

No rent is small for migration of epidural catheter into sub-arachnoid space

Sir,

Epidural analgesia forms the mainstay of pain relief in abdominal surgeries.^[1,2] Epidural needle placement and catheter insertion are preferably performed under local anaesthesia, before induction of general anaesthesia.^[3] Dural puncture by the epidural needle is a known complication, and the reported incidence of accidental dural puncture varies from 0.4% to as high as 6%.^[4] Dural puncture precludes the catheter placement in the same inter-vertebral space because rent created in the dura mater may allow intra-thecal migration of

the epidural catheter. We report a case of inadvertent intra-thecal migration of the epidural catheter through a dural puncture by a 26 gauge needle.

A 38-year-old male patient, height 167 cm and weight 63 kg. was posted for hepato-jejunostomy for the benign stricture of the common bile duct. After a written informed consent, patient was taken up for the surgery. As part of perioperative anaesthesia care, epidural catheter placement was planned in the sitting position. With all sterile precautions, inter-vertebral space between 8th and 9th thoracic vertebra was marked and was punctured with a 26 gauge 1½ inch long needle, for infiltration of local anaesthesia. An aspiration check before injecting the local anaesthetic revealed that probably dura mater had been punctured, and fluid, possibly cerebro-spinal fluid (CSF) was getting aspirated. A note of the depth at which dura mater was punctured was made. Because the dura mater was punctured with a 26 gauge needle, too small to be of concern, it was decided to use the same inter-vertebral space for epidural catheter placement. Epidural space was identified by the loss of resistance technique with a 16 Gauge 12 cm long Tuohy epidural needle (with catheter stabiliser). Skin to epidural space distance was 4 cm. There was no CSF leakage at the hub of the epidural needle. The epidural catheter was easily inserted through the needle but just as the catheter had crossed the mark of 14 cm at needle hub, fluid was seen flowing into the catheter. Fluid was aspirated into a syringe, and it was confirmed as CSF (temperature and sugar content of the aspirated fluid). Epidural catheter was then withdrawn and was placed in an inter-vertebral space higher up. Rest of the course of the hospital stay of the patient was uneventful.

Dural puncture by epidural catheter on its own is not possible, though arachnoid puncture by the epidural catheter has been shown in an experimental study.^[5] In our patient since dura mater and the arachnoid mater were punctured with a 26 G needle, it would have created a weak point through which subsequently the epidural catheter would have travelled into the intra-thecal space. Robbins *et al.* had also reported a similar case where accidental intra-thecal insertion of an extradural catheter happened during combined spinal-extradural anaesthesia.^[6] They used a 26 gauge Whitacre spinal needle through 16 gauge Tuohy extradural needle. Physical characteristics like height and weight can be used to predict the depth of the epidural space to guide epidural needle placement. Ravi *et al.* in their study had concluded that the mean depth of epidural space in patients of

body mass index (BMI) <30 is 41.60 ± 5.80 mm on the basis of a formula (Depth [mm] = a + b [BMI], where a = 17.7966 and b = 0.9777).^[7] Our patient with a calculated BMI of 22.6, the predicted depth of the epidural space was 39.89 mm. Whereas skin to sub-arachnoid space depth (SSD) in Indian males is reported to be 4.81 ± 0.68 cm,^[8] the formula derived for determining SSD in the Indian population, $2.71 + 0.09 \times \text{BMI}$, predicts SSD of 4.74 cm for our patient.^[8] We located the epidural space at 4 cm depth from the skin that was well within the predicted depth for epidural space, and was short of the predicted SSD. This also supports our observation that the epidural needle was indeed in the extradural space. In our case, that the epidural catheter migrated into the sub-arachnoid space in the absence of any undue force warrants caution. We suggest that caution should be exercised even while puncturing inter-vertebral space for infiltration for local anaesthesia and in case dural puncture happens, epidural puncture should not be attempted in the same inter-vertebral space.

Manish Tandon, Chandra Kant Pandey

Department of Anaesthesia, Institute of Liver and Biliary Sciences,
Vasant Kunj, New Delhi, India

Address for correspondence:

Dr. Manish Tandon,
Institute of Liver and Biliary Sciences, D-1,
Vasant Kunj, New Delhi - 110 070, India.
E-mail: manishtandon25@rediffmail.com

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