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References

1. Chambers DJ, Bhatia K. Horner's syndrome following obstetric neuraxial blockade - a systematic review of the literature. *Int J Obstet Anesth* 2018;**35**:75–87.
2. Marois J, Engen D. Horner's syndrome during obstetrical epidural analgesia: a case report. *Can J Anaesth* 2014;**61**:S58.
3. Paw HG. Horner's syndrome following low-dose epidural infusion for labour: a cautionary tale. *Eur J Anaesthesiol* 1998;**15**:110–1.
4. Holzman RS. Unilateral Horner's syndrome and brachial plexus anesthesia during lumbar epidural blockade. *J Clin Anesth* 2002;**14**:464–6.

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In reply



We would like to thank Bouvet and Chassard for their interest in our review.^{1,2} They raise an important point which is relevant to obstetric anaesthetists in their day-to-day practice. As Bouvet and Chassard point out, high neuraxial blockade has long been considered to be dangerous, especially at the high thoracic or low cervical vertebral levels due to the associated adverse cardiovascular and respiratory consequences. As the onset of Horner's syndrome (HS) results from interruption of oculo-sympathetic fibres which are said to exist between T1 and C8, one would expect concurrent hypotension and respiratory difficulty.

In our opinion one of the most interesting findings of the review is the lack of adverse features and the low level of cutaneous sensory blockade associated with the onset of HS during obstetric neuraxial blockade. The mean level of sensory blockade reported was only T4 and the level was as low as T12. In most cases, HS occurs despite the cutaneous level of blockade being significantly below the lower limit at which the oculo-sympathetic fibres emerge from the sympathetic chain. It is not completely clear to us why this large discrepancy between the level of cutaneous blockade and HS exists – we speculate that possibly the oculo-sympathetic fibres are more susceptible to the effects of local anaesthetic during pregnancy. Only 13% of cases of HS experienced

systemic hypotension and only one a consequent fetal bradycardia, with all cases managed successfully using intravenous fluid and vasopressors. Finally, there were no reports of airway or ventilatory compromise associated with HS.

In answer to the practical question regarding the feasibility of an epidural top-up in the management of a parturient undergoing a category 1 caesarean section, our view remains that the presence of HS alone should not influence anaesthetic management and that these women should not be denied neuraxial anaesthesia. Many anaesthetists may not note the presence of HS after an epidural top-up in theatre. The presence of HS alone does not appear to be strongly associated with systemic hypotension or with adverse maternal or fetal outcomes. On the other hand, in our opinion, if HS co-exists with systemic hypotension, upper limb weakness or cranial nerve palsy, one should carefully consider the risks of proceeding to an epidural top-up compared to the risks of alternative anaesthetic management.

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References

1. Bouvet L, Chassard D. Which type of anaesthetic technique should be used for caesarean section in the case of Horner's syndrome in a woman receiving epidural labor analgesia? *Int J Obstet Anesth* 2019;**39**:148–9.
2. Chambers DJ, Bhatia K. Horner's syndrome following obstetric neuraxial blockade – a systematic review of the literature. *Int J Obstet Anesth* 2018;**35**:75–87.

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In vitro intravenous fluid co-load rates with and without an intravenous fluid warming device



Delivery of an intravenous fluid co-load decreases hypotension after spinal anaesthesia.¹ Fluid warming is recommended to reduce the incidence of hypothermia after caesarean delivery.^{2,3} However, the increased tubing length and resistance of an in-line fluid warming device may reduce the speed of fluid administration and