

## **Over-exposed? Infra-red thermography and the assessment of spinal anaesthesia.**

Editor -

We enjoyed discussing the paper by Murphy et al. entitled 'Infrared thermographic assessment of spinal anaesthesia-related cutaneous temperature changes during caesarean section' at our online journal club.<sup>1</sup> We found the methods and results interesting and thought-provoking, though perhaps not for the reasons intended by the authors.

Murphy et al. sought to investigate the effect of spinal anaesthesia on lower body skin temperature amongst women undergoing caesarean section. Their method employed involved using an infrared thermography camera to assess the temperature of the patient's patella, buttock, iliac crests, chest at the level of the xiphisternum and axilla before and after spinal anaesthesia, requiring the whole lateral aspect of the patient to be exposed before and during the onset of the block. Whilst we appreciate the precision of these simultaneous measurements, we wonder about the potential unintended effects of this seemingly significant amount of physical exposure, both in terms of the study itself and the clinical applicability of its findings.

Firstly, we note that nearly 30% of potential study participants declined to take part, a seemingly high proportion for an observational study of such short duration. Caesarean section is known to be associated with a sense of fear and lack of control in many patients,<sup>2</sup> and we wonder the requirement for such extensive exposure was a disincentive to participation which would limit the acceptability of this technique in practice.

Secondly, we question how the degree of skin exposure required to obtain the measurements may have affected the study findings. Radiation is responsible for the greatest proportion of peri-operative heat loss,<sup>3</sup> and as Murphy et al show, under a (successful) spinal block, the emission of infra-red radiation from the lower limbs increases.<sup>1</sup> We suggest that the skin exposure required in this study may have contributed substantially to heat loss, thereby affecting the results.

Furthermore, we note that the one patient whose spinal block failed experienced a reduction in the temperature of the skin overlying the hallux – suggesting heat loss to the surrounding operating theatre environment (and vasoconstriction to minimise its effects).<sup>1</sup>

Murphy et al note in their introduction that 'clinical assessment methods [of the adequacy of spinal anaesthesia] are indirect and subjective'.<sup>1</sup> Whilst their data is certainly objective, it remains indirect with respect to the aims of anaesthesia, i.e., to prevent pain. Though Murphy et al have quantified the increase in the temperature of the lower limbs associated with effective spinal anaesthesia, we note that they were unable to relate the degree of warming to the level of the spinal block. This may be a topic for further study, but at this point it seems difficult to know how best to use these findings in practice. They do, however, starkly illustrate the potential for heat loss from the lower limbs during caesarean section, and this may guide us more towards warming different areas of the patients body. Upper body warming during caesarean section is supported by existing evidence,<sup>4</sup> but should we also be using reflective blankets on the lower limbs in order to retain the infrared heat that these patients are clearly losing? Murphy et al may have identified a way to improve patient temperature management with simple and cheap measures which we feel may be worthy of further investigation.

## References

1. Murphy B, McCaul CL, O'Flaherty D. Infrared thermographic assessment of spinal anaesthesia-related cutaneous temperature changes during caesarean section. *International Journal of Obstetric Anaesthesia*. 2022; 49: 103245
2. Colomar M, Opiyo N, Kingdon C, et al. (2021) Do women prefer caesarean sections? A qualitative evidence synthesis of their views and experiences. *PLoS ONE*. 2021; 16: e0251072.
3. Sessler D, Todd MM. Perioperative heat balance. *Anesthesiology*. 2000; 92: 578.
4. Sultan P, Habib AS, Cho Y, Carvalho B. The Effect of patient warming during Caesarean delivery on maternal and neonatal outcomes: a meta-analysis. *British Journal of Anaesthesia*. 2015; 115: 500-510.