The relationship between monitoring of neonates' sweating in relation to activity and interaction with mothers

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Introduction

Just after birth, newborn babies' ability to control body temperature is not fully developed. Therefore, postnatal temperature management is important. Temperature is controlled by calorigenic muscle thermogenesis and sweating. Sweat is produced through exercising, high ambient temperature, and psychological state. It is said that newborn babies do not immediately sweat normally, but there are few studies that have investigated the sweating of neonates in detail. The objective of this study was to clarify the quantity of early newborn babies' sweat, and the relationship of sweating to activities such as sleeping, crying, and breastfeeding after birth.

Method

Subjects

The study involved 25 newborns, vaginally delivered at full term, at a Japanese Hospital between September 2010 and September 2012.

Data collection

Data was collected using a data logger (18×30×10mm, 3.0g) which was put in the pockets of newborns' underwear and measured the amount of sweat of the newborn babies. To avoid damage to the newborn babies' skin, the sensor was not attached directly to the skin. (Fig. 1, 2, and 3)
Measurements were taken over two days.
The data logger was changed when underwear was changed on Day 1, and during bathing on Day 2.
Newborns' behavior during the time (e.g. crying and breastfeeding) was recorded on report forms.

Data Analysis

The relative humidity data were recorded every ten seconds and sent to a PC. Data on relative humidity recorded were converted to absolute humidity using the analysis software, *Origin 8*. The rate of sweating (expressed as mg/cm^2/min) was recorded every 10 seconds by the data logger for each newborn. Neonates were also observed to investigate the relationship between activity (e.g. crying, breastfeeding and being held by mothers) and the rate of sweating.

Fig. 1. **Data logger**

Fig. 2. **Data logger components**

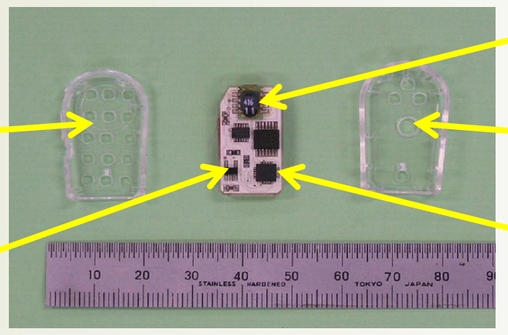


Fig. 3. **Newborns' underwear**

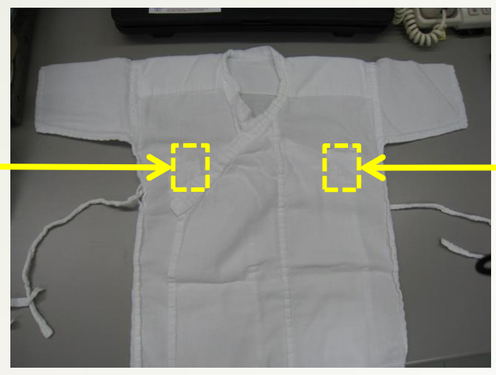
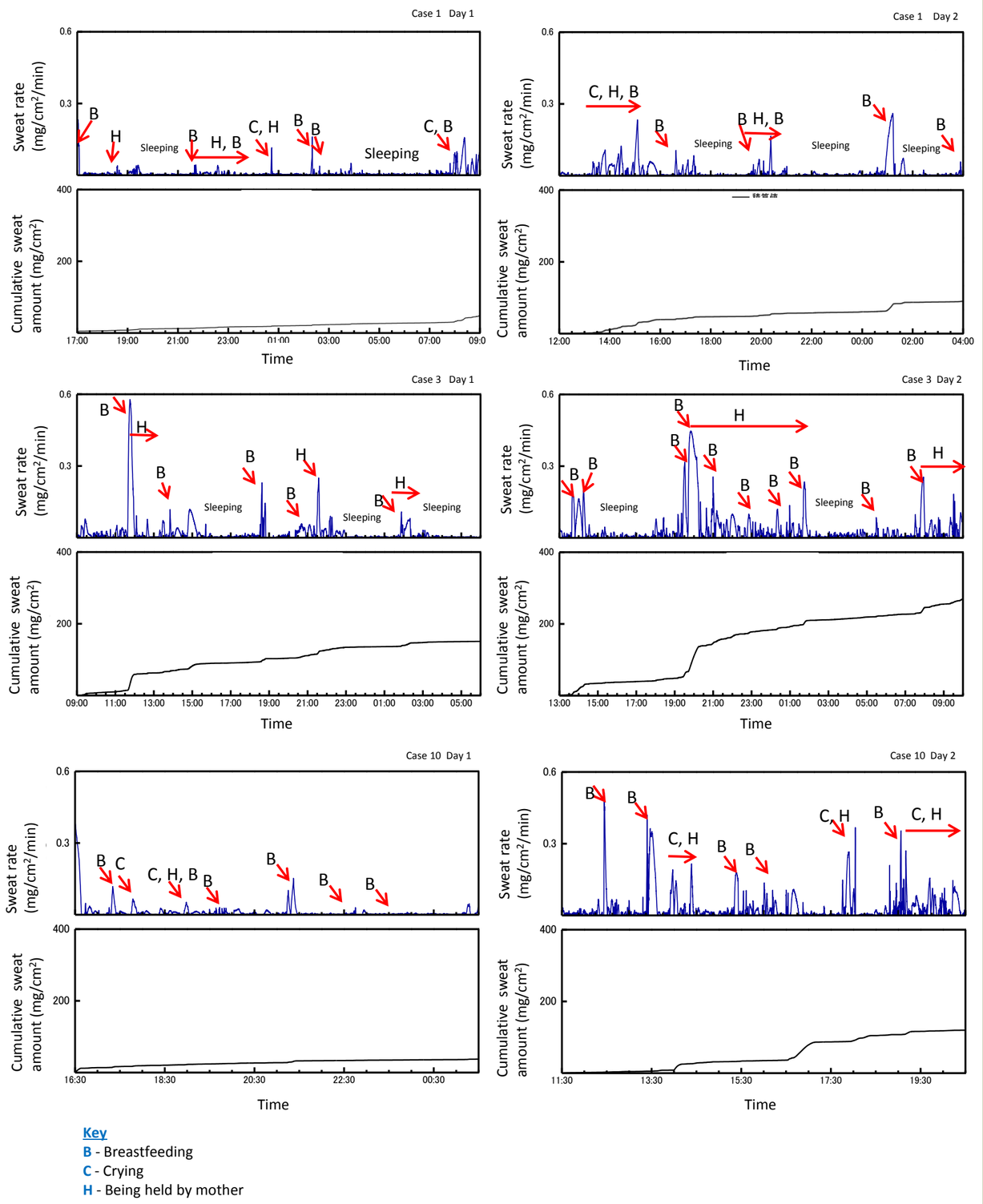


Fig. 4. **Change in cumulative amount of sweat, and relationship between sweat rate and activity of mothers and newborn babies**

3 cases



Results

From a sample of 15 newborns, the average amount of sweat was 0.24±0.13 mg/cm^2/min. Newborns' sweat gradually increased from birth for the first 48 hours. Spikes in the amount of sweat were observed when the babies cried, were held, and during breastfeeding. During sleep, the amount of sweat remained small and relatively constant. Newborn babies showed evidence of sweating from an early stage after birth, and the quantity of sweat progressively increased thereafter.

Discussion

It is a widely held belief that neonates do not sweat immediately after birth, but sweating related to activity was observed. All of the neonates in this study were full term, and normally delivered, which may be a factor. Premature babies or those delivered by caesarean section were not included in this study. The amount of sweat in the 24-48 hour post-birth period was significantly higher than in the first 24-hour period. It can be inferred from observation of the spikes in the amount of sweat that activity is taking place.

Conclusion

Full-term, normally delivered babies exhibited sweating immediately following birth which was related to activity. The results suggest the potential for the development of a tool to better understand interactive behaviour between mother and child.

This study was approved by the Ethics Committee of Kanazawa University (No:271).