

Erector Spinae Block – From Analgesia to Anaesthesia

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Since the introduction of ultrasound in anaesthesia practice, regional anaesthesia has gained importance in management of anaesthesia, post operative analgesia and chronic pain. Fascial plane blocks have emerged as one of the easiest techniques of regional anaesthesia, especially under ultrasound guidance. It relies on identifying the fascial planes in which the nerves transect and depositing local anaesthetics. Newer techniques need to pass the critical test of efficacy and should be capable of refining current clinical practice, before it becomes clinically acceptable practice¹.

Thoracic epidural is considered the gold standard for post operative analgesia for thoracic surgeries. The failure rate associated can be 14-30% and complications associated with TEA are accidental dural puncture, hypotension, spinal injection, nerve injury, and epidural hematoma². In contrast, US-guided PVB was reported to be associated with very few complications³. However, the needle-tip must be close to the pleura and spinal nerve roots. PVB has been classified as a technique of advanced level of difficulty⁴ regional analgesic techniques documented in literature for thoracic and abdominal surgeries include paravertebral block, retrolaminar block, erector spinae block, paraspinous sub serratus anterior/rhomboidus major plane block, serratus anterior plane block, pectoral blocks, transecting abdominal plane block, quadratus lumborum block and rectus sheath block. Among the various fascial plane blocks described, the erector spinae block is the recent one, first described by Ferrero *et al.* in 2016 for chronic postthoracic neuropathic pain poorly responsive to oral pharmacotherapy⁵. Erector spinae muscle is a group of three muscles originating from sacrum and lumbar spines, running along the paraspinous regions of thoracic vertebrae to get inserted

at transverse and spinous processes of upper thoracic or cervical vertebrae. This muscular column is encased in a retinaculum (a complex sheet of blended aponeuroses and fasciae) that extends from the sacrum to the skull base, often referred to as thoracolumbar fascia in the lower part⁶. This anatomical arrangement forms a scientific basis for fluid spread when drug is injected in the plane beneath erector spinae muscle. However, the variations in arrangement between thoracic and lumbar level may explain the heterogeneity in characteristics of block depending upon the level of injection. A review of the sono anatomy available in literature suggests that this is a simple block to perform, and is probably safe.

Clinical investigations exploring the mechanism of action of this block has shown some interesting facts. Initial study models examining radiological and anatomical evidence following injection of dyes observed extensive cranio caudal spread and the authors postulated the spread of drug across the ligaments and soft tissue to reach the spinal roots where it acted to provide analgesia⁷. Another author studied the spread of dye following erector spinae block (ESPB), in a patient by MRI imaging and noted that there was circumferential epidural spread, in addition to paravertebral, interforaminal and intercostal spread at thoracic levels, which is supposed to be better than its predecessor, the retrolaminar block⁸.

Initial case reports and case series reported the success of ESPB following breast surgeries and abdominal surgeries, this was further reinforced by few clinical trials which successfully demonstrated the analgesic efficacy of ESPB in breast surgeries, cardiac surgeries and laparoscopic cholecystectomies⁹⁻¹¹. A retrospective analysis of 18 patients receiving erector spinae block as analgesic technique for microscopic spine surgeries, revealed

reduction in pain scores and fentanyl consumption in first 24 post operative hours compared to control group¹². In this issue, a randomized control trial has been done to assess the analgesic efficacy of bilateral erector spinae block on post operative analgesic requirements following laparoscopic cholecystectomy¹³. A pooled analysis of 242 cases published in various journals as case series and case reports, was done and the authors noted that the technique provided reliable analgesia and was relatively simple and safe compared to advanced techniques such as paravertebral block and thoracic epidural. However, the duration of analgesia varied among publications depending upon the drug and volume used, as well as the technique (single shot vs continuous)¹⁴.

Though the role of erector spinae block as an analgesic adjunct has been well established, its role as a sole anaesthetic has not yet been tested. In a series of two cases of radical mastectomy, erector spinae block failed to block the anteromedial branches of intercostal nerves resulting in need for additional supplemental blocks¹⁵.

Ivanusic *et al.*, in their cadaveric study, showed no spread to both para- vertebral space and ventral rami, in contrast to earlier reports of cadaveric studies¹⁶. Staining of the sympathetic chain was noted in some of the cadaveric studies and hence possibility of hypotension and bradycardia should be kept in mind while administering the block⁷. A case report by Vandana *et al* is published in this issue where the authors used erector spinae block as a sole anaesthetic technique for mini thoracotomy¹⁷. Anatomical studies evaluating dye/ local anesthetic spread in cadavers may not parallel the clinical effectiveness of the ESPB. Local anesthetic choice, dose, volume and concentration may have important clinical effects. A qualitative review of 4 RCTs revealed that ESPB was associated with reduction in pain scores, post operative opioid consumption, prolongation of duration of analgesia, without complications being reported in those studies¹⁸.

Further, a recent review of evidences for choice of thoracic wall blocks failed to recommend the use of optimal dose, volume and type of drug for erector spinae block to provide successful analgesia or anaesthesia¹⁹. Randomized controlled trials may be needed in future to address the issues of drug dosing and optimizing the volume required for providing consistent surgical analgesia and post operative analgesia with least complication rate.

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