Ultrasonographic optic nerve sheath diameter measurement in overweight parturient with intracranial tumour: Guiding choice of anaesthesia

Sir,

General anaesthesia (GA) is considered the choice of anaesthesia for patients presenting with intracranial tumours. In pregnant patients, spinal anaesthesia is preferred compared to GA for caesarean section.\[1\] However, dilemma arises when an obese parturient presents with intracranial tumour with a history suggestive of intracranial hypertension, which favours the use of GA for caesarean section with its associated potential problems.

Ultrasonographic optic nerve sheath diameter (ONSD) measurement has been used to delineate the presence of intracranial hypertension. ONSD more than 5 mm is considered to be indicator of the presence of intracranial hypertension.\[2\] We are describing usage of ultrasonographic ONSD measurement in guiding choice of anaesthesia in an overweight parturient with intracranial tumour.

A 26-year-old 36-week primigravida with body mass index of 28.33 with intracranial space occupying lesion was planned for elective caesarean section. The patient was having frontal headache for past 1 month with left eye ptosis for last 3 weeks. Headache was associated with vomiting. There was no history of seizures. Magnetic resonance imaging (MRI) obtained 3 weeks before showed large lobulated extra-axial mass (28 mm × 22 mm) in the left parasellar region. Lateral wall of cavernous sinus was inseparable with partial encasement of cavernous internal carotid artery. Lesion was closely abutting optic nerve near optic foramen. There was no midline shift, basal cisterns were not obliterated, ventricles were normal with no obstructions, sulci and gyri were normal, cerebral grey matter and white matter were normal and hence no signs of raised intracranial tension, with possible diagnosis of chondroid [Figure 1].

Neurosurgery along with ophthalmological evaluation was done. There was ophthalmoplegia of the left eye with palsy of cranial nerve 3rd, 4th and 6th with disc pallor; papilloedema was absent. As the pregnancy was term, elective caesarean section was planned to avoid the onset of labour and any associated elevations of blood pressure and intracranial pressure (ICP) after consultation from neurosurgeons and patient also wanted elective caesarean section.

The MRI did not show intracranial hypertension, but the patient was having a headache along with vomiting. Since the MRI was 3 weeks old, it was decided to measure ONSD. ONSD was measured with high frequency (6–13 MHz) linear transducer placed over the eyes. Measurement was taken bilaterally 3 mm behind globe, then average of the both the measurements was taken. It was 3.4 mm which was suggestive that ICP was not raised [Figure 2]. The patient was administered spinal anaesthesia at L3–L4 level with 2.5 ml of 0.5% hyperbaric bupivacaine with 27 gauge quincke needle and cerebrospinal fluid (CSF) leak was avoided. The patient was haemodynamically and neurologically stable intraoperatively. She was followed up in postoperative period and there were no complaints of any features of PDPH. Hence, she was then discharged in stable condition on post-operative day 4.

Neuraxial anaesthesia technique can potentially avoid parturient’s airway manipulation, exposure of general anaesthetics drugs on the foetal developing brain, risk
Letters to Editor

Figure 2: Ultrasonographic optic nerve sheath diameter measurement of 3.4 mm

of awareness under GA and the uterine relaxant effects of volatile anaesthetics.[1] Neuraxial anaesthesia for caesarean delivery allows the parturient and partner to experience the birth. As there are chances of dural puncture even with experienced hand with an epidural, it was avoided. GA is not fully contraindicated, and it is the best modality but considering the utilisation of ONSD and patient preference for spinal anaesthesia, it was chosen as the technique.

The optic nerve, as part of the central nervous system, is surrounded by a dural sheath and a subarachnoid space containing CSF. Three mm behind the ocular globe, the optic nerve is only surrounded by fat and the dural sheath is distensible within its fatty environment, particularly in case of raised pressure in the CSF.[3] Consistent with this, a position 3 mm behind the globe is preferred for measurement.[4] Measurements made at this point are more reproducible since ultrasound contrast is greater at this depth with a linear probe. As dilatation of the optic nerve sheath occurs much earlier than development of papilloedema, it predicts raised ICP earlier.[5] It was decided to measure the ONSD, which has been found to be a strong predictor of raised ICP with a high sensitivity and specificity in multiple studies and in a systematic review.[6]

Intraventricular measurement is the gold standard for measuring ICP but carry many risks, including haemorrhage and infection. Therefore, noninvasive methods such as neuroimaging, transcranial Doppler sonography, ONSD USG and computed tomography/MRI are preferred. There is wide variation in the optimal cut-off values for ONSD, but range from 4.8 to 5.9 mm is usually taken.[7,8]

There is a high level of correlation between MRI and a bedside ultrasound to detect acute rise in ICP with a high level of accuracy and despite its limitations, USG ONSD measurement is likely to be more reliable than clinical assessment in the diagnosis of intracranial hypertension.[8] It has the potential to become one of the first line modalities in point of care testing to detect increased ICP, especially in emergency situations when parturient needs emergency caesarean delivery.

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Conflicts of interest
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Letters to Editor

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