Editorial

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Quick response code

Ultrasound-guided transmuscular quadratus lumborum plane catheters: In the plane or out of it?

The ubiquitous availability of high-resolution, portable ultrasound transitioned a paradigm shift in nerve blocks, from deposition of local anaesthetic in the vicinity of a nerve/plexus after visualisation, to deposition of drug into interfascial planes, not because nerves can be visualised in these planes but with the correct anatomical knowledge that nerves do course within them.[1] The advent of ultrasound guidance facilitated the performance of the transversus abdominis plane (TAP) and rectus sheath blocks, rendering these safer and more predictable. With time, modifications of the TAP block emerged.[2] However, blocks of the abdominal wall were limited to providing sensory analgesia alone.

In 2007, at the European Society of Regional Anaesthesia meeting in Valencia, Spain, and the Association of Anaesthetists of Great Britain and Ireland meeting in Exeter, the UK, Rafael Blanco introduced the concept of quadratus lumborum (QL) block. He proposed two approaches: anterolateral to the QL muscle (QL I) and posterior to the QL muscle (QL II).[3] He found the rostral spread to be higher with the latter approach indicating spread of drug to the thoracic paravertebral space. He also noted that onset of block was faster with the QL II approach. This block was unique in comparison to TAP block in that it offered both somatic and visceral analgesia. Spread to the thoracic paravertebral space was confirmed by Carney *et al*. in 2011.[4] Borglum *et al*., in 2013, presented the transmuscular approach via identification of the now familiar 'shamrock' appearance comprising the erector spinae, QL and psoas major as the three clovers of the flower, and the stem being formed by the transverse process of corresponding lumbar vertebra. The drug was deposited in the plane between QL and psoas major muscles (QL III).[5] Subsequently, QL I, QL II and QL III blocks were renamed as lateral, posterior and anterior approaches, respectively.

Fascia is defined as connective tissue with irregularly arranged collagen fibres, much unlike the regular pattern in tendons and ligaments. Deep fascial planes are invested with dynamics owing to insertion of tendons in these planes, muscle contraction that is transmitted to the surrounding fascia, innate contractility of the fascia and the ability to act as energy absorbers.[6] Local anaesthetic solution that is deposited in fascial planes is spread actively due to the dynamic property of fascia and also by spread along the path of least resistance. The thoracolumbar fascia (TLF) consists of several layers and separates the paraspinal muscles from the muscles of the posterior abdominal wall, that is, QL and psoas major. The three-layer model has the TLF split into the posterior layer, the middle layer that runs between the paraspinal muscles and the QL and the anterior layer that lies between the QL and psoas major muscles. The thin anterior layer is thought to be an extension of the transversalis fascia.[6] The TLF is said to have a high-density network of sympathetic fibres and mechanoreceptors that may be blocked by local anaesthetic.[7] Drug deposited in the anterior TLF (transmuscular QL or QL III) ascends rostrally through the medial and lateral arcuate ligaments to the thoracic paravertebral space posterior to the endothoracic fascia.[8] Identification of ascending and descending lumbar vessels in the fascial planes by colour Doppler, preferably power Doppler owing to the minute size, is essential to prevent systemic absorption and retroperitoneal haematoma formation.

In this issue of the *Indian Journal of Anaesthesia*, Diwan *et al*. present a case series of five patients who underwent pyelolithotomy under general anaesthesia and transmuscular QL block.[9] The authors' choice of unilateral transmuscular QL catheter, purportedly within the anterior thoracolumbar fascia (ATLF), for perioperative analgesia in patients undergoing pyelolithotomy, is justified. It is broadly agreed that rostral spread is more when the point of insertion is closer to the costal margin.[10] The authors chose to differentiate high versus low QL block with reference to the kidney. It may be remembered that the left kidney is higher (11th rib to 2nd lumbar vertebra) when compared with the right kidney (12th rib to 3rd lumbar vertebra).[8]

Diwan *et al*. further performed computerised tomography scans on the third postoperative day to evaluate the position of QL catheters inserted at surgery.[9] The variability in dye spread, as seen in the five patients studied, raises a few pertinent questions:

1. Like the epidural space, is the ATLF a potential and compliant space that affords ascent of a catheter placed within?
2. What length of catheter within the ATLF is ideal?
3. For optimal analgesia, what is the ideal regimen? Is an intermittent, programmed bolus better than a continuous infusion of local anaesthetic?
4. Will the QL block eventually give way to the simpler, safer and more superficial erector spinae block?

For obvious reasons, dye studies in cadavers will not replicate conditions that additionally affect spread in live patients.[6] Given the expenses involved, studies in larger numbers of patients may prove to be difficult. Meanwhile, this study highlights the variability of spread of local anaesthetic with indwelling QL catheters. It is fondly hoped that some definitive answers will emerge over time.

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