September 22nd, 2023 08:00 - 09:00

POSTER WALK – RESUSCITATION 2

ID 743.TIMING OF UMBILICAL CORD CLAMPING – ATTITUDES AND BELIEFS AMONG SWEDISH MIDWIVES AND OBSTETRICIANS

Doctor Maria Wilander[1], Katarina Ekelöf[1], Elisabeth Saether[2], Katarina Patriksson[3], Li Thies–Lagergren[4], Doctor Heike Rabe[5], Doctor Ola Andersson[6]

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Background

Keeping the umbilical cord intact for some minutes after birth allows placental transfusion, reduces iron deficiency, and improves neurodevelopmental outcome in the neonate. Recent studies indicate that also the neonates requiring resuscitation would benefit from respiratory support provided with an intact umbilical cord. Despite these findings, implementation of delayed cord clamping (CC) has been slow and there is still a controversy regarding the optimal timing of CC. Attitudes and beliefs about CC practices within the multidisciplinary team are important factors in the implementation process. We conducted a survey of Swedish midwives and obstetricians to assess their attitudes and beliefs about CC.

Method

We used an adaptation of a previously published questionnaire. The questionnaire was translated and distributed electronically to five hospitals included in the ongoing "SAVE–study – Sustained cord circulation And VEntilation" in Sweden. The results were analyzed and presented with descriptive statistical methods.

Results

In total, 96 midwives and 13 obstetricians responded to the survey. The most frequent response on the importance of timing of CC regardless of gestational age (GA) was "Very important" (81 %). Most midwives preferred a physiologically based time to CC in term neonates at normal vaginal (92.7 %) or instrumental (88.5 %) deliveries. The most common answer from obstetricians regarding the timing of CC in cesarean sections was 1–3 minutes (table 1). Need for resuscitation was listed, by both professions, as the most common reason to consider immediate CC (89 %), consistent with guidelines on neonatal resuscitation. Risk of hyperbilirubinemia in the neonate did not seem to affect the decision of CC, 82 % responded "no effect on decision" or "no opinion/don't know".

Conclusion

Even though midwives and obstetricians in our survey seem to be prone to practice delayed CC, there are still important barriers against the implementation of the optimal time to CC, especially in neonates in need of resuscitation. More research on intact cord resuscitation and its effects on neonatal outcomes is needed to overcome these barriers.

Table 1. Attitudes on timing of cord clamping in different clinical situations

		< 30 sec n (%)	30-60 sec n (%)	1-3 min n (%)	3-6 min n (%)	> 6 min n (%)	When pulsations ceases n (%)	At placental delivery n (%)
Midwives answers	At normal vaginal delivery	0 (0.0)	1 (1.0)	1 (1.0)	8 (8.3)	1 (1.0)	**58 (60.4)**	31 (32.3)
	At vaginal, instrumental delivery	0 (0.0)	1 (1.0)	1 (1.0)	11 (11.5)	1 (1.0)	**60 (62.5)**	25 (26.0)
	At vaginal delivery and need of resuscitation	8 (8.3)	**25 (26.0)**	19 (19.8)	12 (12.5)	4 (4.2)	**24 (25.0)**	5 (5.2)
Obstetrician answers	At elective c-section	0 (0.0)	2 (15.4)	**6 (46.2)**	1 (7.7)	0 (0.0)	5 (38.5)	0 (0.0)
	At emergency c-section on maternal indikation	0 (0.0)	4 (30.8)	**5 (38.5)**	0 (0.0)	0 (0.0)	4 (30.8)	0 (0.0)
	At emergency c-section on fetal indikation	2 (15.4)	**5 (38.5)**	3 (23.1)	0 (0.0)	0 (0.0)	3 (23.1)	0 (0.0)
	At emergency c-section and need of resuscitation	**5 (38.5)**	**5 (38.5)**	1 (7.7)	0 (0.0)	0 (0.0)	2 (15.4)	0 (0.0)

None declared

ID 444. INNATE HYPOTHERMIA AFTER BIRTH IS AN ADAPTATIVE PHYSIOLOGICAL MECHANISM CRUCIAL TO EXTRA-UTERINE TRANSITION TO TERM INFANTS: WHAT ABOUT PRETERM INFANTS?

Miss LARISSA BOARON[1], Mrs Fabia Pereira Martins–Celini[1], Mr Vitor Coca Sarri[1], Miss Marina Ferreira[1], Miss Tatiana Soares de Carvalho[1], Miss Amanda de Cássia Ansani Alves[1], Miss Cristina Calixto, Miss Cristina Helena Faleiros Ferreira[1], Mr Davi Casale Aragon[1], Mrs Walusa Assad Gonçalves–Ferri1[1]

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Background

Hypothermia at birth sometimes is not due the poor adaptation to extrauterine environment. The 1 to 2°C drop in body temperature after birth is essential for physiological mechanisms in full–term infants. However, there are no data on innate hypothermia in preterm infants at birth. Our study proposes the evaluation of innate hypothermia outcomes in preterm infants.

Methods

Retrospective cohort study (prospective data collected) from the Brazilian Neonatal Network. Infants < 1500 grams. Exclusion criteria: Malformation, temperature outside the study range. Four groups were created according to axillary temperature at NICU admission: Innate hypothermia group (IHS): 35°c to 36°c with hemodynamic stability; Innate hypothermia group (IHI): 35°c to 36°c with hemodynamic instability; Normothermia group (NS): 36 .5°C to 37.5°C with hemodynamic stability; Normothermia Group (NI): 36.5°C to 37.5°C with hemodynamic instability. The rewarming speed is unknown.

Results

8758 preterm infants were eligible for the study. 2918 newborns were excluded and 5840 were included. The IHS group corresponded to 43.2% (2525), IHI group 10.2% (597), NS group 38.9% (2276), and NI 4 7.5% (442).

Concerning perinatal characteristics, the groups IHS, INI, NS, and NI presented respectively:

• Gestational age at birth (weeks): 29.1 (SD 2.6); 27.9 (SD 2.4); 29.3 (SD 2.6); 27,8 (SD 2.4).

• Birth weight (grams): 1084 (SD 264.4); 991 (SD 270.9); 1116 (SD 260.4) and 987 (SD 269.3).

• First minut Apgar score: 5.9 (SD 2.4); 4.8 (SD 2.5);6.1 (SD 2.3); and 4.9 (SD 2.6).

• Fifth minute Apgar score: 8,2 (SD 1.5);7.4 (SD 2.0);8.2 (SD 1.5); and 7.4 (SD2.1).

• SNAPPE II: 20.6 (SD 18.5); 36.8 (SD 26.1);18.93 (SD 18.3); and 36.5 (SD 24.7).

Regarding the outcome variables, weren`t observed risk related to innate hypothermia.

Conclusion

Innate hypothermia (IH) was observed in 63% of the infants. IH is not associated with poor outcomes. Patients with hemodynamic instability presented poor outcomes, however, the IH occurrence did not increase the risks.

Innate hypothermia, is an essential physiological adaptive mechanism in full–term infants and our large study presented data that provided support ethical and demonstrated the feasibility to prospective studies on the cold stress benefits for preterm infants at birth.

Table 1: Outcomes related to innate hypothermia according to study groups

OUTCOMES	IHS (AdjRR/CI95%)*	IHI (AdjRR/ CI95%)*	NI (AdjRR/CI95%)*
Death	1,16 (1,00; 1,35)	2,36 (2,00; 2,80)	2,48 (2,06; 2,97)
Early death#	1,12 (0,89; 1,41)	3,81 (3,02; 4,80)	4,00 (3,13; 5,11)
PH	1,19 (0,96; 1,49)	2,86 (2,23; 3,64)	2,48 (1,88; 3,27)
IPVH	1,12 (0,87; 1,46)	2,55 (1,91; 3,42)	3,02 (2,23; 4,09)
Enterocolitis	1,07 (0,87; 1,31)	1,02 (0,74; 1,39)	1,08 (0,77; 1,52)

*Reference: NS=Normothermia and hemodynamic stability. Adjusted relative risk: Gestational age, Apgar at 5 minutes, and Early sepsis.
Legend: IHS: Innate Hypothermia and hemodynamic stability; IHI: Innate Hypothermia and hemodynamic instability; NI: Normothermia and hemodynamic stability; IPVH: Intra-peri-ventricular hemorrhage; PH: Pulmonary hemorrhage. #Early death: death less than 7 days of life.

None declared

ID 278. Compliance with a protocol to prevent hypothermia highlights the benefits of combining measures as described in the Neonatal Life Support guidelines

Doctor Anna Amoruso[1], Doctor Stéphanie–Christina Dimitropoulou[1], Doctor Andrew Carlin[2], Doctor Karin Mathé[1], Doctor Anne–Britt Johansson[1], Professor Aline Vuckovic[1]

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Introduction:

Maintaining thermal balance is essential to improve the prognosis of preterm infants. We aimed to evaluate whether a protocol targeting normothermia in the delivery room would impact neonatal adaptation at admission to the neonatal intensive care unit (NICU) and outcomes during hospital stay in very preterm (VPT) and/or very low birth weight (VLWB) infants.

Methods:

A protocol to prevent hypothermia was based on combined interventions in the delivery room (polypropylene bag, heated and humidified T–piece circuit, heated incubator). After training of NICU and obstetric teams, the protocol was prospectively applied in all expected VPT and/or VLBW infants born in a single center between October 2020 and September 2021. Compliance with the protocol was assessed by a checklist for task completion. Data from historical controls born between January and December 2019 were retrospectively collected. Body temperature and neonatal parameters at NICU admission as well as death at NICU discharge were compared in pre–intervention and post–intervention groups and in compliance and non–compliance groups.

Results:

The pre–intervention (n=51) and post–intervention (n=34) groups showed similar demographics. The rate of normothermia at NICU admission was similar in the pre–intervention and post–intervention groups (P=0.38). The median temperature at NICU admission did not differ either (P=0.41). No case of severe hypothermia (<35°C) was found. All other outcomes were not different between intervention groups. Compliance increased from 25.0% during the 4 first months of protocol application to 66.7% during the last 4 months of study (P=0.04). At NICU admission, non–compliance to the protocol (n=16/34; 47.0%) was significantly associated with lower body temperature, lower capillary pH value, and lower glycemia (see table). This was despite higher median birth weight in the non–compliance group (P=0.014).

Conclusion:

In this pre–/post–intervention study, body temperature at admission and neonatal outcomes did not improve after implementation of a protocol targeting normothermia in VPT and/or VLBW infants at NICU admission. Low compliance to the protocol could explain, at least in part, unimproved outcomes at admission.

	Compliance group	Non-compliance group	
Variables	**(*n* = 18)**	**(*n* = 16)**	***P***
Demographic			
Male gender	8 (44.4 %)	8 (50 %)	>.9
Multiple pregnancy	7 (38.8 %)	6 (37.5 %)	>.9
Gestation (weeks)	27.8 (25.9-30.5)	30.5 (29.4-31.5)	.06
Birthweight (g)	1015 (740-1310)	1435 (1023-1616)	.01
Intrauterine growth restriction	4 (22 %)	0 (0 %)	.1
Placenta previa/ abruption			
Gravidic hypertension	1 (5.5 %)	3 (18.75 %)	.3
Proven chorioamniotitis	1 (5.5 %)	0 (0 %)	> .9
Antenatal steroids, complete maturation	14 (7.78 %)	8 (50 %)	0.15
C-section	13 (72.2 %)	9 (56.2 %)	0.47
Extra-uterine life transition			
FiO_2 max, %	40 (30-70)	50 (30-95)	.92
Intubation	10 (55.5 %)	4 (25 %)	.09
Chest compressions	1 (5.5 %)	1 (6.2 %)	>.9
APGAR 5 min	7 (6-9)	(6-9)	.49
Air room temperature, °C	25.9 (25.0–26.4)	–	–
Neonatal admission outcomes			
Admission temperature	36.8 (36.3-37.2)	36.3 (35.9-36.6)	.02
pH capillary	7.32 (7.28-7.40)	7.26 (7.25-7.34)	.006
Glycemia (capillary) mg/dL	82.0 (68.7-105.5)	57.5 (35.0-73.5)	.005
Hypoglycemia	1 (5.56)	5 (31,25)	.07

Data expressed as median (interquartile range) or n (%). Mann-Whitney U test or the Fischer exact test upon applicability.

Study supported by a grant of the Belgian Kids finds for Pediatric Research

ID 211. EXTRA-UTERINE PLACENTAL TRANSFUSION AS AN ALTERNATIVE TO DELAYED CORD CLAMPING FOR INFANTS DELIVERED BY CAESAREAN SECTION: AN INTERVENTION DEVELOPMENT AND PILOT STUDY

Mrs Elisabeth Saether[1], Dr Ola Andersson[3,4], Dr Solveig Bjellmo[1,6], PhD Tor Aage Myklebust[10], Professor Stine Bernitz[8,9], Dr Solhild Stridsklev[6,7], Dr Beate Horsberg Eriksen[1,5]

[1]Møre and Romsdal Hospital Trust, Department of Obstetrics and Gynaecology, Aalesund, Norway, [2]Møre and Romsdal Hospital Trust, Department of Pediatrics, Aalesund, Norway, [3]Lund University, Department of Clinical Sciences Lund, Pediatrics/neonatology, Lund, Sweden, [4]Skåne University Hospital, Department of Neonatology, Malmö/Lund, Sweden, [5]Norwegian University of Science and Technology, Klinforsk, Trondheim, Norway, [6]Norwegian University of Science and Technology, Faculty of Medicine and Health Sciences, Trondheim, Norway, [7]St.Olav's Hospital, Department of Obstetrics and Gynaecology, Trondheim, Norway, [8]Oslo Metropolitan University, Faculty of Health Sciences, Masters program in Midwifery, Oslo, Norway, [9]Østfold Hospital Trust, Department of Obstetrics and Gynaecology, Grålum, Norway, [10]Møre and Romsdal Hospital Trust , Department of Research and Innovation, Aalesund, Norge

Background: Keeping the umbilical cord intact the first minutes after birth has many proven benefits for both term and preterm infants. However, due to lack of mobile resuscitation equipment or concern for excessive maternal blood loss, this may be difficult to achieve in caesarean delivery. The objective of this study was to develop, pilot–test and refine extra–uterine placental transfusion, intact–cord stabilisation and physiology–based cord clamping in caesarean sections, independent of mobile resuscitation equipment and birth settings.

Methods: The intervention development process covered: A) delivering the placenta without cord clamping, B) intact–cord stabilisation and C) physiology–based cord clamping. Intervention drafts for different scenarios were tested through facilitated and video–taped in–situ simulation sessions, and subsequently adjusted and refined through multiple feed–back rounds. All involved personnel was trained prior to pilot testing. Women having a caesarean section in regional anaesthesia, expecting a healthy term or near–term singleton infant were included in the pilot–study after written consent. The primary outcome (feasibility) was proportion of completed interventions. To assess safety, maternal peroperative blood loss, infant 5–minute Apgar score and infant rectal temperature were compared to pre–defined accept criteria. Infant heartrate was monitored by dry–electrode ECG from 10 seconds after delivery until the umbilical cord was clamped and cut. Any respiratory support was registered. Early skin–to–skin contact between mother and infant was attempted.

Preliminary results: 28 mother–infant–dyads were included in the pilot study. Gestational age ranged from 37 to 42 weeks. The intervention was successfully completed in 100 % of the cases, of which 36% were planned caesareans. Median infant heart rates at one and five minutes were 156 (88–213) and 170 (124–205) beats per minute respectively. Six infants had intact–cord respiratory support. One mother had blood loss > 1000 ml, one infant had 5–minute Apgar score < 7 and two infants had rectal temperatures below 36.5°C during the first 30–40 minutes after birth.

Conclusion: Extra–uterine placental transfusion to facilitate intact–cord stabilisation and physiology–based cord clamping for infants delivered by caesarean section was feasible and safe according to predefined accept criteria. Further testing of this complex intervention in larger, comparative studies is warranted.

"None declared"

ID 685. Effects of Prolonged Intact Cord Resuscitation in an Asphyxiated Preterm Ovine Model

Doctor Mausma Bawa[2], Mrs Sylvia Gugino[1], Mr Justin Helman[1], Ms Nicole Bradley[1], Doctor Arun Prasath[1], Doctor Clariss Blanco[1], Doctor Mary Divya Kasu[1], Doctor Hamza Abbasi[1], Doctor Munmun Rawat[1], **Doctor Praveen Chandrasekharan**[1]
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The timing of physiological or delayed cord clamping continues to be a subject of ongoing debate. Is it possible to keep the umbilical cord intact and functional in a preterm neonate for a longer duration, especially when they are asphyxiated?

Objective: In this pilot study, our objective was to determine if placental flows from both umbilical vein and artery could be kept open for 2 hours.

Methods: Using a surfactant deficient preterm model (125–126d preterm lamb Ξ ⩽ 28wk gestational age), asphyxia was induced by umbilical cord occlusion until the heart rate (HR) was ⩽ 90bpm. Post asphyxia, in the control group (Early cord clamping and ventilation – ECCV): umbilical cord was clamped immediately and positive pressure ventilation was initiated. In the experimental group, (Prolonged delayed cord clamping and ventilation –PDCCV) ventilation was initiated and continued with extended cord clamping for 2 hours. Oxygen was titrated according to NRP saturation targets. Preductal oxygen saturation, oxygen exposure, blood gas and pulmonary/systemic hemodynamics were recorded for the 2 hours post–resuscitation. Surfactant was administered after 10 minutes of ventilation in both groups. The ewe was in general anesthesia with an intact placenta and for the entirety of two hours.

Results: A total of 11 lambs (6 from PDCCV and 5 from ECCV) were included. All six lambs in the PDCCV group were ventilated with an intact umbilical cord for 2 hours (fig 1). Preductal saturation (fig 2a), supplemental oxygen (fig 2b), arterial oxygenation (fig 2c), and pulmonary blood flow (fig 3a) significantly differed between the groups. Arterial carbon dioxide and carotid blood flow (fig 3b) were lower in PDCCV than in ECCV.

Conclusion: Our study shows that umbilical cord can be kept intact for 2 hours in an asphyxiated preterm model. Prolonged DCCV led to better gas exchange and hemodynamics. The factors such as asphyxia, PPV, and arterial oxygen concentration did not lead to functional umbilical cord occlusion in our study. Future translational/clinical studies are needed to understand the reason for physiological umbilical cord closure

Fig 1 **Two hours of ventilation with an intact umbilical cord**

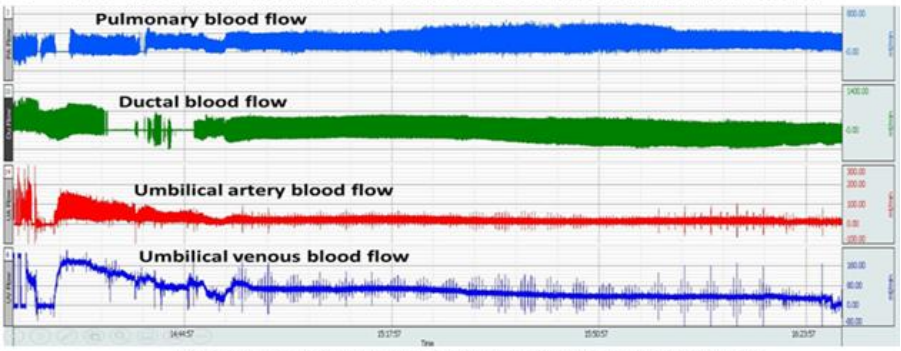
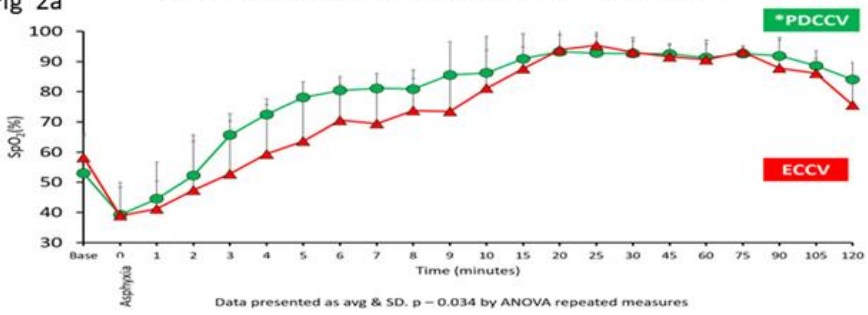


Fig 2a

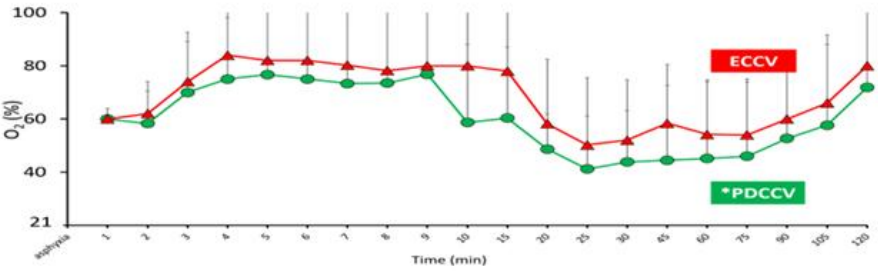
Peripheral arterial saturations were higher with PDCCV



Data presented as avg & SD. p – 0.034 by ANOVA repeated measures

Fig 2b

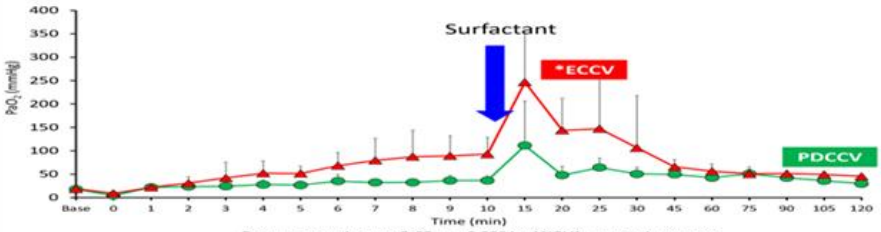
Oxygen exposure was significantly lower with PDCCV



Data presented as avg & SD. p – 0.022 by ANOVA repeated measures

Fig 2c

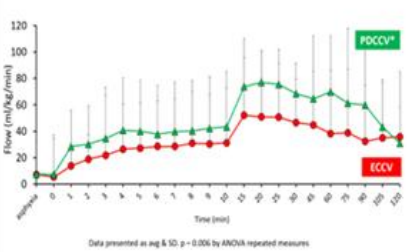
Arterial Oxygenation was higher in ECCV



Data presented as avg & SD. p – 0.006 by ANOVA repeated measures

Fig 3a

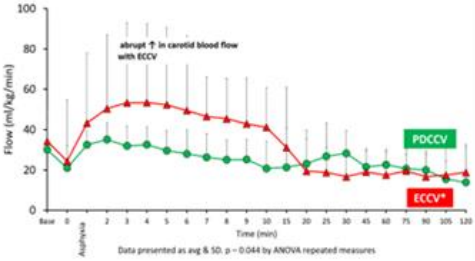
Pulmonary blood flow was significantly higher with PDCCV



Data presented as avg & SD. p – 0.006 by ANOVA repeated measures

Fig 3b

Carotid blood flow was significantly higher with ECCV



Data presented as avg & SD. p – 0.044 by ANOVA repeated measures

Fig 1:umbilical artery & venous flows, intact cord for 2 hours

Fig 2a:peripheral arterial saturation

Fig 2b:oxygen exposure

Fig 2c:arterial oxygenation

Fig 3a:peak pulmonary blood

Fig 3b:peak carotid blood flow

Fig 1:umbilical artery & venous flows, intact cord for 2 hours

Fig 2a:peripheral arterial saturation

Fig 2b:oxygen exposure

Fig 2c:arterial oxygenation

Fig 3a:peak pulmonary blood

Fig 3b:peak carotid blood flow

None declared

ID 78. Reference ranges for cerebral oxygen saturation in stable neonates during immediate transition after birth – Differences between devices

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Background: Reliable, feasible and non– invasive brain monitoring in neonates during immediate transition after birth is of growing interest. There are different near–infrared spectroscopy(NIRS) devices measuring cerebral oxygen saturation using different algorithms. Immediate postnatal transition is accompanied by major changes in cerebral oxygenation and therefore it is crucial to define reference ranges for each device.

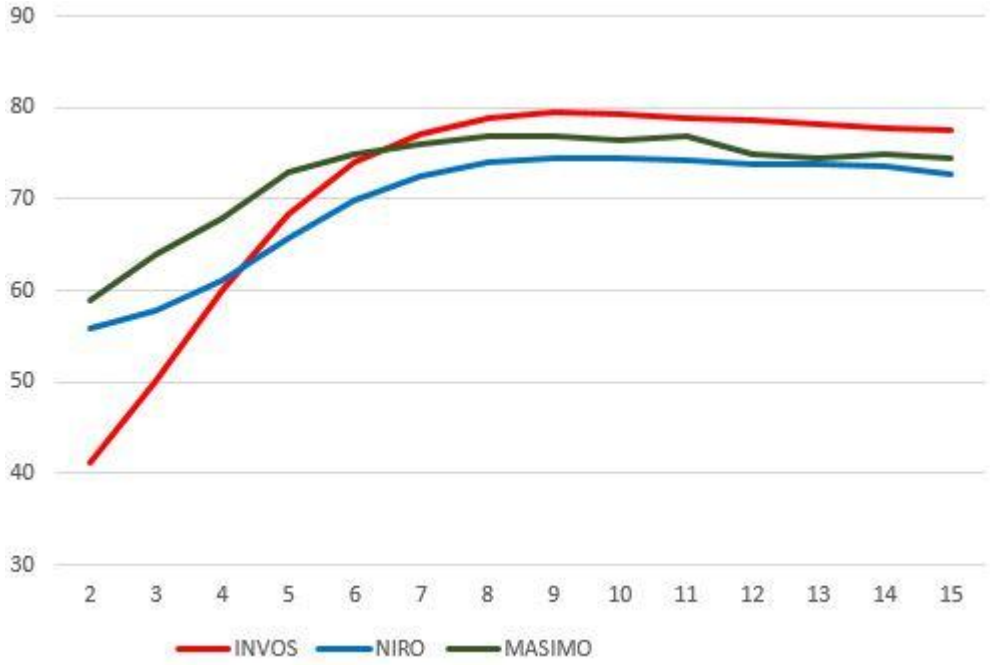
Objective: The aim of the present prospective observational study was to define reference ranges for cerebral oxygen saturation(rSO2) during immediate transition after birth measured with Masimo (Root,O3 regional oxymetry,Masimo, USA) in stable preterm and term neonates without any medical support and compare them with already published reference ranges from other NIRS devices.

Methods: The rSO2 was continuously measured with Masimo in neonates during the first 15 minutes after birth. The neonatal sensor was placed on the left frontoparietal side of the head and was fixed with a cap. Data of neonates after caesarean delivery without any medical support were included into the final analysis. Median values and 10th and 90th centile were calculated for each minute. These rSO2 values were

compared to already published reference ranges of INVOS 5100C (Medtronic Corp, Troy, Michigan: crSO2) and NIRO 200NX (Hamamatsu, Japan: cTOI).

Results: A total of 192 neonates were enrolled: 27 preterm and 165 term neonates after caesarean delivery. Due to respiratory support, 13 preterm and 57 term neonates were excluded. The data of 122 neonates (14 preterm/108 term) were analysed. rSO2 values measured with Masimo and the published cerebral oxygen saturation values of the INVOS 5100C and NIRO 200NX in every minute during the first 15 minutes after birth are presented in table 1. Compared to the established reference ranges, rSO2 values measured with Masimo have a similar course when compared to cTOI values measured with NIRO 200NX, whereas crSO2 values measured with INVOS 5100C are initially lower and increase during the first minutes after birth.

Conclusion: The present observational study adds reference ranges of rSO2 measured with Masimo in stable neonates immediately after birth. As there are differences regarding reference ranges of various NIRS devices, it is important to consider this for future clinical use.



None declared