Letter to the Editor

In vitro effect of exothermic mattresses on temperature in the delivery room

Sir,

To minimize heat loss after birth the International Liaison Committee on Resuscitation (ILCOR) recommends that infants <28 weeks' are wrapped in polyethylene and placed under radiant heat in the delivery room (DR). Exothermic mattresses may also be used in the DR to prevent hypothermia. These sodium acetate gel-filled mattresses crystallize when activated to produce heat. The manufacturers of TransWarmer® mattress (Cooper Surgical Inc.) state that when activated at 24 °C, the mattress will reach a peak temperature of 40 °C in less than 60 s, however an in vitro study found that it took 3 min from activation to peak target temperature (38–42 °C).2

In a prospective cohort of preterm infants who were placed in polyethylene bags under radiant heat after birth at our hospital, hyperthermia occurred more frequently in infants also placed on exothermic mattresses in the DR compared to those not placed on mattresses.3 Unexpectedly, we also found that more

![Graph](image_url)

Fig. 1. Results: temperature readings of 4 bags of IV fluid at 30-s intervals over 10 min.

infants who were placed on mattresses were hypothermic on admission. We suspected that a short interval between mattress activation and delivery was the cause of hypothermia in these infants. We hypothesized that if a mattress is activated less than 3 min before use, the mattress may be endothermic and absorb heat from the infant.

To test this hypothesis we created an in vitro model using four 1-litre bags of IV fluid. A digital thermometer was inserted through the access port of each bag and the bags were pre-warmed to 37.2 °C. The bags were then placed simultaneously on a resuscitation table under pre-warmed radiant heaters. The first bag was placed directly on the table without a TransWarmer® mattress; the second on a non-activated mattress; the third on a mattress activated 1 min beforehand and the fourth on a mattress activated 3 min prior. The temperature of each bag was recorded at 30-s intervals for 10 min. The DR temperature was 25 °C.

Results are shown in Fig. 1.

The major limitation of our study is that we used a bag of fluid as a model for a preterm infant. Clear plastic bags of fluid absorb radiant heat but do not lose evaporative heat like wet newborn infants.
as demonstrated by the increase in temperature of the bag with no mattress. The temperature of the bag placed on the mattress activated 1 min before did not fall as speculated; it increased in a similar fashion to the bag placed on the mattress activated 3 min before. While the results of our study do not support our hypothesis, it does not preclude this effect in preterm infants, who are likely at higher risk of hypothermia than the model.

The non-activated mattress appeared to steadily absorb heat from its surroundings causing the temperature of the bag to fall despite radiant heat. Placing an infant on a non-activated mattress could thus result in hypothermia. In practice, when using exothermic mattresses great care should be taken to ensure that they are activated before use and are not unactivated beneath the infant during stabilization in the DR or transport.

1. Conflict of interest statement

No conflicts of interest to declare.

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References


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