b		
Male ²	32 (43%)	54 (49%)	0.422 ^b		
Apgar score 1 min ³	4 (2-6)	5 (3-7)	0.006 ^c		
Apgar score 5 min ³	7 (6-8)	8 (6-9)	0.097 ^c		
Respiratory parameters in the first 5 minutes after birth					
Minute volume (mL/kg/min) ³	33 (11-88)	84 (21-183)	0.001 ^c	-0.291 ^d	0.006 ^d
Tidal volume (mL/kg/breath) ³	2.9 (1.8-4.0)	4.2 (2.9-6.3)	<0.001 ^c	-0.216 ^e	0.007 ^e
Respiratory rate (breaths/dmin) ³	18 (10-28)	25 (14-32)	0.043 ^c	0.078 ^e	0.259 ^e
Incidence of apnoea (n) ³	3 (1-5)	2 (0-4)	0.057 ^c	0.022 ^e	0.751 ^e
Duration per apnoea (s) ³	20 (15-26)	17 (14-21)	0.033 ^c	0.064 ^e	0.494 ^e
Total duration of apnoea (s) ³	70 (18-122)	35 (0-86)	0.016 ^c	0.022 ^e	0.738 ^e
Additional physiological parameters in the first 5 minutes after birth					
HR (beats/min) ³	119 (94-135)	123 (99-142)	0.270 ^c	-0.021 ^e	0.808 ^e
SpO ₂ (%) ³	59 (48-67)	74 (54-71)	0.052 ^c	-0.157 ^e	0.070 ^e
SpO ₂ at 5 min after birth (%) ³	86 (65-93)	93 (82-99)	0.003 ^c	-0.184 ^e	0.034 ^e
FiO ₂ (%) ³	54 (39-64)	45 (34-55)	0.001 ^c	0.104 ^e	0.143 ^e
SpO ₂ /FiO ₂ ratio (%) ³	1.02 (0.80-1.53)	1.38 (1.10-1.91)	<0.001 ^c	-0.172 ^e	0.030 ^e

¹ mean±SD.

² n (%).

³ median (IQR).

^a Independent samples-T test.

^b Pearson's Chi-squared test.

^c Mann-Whitney U test.

^d Linear regression mixed model adjusted for gestational age, antenatal corticosteroids, general anaesthesia and time as fixed effects.

^e Linear regression adjusted for gestational age, antenatal corticosteroids and general anaesthesia.

Table 1: Baseline characteristics, respiratory parameters and physiological parameters.

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None declared

ID 558. DEMOGRAPHIC CHARACTERISTICS AND MONITORING PARAMETERS OF PREMATURE NEONATES <32 WEEKS' GESTATION WITH AND WITHOUT ADVERSE OUTCOME: A SECONDARY ANALYSIS OF THE COSGOD III TRIAL.

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Background

To identify differences in demographic characteristics and monitoring parameters between premature neonates <32 weeks' gestation who died or had cerebral injury (adverse outcome) compared to those who survived without cerebral injury (favorable outcome).

Methods

This ancillary study is a post-hoc-analysis of secondary outcome parameters of a multicenter randomized clinical trial (COSGOD III) in which neonates were randomized either to cerebral oxygen saturation (crSO₂) monitoring by near-infrared spectroscopy (NIRS) in addition to routine monitoring within the first 15 minutes after birth to guide stabilization or a control group with standard care. In the present study all included premature neonates were assigned either to adverse outcome group (composite of mortality and cerebral injury defined as any grade of intraventricular hemorrhage or cystic periventricular leukomalacia) or favorable outcome group (survival without cerebral injury). Group differences of demographic characteristics,



and monitoring parameters (heart rate [HR], arterial oxygen saturation [SpO₂] and crSO₂) were assessed.

Results

In total, 607 premature neonates were included in the COSGOD III trial. In the present study 117(19%) and 490(81%) were assigned to adverse outcome group and favorable outcome group, respectively. In the adverse outcome group, premature neonates had lower median gestational age [26.7(25.5–28.9) vs. 29.3(27.3–30.7); $p < .001$], birth weight [900(690–1195) vs. 1150(885–1435); $p < .001$] and Apgar scores ($p < .001$) compared to the favorable outcome group. The adverse outcome group had significantly lower HR from 2 to 4min and SpO₂ from 2 to 8min, thereafter both parameters were similar in both groups. crSO₂ was similar in both groups within the first minutes and was significantly lower in the adverse outcome group from 4 to 15min after birth compared to the favorable outcome group.

Conclusion

Beside lower gestational age, birth weight and Apgar scores, premature neonates <32 weeks' gestation with adverse outcome had lower HR, SpO₂ and crSO₂ after birth. While routine parameters (HR and SpO₂) equalized between groups shortly after birth (4 and 8 minutes, respectively), crSO₂ values continued to be lower in the adverse outcome group until minute 15 after birth demonstrating a potential benefit of using NIRS monitoring for identifying neonates in need for medical interventions to potentially prevent adverse outcome.

None declared

ID 920. Telesimulation for the training of medical students in neonatal resuscitation

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Background: Telesimulation describes “a process by which telecommunication and simulation resources are utilized to provide education, training, and/or assessment to learners at an off–site location” [1]. We were able to show in a pilot study that telesimulation is feasible for the training of neonatal resuscitation both in medical students and neonatal nurses [2]. In this follow–up study we investigated whether telesimulation using a simple neonatal mannequin would be associated with (i) an increase in neonatal resuscitation knowledge and (ii) a positive effect on ventilation skills among medical students.

Methods: First–year medical students at the Medical University of Graz, Austria, without previous experience in neonatal resuscitation, were recruited on a voluntary basis. For the telesimulation intervention a one–hour algorithm training was delivered by a neonatologist using Cisco Webex for small groups of up to a maximum of four students. Students were remotely located and used a provided training package including a low–fidelity mannequin (Newborn Anne™ or Baby Anne™, Laerdal Medical, Norway) to train essential skills, while receiving live instruction and feedback from the trainer.

The effect of the telesimulation session was assessed using a 20–question single–choice paper–and–pencil questionnaire about current neonatal resuscitation guidelines [3], which was distributed before and after the training. Furthermore, all students individually underwent a standardized simulated scenario involving a non–

vigorous neonate after birth, which was video-recorded to assess the time until the first ventilation breath was delivered.

Results: Until April 2023 25 medical students (m:f=16:9, median age 22a [IQR 20–24]) participated. The median number of correct answers on the questionnaire increased from 12/20 (10.5–14) to 19/20 (18–20) after the training ($p<0.001$). The median time to the first delivered ventilation breath was 26s (22–39). Twenty-three (92%) of the 25 students initiated positive pressure ventilation within 60s.

Conclusion: Neonatal resuscitation knowledge was significantly improved after a single telesimulation training. Even more important, the majority of students was able to initiate positive pressure ventilation within the first minute after birth, as currently recommended [3].

References:

1. McCoy CE et al. AEM Educ Train 2017;1(2):132–6.
2. Mileder LP et al. Med Educ Online 2021;26(1):1892017.
3. Madar J et al. Resuscitation 2021;161:291–326.

None declared.

ID 560. In A Large Cohort Of Preterm Infants With Need For Respiratory Support During Fetal-To-Neonatal Transition: How About The SpO₂ At 5 Minutes ?

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Background

In preterm infants <32 weeks gestational age (wGA) with need for respiratory support it was shown that reaching an oxygen saturation (SpO₂) $\geq 80\%$ at 5 minutes after birth was associated with lower mortality and less morbidity. Following publications supported this concept. Therefore, targeting a SpO₂ of 80% at minute 5 became a well-accepted strategy, which is mentioned in all recent Resuscitation Guidelines. Aim of this retrospective analysis of a large cohort of preterm infants was to see, whether this target was reached in time.

Methods:

This is a post-hoc analysis of secondary outcome parameters of different trials including the multicenter COSGOD III trial. We analyzed the time needed until SpO₂ was $\geq 80\%$. The preterm infants were stratified according to gestational age (GA) in 3 groups (<28wGA, 28–31wGA, >31wGA). Furthermore, we analyzed, whether there was a difference between male and female preterm infants. The SpO₂ sensor of the pulse-oximeter was placed on the right wrist.

Results:

We included 828 premature infants, according to strata: <28wGA: 288 (35%), 28–31wGA: 460 (56%), >31wGA: 80 (9%). The median (quartile 25 – quartile 75) birthweight was 790 (660–930) g, 1300 (1100–1550) g, 1958 (1720–2301) g, respectively. The percentage of female sex was 45%, 51%, 50%, respectively. Preterm infants with A) <28wGA, B) 28–31wGA, C) >31wGA reached a SPO₂ of 80% at a mean time (+SD) of A) 5.6 +0.14 min, B) 5.0 +0.11 min, and C) 6.8 + 0.25 min.

The differences between the three strata were statistically significant. There was no difference between preterm infants in terms of sex (comparing male vs female).

Conclusion:

There were differences between the three GA strata in terms of the mean time needed to reach a SpO₂ \geq 80% during fetal-to-neonatal transition. That result points out, that only about 50% of infants reached the recommended target in time. Nevertheless, according to literature the target of a SpO₂ \geq 80% is only relevant for preterm infants $<$ 32wGA. There were no differences in terms of sex.

None declared