Hypothermia in preterm infants in the first 72 hours after NICU admission: incidence and impact of clinical procedures

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Introduction

Although hypothermia (WHO, temperature<36.5°C) at admission to the Neonatal Intensive Care Unit (NICU) is associated with higher morbidity and mortality, little is known about hypothermia during the first 72h after admission.

Our aim was to investigate the incidence of hypothermia in preterm infants during the first 72h after NICU admission and to evaluate if clinical procedures are associated with hypothermia.

Methods

- Single-center retrospective cohort study (july 2016-august 2017) including premature infants <30 weeks gestational age (n=111)
- The following factors were analysed:
- Incidence of hypothermia at admission: temperature measured rectally
 - Incidence of hypothermia during first 72h: temperatures registered at 2h intervals using a skin probe device
 - Temperature differences between control state and during procedure ($\Delta T_{\text{procedure}}$) and between control state and post-procedure ($\Delta T_{\text{post-procedure}}$) of the following procedures: less invasive surfactant administration (LISA), intubation, insertion of umbilical or central lines and ultrasound (heart or cerebrum).

Results

Figure 1: At admission, Time=0, the mean temperature was 36.6 ± 0.93 °C (range 33.4-39.2 °C). At Time=0, n=42 (38%) of the preterm infants were hypothermic. In the first six hours this decreased to 7%. Between 2-72 hours the mean percentage of hypothermia was 8% (range 4-18%). T=temperature in degrees Celsius.

	LISA (n=58)	Intubation (n=26)	Inserting lines (n=61)	Ultrasound (n=230)
T control, mean $\pm$ SD	36.8 $\pm$ 0.7	36.9 $\pm$ 0.5	37.0 $\pm$ 0.8	37.1 $\pm$ 0.4
T procedure, mean $\pm$ SD	36.8 $\pm$ 0.7	36.4 $\pm$ 0.9	36.8 $\pm$ 0.7	36.9 $\pm$ 0.4
T post-procedure, mean $\pm$ SD	37.0 $\pm$ 0.7	36.4 $\pm$ 0.8	36.7 $\pm$ 0.6	36.8 $\pm$ 0.4
$\Delta T_{\text{procedure}}$ mean $\pm$ SD (95% CI)	-0.03 $\pm$ 0.7 (-0.30-0.24)	0.58 $\pm$ 0.9 (0.09-1.07)	0.21 $\pm$ 0.8 (-0.07-0.48)	0.11 $\pm$ 0.4 (0.06-0.17)
P-value	0.816	0.025*	0.135	<0.001*
$\Delta T_{\text{post-procedure}}$ mean $\pm$ SD (95% CI)	-0.14 $\pm$ 0.7 (-0.38-0.10)	0.46 $\pm$ 1.2 (-0.13-1.06)	0.29 $\pm$ 0.9 (0.01-0.58)	0.22 $\pm$ 0.5 (0.15-0.29)
P-value	0.251	0.116	0.044*	<0.001*

Legend Table 1: T control (temperature 2h before the procedure), T procedure (temperature at the moment of the procedure), T post-procedure (temperature 2h after the procedure), $\Delta T_{\text{procedure}}$ (difference in temperature between control state and procedure), $\Delta T_{\text{post-procedure}}$ (difference in temperature between control state and post-procedure). P-value: derived from Paired Samples T test. *Significant at p<0.05 level.

Table 1: Intubation, line-insertion and ultrasound were associated with a significant decrease in temperature, with intubation having the largest effect.

Discussion and conclusion

This study shows that hypothermia during the first days of NICU admission is common and several clinical procedures are associated with a decrease in temperature. LISA was not related with hypothermia, probably because of shorter procedure duration. This study underlines the importance of developing strategies to prevent hypothermia during the first days after NICU admission, particularly during procedures.