Letters to Editor

Paediatric lumbar paravertebral sonoanatomy: More like a "Dragon fly" than a "Shamrock"

Paediatric regional anesthesia with ultrasound guidance is emerging as a safe, effective means to provide analgesia.[1] In comparison to adults, many anatomical and physiological differences are noted in paediatric patients.[1] Owing to differential muscle mass, paediatric ultrasound images of the paravertebral sonoanatomy are likely to appear differently. The classical "Shamrock sign" is described on ultrasound-guided lumbar plexus scanning in adults, however this may not be easily visualised in the elderly and obese.[2,3] In adults, the ultrasound image of the muscles around the lumbar plexus resembles a "Shamrock" comprising of the three leaves: representing three muscles of the erector spinae (spinalis, longissimus, iliocostalis), the QL, the psoas and the stem being the transverse process of the lumbar vertebra.[2,4] The images also have been previously described as thumbs -up sign, an orca's silhouette or have focussed on the bulging edge of the body of the lumbar vertebra.[5] The success of the QL muscle identification lies in noting its relationships to the abdominal wall muscles, the psoas and the transverse process of the lumbar vertebra. The sonoanatomy of the lumbar paravertebral muscles in adults is almost always achieved with a curvilinear low frequency (5–8 Hz) transducer considering the wide field of view and facilitation of tissue penetration to a deeper muscle. The lumbar plexus in paediatric patients was noted to be relatively superficial, requiring less tissue penetration and a high frequency linear probe for better spatial resolution.[6]

We share the ultrasound imaging of the lumbar paravertebral sonoanatomy of four children (age 1.8 years, 10 years, 7 years, and 3 years-Figure 1a-d, respectively) who underwent upper and lower abdominal surgeries and were administered an anterior QL block. A written informed consent from the parents of these children was obtained. The ultrasound scanning for the children was done in the lateral position using a high frequency linear probe (Hitachi- Aloka arrieta S60) placed in a transverse orientation along the mid/posterior axillary line just cephalad to the iliac crest. A real time scan was performed from the anterior abdomen to the posterior, to confirm the image of the QL muscle. Viewing the psoas and the QL muscle is essential for performing the anterior QL block. The image attained better clarity with a caudad angulation into the pelvis to visualise the QL relative to the transverse process. We observed lack of resemblance of the various ultrasonographic images obtained on scanning paediatric patients to a "Shamrock."

The ultrasound image on scanning for the QL block appeared more like the outline of the wings of a dragonfly rather than a shamrock [Figure 1]. The upper and lower wings on the left are the QL and the psoas muscle respectively and on the right being the erector spinae muscles. The scans with a linear probe revealed the QL muscle attached to the lumbar transverse process which appeared smaller, less bulky and flattened toward the abdominal muscles lying adjacent to the psoas in contrast to adults where it is bulkier and forms one of the petals of the shamrock. We have not come across any musculoskeletal ultrasound of paediatric patients in literature that describes the age at which the muscles around the lumbar plexus achieve the bulk of an adult. A study to quantitatively evaluate the QL in fetuses and its growth dynamics concluded a logarithmic increase in the length, width and cross-sectional area proportionate to age and can explain differences in paediatric musculoskeletal ultrasonography.[7] We suggest that in children a "dragonfly sign" may be more appropriate than the "Shamrock sign."

Further studies are needed to validate this observation but are noteworthy that every block's ultrasound

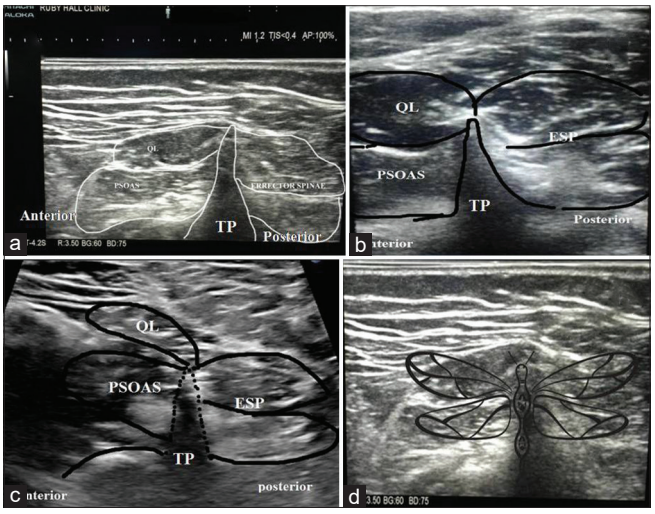

Figure 1: Ultrasound scans of lumbar paravertebral sonoanatomy in a- 1.8years, b- 10 years, c- 7 years, d- 3 years (superimposed image of dragonfly) paediatric patients with anterior and posterior orientation. (QL-quadratus lumborum, TP - Transverse process lumbar vertebra, ESP - Erector spinae group of muscles, psoas- psoas muscle)

image in children may not be similar to that in adults. Knowledge about the varied sonoanatomy in adults and paediatrics (attributable to age, weight, muscle mass) is essential with special reference to musculoskeletal ultrasound in paediatric regional anaesthesia literature.

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Conflicts of interest

There are no conflicts of interest.

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