accurate to draw this conclusion after also comparing the maximum sensory level achieved and the time required to do so, between Groups A and B, and C and D. This is because the maximum sensory level may be achieved earlier with EVE, even though the eventual sensory levels with and without EVE could be the same.

My second observation is regarding the similarities that the authors draw between their findings and those of Yamazaki and colleagues [2]. I would like to point out that in the trial by Yamazaki and colleagues, the block was performed with patients in the lateral position and the epidural volume was injected 20 min after the intrathecal injection. The intrathecal spread and hence the sensory level after a subarachnoid block would be different for a patient in sitting position vs. one in lateral position. Consequently, the effect of EVE can also be expected to be different between varying patient position. More importantly, EVE has been shown to be a time-dependent phenomenon. When performed 20 min after intrathecal injection [3], it fails to augment the spinal block and even decreases the duration of spinal anaesthesia when performed after two segment regression of spinal block [4]. Hence the cause of failure of EVE in block augmentation with the trial of Yamazaki and colleagues cannot be compared to the present study.

Lastly, no observation is made on the method of confirming correct placement of the epidural catheter. Whether using clinical or radiological method, the confirmation of correct placement of epidural catheter for EVE-based trials is essential. With a non-functioning catheter the 'apparent' application of EVE would in fact be absent. This would definitely result in erroneous interpretation of the observations.

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Reply

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EDITOR:
We thank Dr Tyagi for her interest in our study and her comments [1]. In our study, after EVE, the segmental spread of spinal anaesthesia either with hyperbaric or plain bupivacaine and times to reach maximal dermatomal level were investigated. We found a significant difference in sensory block level between Groups A and C and it was mainly thought to be related to the baricity of the local anaesthetic. These findings were consistent with Yamazaki and colleagues' study, investigating the effect of EVE on spinal anaesthesia with hyperbaric or plain tetracaine in non-obstetric patients [2]. Similarly, time to reach T_4 was significantly shorter in the plain bupivacaine groups than in the hyperbaric bupivacaine groups. However, there was no significant difference between Groups A and B, and between Groups C and D. That is, although baricity did affect the time to reach the maximal dermatomal level, the addition of EVE to spinal anaesthesia did not offer any advantage in the enhancement of segmental spread of spinal block regardless of plain or hyperbaric bupivacaine use. Finally, we found a faster onset time and higher sensory block level in Groups C and D than in Groups A and B, and we believe that these effects were mainly related to the baricity of local anaesthetic, but not with the addition of EVE to spinal anaesthesia.

It has been speculated by Dr Tyagi that the effect of EVE could be expected to be different between

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varying patient positions. In fact, studies have found little correlation with adult patient height, weight or body mass index and level of sensory block after subarachnoid anaesthesia with iso- or hyperbaric local anaesthetic solutions [3]. Furthermore, it has also been demonstrated that the spread of sensory blockade after intrathecal injection in the lateral position is less likely to be influenced by baricity than when injected, with patients in the sitting position [4].

As the ideal time to epidural volume injection is yet to be found to provide an extension in spinal anaesthesia, choice of ideal time to epidural injection to achieve the desired clinical effect might be important, as stated in the Discussion section. Some authors injected epidural volume just after subarachnoid injection, and some after 5, 10 and 20 min [5–7]. In our study, epidural saline was injected 5 min after spinal block and this was consistent with the previous studies investigating the time effect of EVE [5–7].

Although ultrasonographic or radiographic techniques have been proposed to identify epidural space, it has been reported that the most popular method for detecting the epidural space is the loss-of-resistance technique [8]. In our study, as pointed out in the Method section, in identification of epidural space, loss-of-resistance technique (LOR) was used with less than 0.5 mL of saline. In our opinion, confirmation of the correct placement of epidural catheter for Caesarean section by other methods (radiographic techniques) is not practical and is too time-consuming. As far as we know, alternative methods for detecting the epidural space are not routinely used.

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