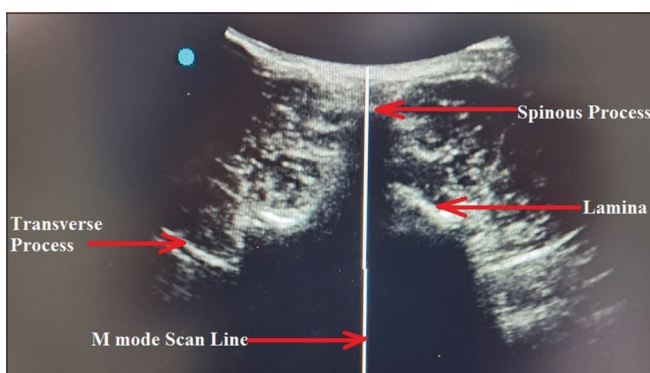


## M-mode scan line in ultrasound: A useful guide to identify the midline in central neuraxial block

Dear Editor,

Difficult central neuraxial block (CNB) is a frequent problem that is encountered in operating rooms and may require multiple attempts or may sometimes result in procedural failure. In a study, it was observed that the first puncture success rate of a CNB was only 52.9%.<sup>[1]</sup> Though failed dural puncture was only 0.2% in this study, limiting the number of attempts is a prerequisite for safe neuraxial anaesthesia. In expected difficult spinal anaesthesia like in patients who are more than 35 years of age, are overweight, obese, have a history of difficult spinal puncture, have a spine deformity, have nonpalpable anatomical landmarks, and have narrow intervertebral space etc., good positioning and use of neuraxial ultrasonography (USG) are indicated.<sup>[2]</sup> Bogin and Stulin<sup>[3]</sup> first described the use of USG for determining the landmarks for lumbar puncture. Neuraxial USG identifies a given lumbar intervertebral space more accurately than the landmark technique; it provides excellent correlation between USG-measured depth and needle insertion depth to the epidural or intrathecal space and increases success and ease of performance.<sup>[4]</sup>

USG imaging of the spine is done in the transverse axis or longitudinal axis, with the patient being in a sitting or lateral decubitus position. In transverse scanning, USG is generally performed in B-mode using low frequency (2–5MHz) and in curved array transducer via the midline and paramedian approach.<sup>[4]</sup> In the midline approach for CNB, we need to mark the



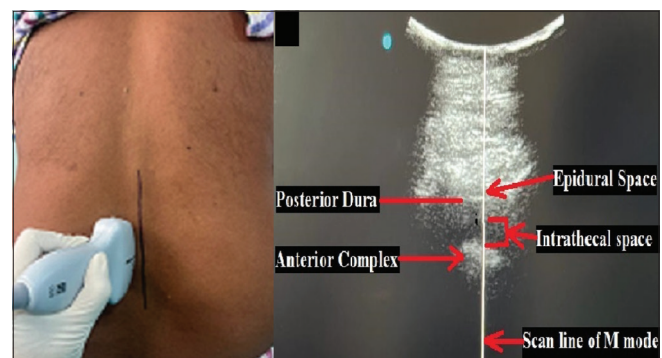
**Figure 1:** M-mode scan line in transverse spinous process view

midpoint using upper and lower spinous processes in a transverse spinous process view, and depending on the angulation of the spinous processes the transducer needs to be tilted to obtain an optimal interspinous view of neuraxial structures [Figure 1]. For paramedian approach, the paramedian sagittal oblique (PMSO) view is used in which the transducer is placed 2–3cm lateral to the midline and tilted slightly medially towards the midline [Figure 2].<sup>[5]</sup> This view provides a better image of the neuraxial structures through the widest part of the interlaminar space. In both of these techniques, generally, B-mode is used. It is sometimes difficult to obtain the exact midpoint using B-mode. This problem can be solved using a scan line in the motion mode (M-mode).

- In the transverse spinous process view (median approach), the M-mode scan line is made to pass through the midpoint of the spinous process and through the middle of the anterior complex seen in the PMSO view (paramedian approach) [Figures 1 and 2].
- This M-modes can line also confirms the required medial tilting in the paramedian approach and will mark the trajectory for needle insertion.
- It can also estimate the depth of the epidural/spinal space.

We used this M-mode scan line in 50 patients during the preprocedural scan for assessing the midline angulation with respect to the longitudinal axis so that there would be no need for cephalic/caudal angulation, which would be usually required during the palpation-based paramedian approach. It helped us perform a successful spinal puncture in the first attempt without any cephalic or caudal angulation.

To conclude, with the use of M-mode scan line during CNB marking of the midline, assessing the



**Figure 2:** M-mode scan line in paramedian sagittal oblique view

degree of angulation with longitudinal axis during the paramedian approach, and estimating the depth of epidural or subarachnoid space become easier, quicker, and more accurate.

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#### Conflicts of interest

There are no conflicts of interest.

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#### REFERENCES

1. Prakash S, Mullick P, Kumar SS, Diwan S, Singh R. Factors predicting difficult spinal block: A single centre study. *J Anaesthesiol Clin Pharmacol*2021;37:395-401.
2. Chaudhuri K, Roy S, Som B, Tripura K. Anatomical predictors of difficult spinal anaesthesia among women who underwent cesarean section in a tertiary care institute – A cross-sectional analytical study. *Eur J Mol Clin Med*2022;9:1096-103.
3. Bogin IN, Stulin ID. Application of the method of 2-dimensional echospondylography for determining landmarks in lumbar punctures. *Zh Nevropatol PsikhiatrIm S S Korsakova* 1971;71:1810-1.
4. Perlas A, Chaparro LE, Chin KJ. Lumbar Neuraxial ultrasound for spinal and epidural anesthesia: A systematic review and meta-analysis. *RegAnesth Pain Med*2016;41:251-60.
5. Karmakar MK, Li X, Ho AM, Kwok WH, Chui PT. Real-time ultrasound-guided paramedian epidural access: Evaluation of a novel in-plane technique. *Br J Anaesth*2009;102:845-54.

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