

US Guided Central Neuraxial Block For Challenging Anatomy

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Ultrasound imaging of the spine for anaesthesia in adults is performed using broad curved array probes (usually 2 to 5MHz). These give generally better penetration as this is the limiting factor in spinal ultrasound imaging.

There are 2 approaches to the assistance of the placement of neuraxial block by ultrasound.

1. Mapping the accessible spinal anatomy by ultrasound and subsequent conventional needle technique
2. Determining the anatomy followed by real time guidance of the needle to the target and subsequent monitoring of the injection.

Spinal mapping has some clearly defined aims including the identification of spinal abnormalities, particularly unexpected rotation, the identification of the vertebral levels, measurement of the depth of the epidural space optimal angle and in obese patients the true midline.

Pre scanning and marking the midline and interspace level as well as estimating the depth of the dura and the estimated angle of the needle has been shown in randomised controlled trials in normal and presumed difficult patients to reduce the number of puncture attempts by an experienced operator. Pre procedure ultrasound was also found to improve the success rate of novices performing epidural puncture.

Real time ultrasound guidance of epidural puncture was initially described in a two operator technique using a midline out of plane needle trajectory and paramedian scan. A one operator freehand in-plane paramedian technique as well as a similar technique with a needle guide plane have since been published both are advanced level techniques. No study has compared real time ultrasound guided epidural location to other techniques.

A number of studies have shown a good correlation of the epidural depth as measured on ultrasound and the eventual needle insertion depth to the epidural space including in obese patients.

Compared to manual palpation ultrasound has been shown to be superior to palpation in the accurate identification of the vertebral level when confirmed by X ray. Particular problems were noted with the L4/5 space mistaken for the L5/S1 space as a result of narrowing of the L5/S1 disc or pronounced lordosis making the L5/S1 space difficult to identify.

Useful reference

Ultrasound-facilitated epidurals and spinals in obstetrics. Carvalho JC. *Anesthesiol Clin.* 2008 Mar;26(1):145-58