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Ultrasound-Guided Transmuscular Quadratus Lumborum Blockade

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Editor,

The original concept of an ultrasound-guided (USG) quadratus lumborum (QL) block indicated for postoperative pain management (PPM) after abdominal surgery was conceived by Rafael Blanco (ESRA XXVI, 2007). Distribution of local anaesthetic (LA) has been observed to be distinctly different compared to various Transversus Abdominis Plane (TAP) blocks. (1,2) Several variants of Blanco's original USG QL block with injection of LA close to the antero-lateral border of the QL muscle and superficial to the transversalis fascia (TF) have been described utilising both linear and curved array transducers. (1,3-4)

We have demonstrated that the original QL block is characterized by a 30 minutes block onset time, and that a single injection of 30 mL of ropivacaine 0.375% will anaesthetize both the lateral and anterior cutaneous branches from Th7 to L1.4 The effect of the QL block is believed to result from a spread of LA from its lumbar deposition cranially into the thoracic paravertebral space (TPVS), since Carney et al found traces of contrast agent in the TPVS following application of this block.1 Hence, the QL block would seem to be able to alleviate both somatic and visceral pain. However, our own MR imaging (MRI) studies revealed that a major portion of the LA administered at the lateral border of the QL muscle spread in an antero-lateral direction, away from the point-of-injection and thus considered redundant.(4)

We present a novel USG transmuscular QL block which relies on clearly identifiable sonographic bony landmarks that we have previously described. (5) The patient is placed in the lateral position with the side to be anaesthetized turned upwards (Fig. 1A). A curved array transducer (6-2 MHz) is placed in the transverse plane at the abdominal flank immediately cranial to the iliac crest. The transducer is then moved dorsally keeping the transverse orientation until the QL muscle is identified with its attachment to the lateral edge of the transverse process of the L4 vertebral body. With the psoas major muscle (PM) anteriorly, the erector spinae muscle (ESM) posteriorly and the QL muscle adherent to the apex of the transverse process, a well recognisable pattern of a shamrock with three leaves can be seen (Fig 1B). (5)

The needle is inserted in-plane to the transducer (lateral edge) and the tip of the needle is advanced through the QL muscle, penetrating the ventral proper fascia of the QL muscle and LA is finally injected between the QL and PM. MRI one hour post-injection clearly depicts the injectate spreading cranially along the QL and PM reaching the arcuate ligaments and beyond (Fig. 1C). The transmuscular QL block does not result in redundant antero-lateral spread of the injectate (Fig. 1D). This may indicate that lower volumes of LA potentially can be used and yet provide extensive thoracolumbar anaesthesia.

The TF covers the thoracolumbar fascia (TLF) and the anterior surface of the QL as well as the antero-lateral surface of the PM.6 The TF splits in two sheets at the level of the diaphragm. One becomes the inferior diaphragmatic fascia. The other sheet passes behind the lateral and medial arcuate ligaments to become contiguous with the endothoracic fascia. (7) Thus, LA injected in the lumbar region between the PM and QL can potentially spread cranially reaching the TPVS, because both muscles have their embryonic origin and insertion within the thoracic cage, respectively. (8) This would explain the extensive thoracolumbar anaesthesia that we have observed in more than 100 adult patients following transmuscular QL blocks for PPM after abdominal surgery. A controlled randomised study on volunteers incorporating administration of LA mixed with contrast (gadolinium), MRI and sensory dermatome testing is currently under way.

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Figure

Figure 1: Transmuscular Quadratus Lumborum Block. The needle is inserted in-plane to the transducer (lateral edge) (1A) and advanced through the QL injecting the local anaesthetic in the fascial interspace between the QL and PM (1B). MRI in the coronal plane depicts the injectate spreading cranially along the QL and PM reaching the arcuate ligaments and beyond (1C). MRI in the axial plane depicts how the transmuscular QL block does not result in redundant antero-lateral spread of the injectate (1D). PC: peritoneal cavity. PM: psoas major muscle. ESM: erector spinae muscle. QL: quadratus lumborum. Short white arrows: deposition of local anaesthetic, Long red arrow: needle passage through the QL.

Conflict of Interest:

None declared

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