Enhancing ergonomics in rib counting in ultrasound-guided serratus anterior plane block

Dear Editor,

Blanco demonstrated serratus anterior plane block (SAP) as a novel form of the ultrasound-guided fascial plane block to achieve regional anaesthesia of the hemithorax.[1] The original method described for identifying the plane requires counting ribs, with the patient in the supine position, scanning the sagittal plane inferiorly and laterally until the fourth and fifth ribs are identified in the mid-axillary line. However, it is difficult to perform this block in patients who are obese, have pendulous breasts or chest burns, where it is more accessible to scan the lateral chest wall in the coronal plane with a lateral decubitus position.[2] Earlier, Hurdle *et al*.[3] described both posterior and anterior approaches for rib counting under ultrasound guidance in sitting, prone, and supine positions. We propose an alternative ultrasound scanning technique for rib counting in the coronal plane with a high-frequency (6–15 MHz) linear array transducer:

- The patient is placed in a lateral decubitus position with the nondependent arm flexed, adducted, and raised over the head with the side scanned uppermost [Figure 1a].
- The examiner stands behind the patient, and the ultrasound machine faces the examiner.
- The lowest rib cage margin in the mid-axillary line is palpated and marked.
- The ultrasound transducer is placed in coronal orientation over the flank (upper end of the transducer on the marked area).
- The chest wall is scanned from the lateral to the anterior side till the hyperechoic 11th rib is visible.
- The ultrasound transducer is moved cephalad in the coronal plane to identify the 10th rib.
- Scanning of the lower nine ribs cranially is continued till the ultrasound transducer is positioned at the apex of the axilla, and the 2nd rib is identified.

By scanning the chest wall from the lateral to the anterior side, the hyperechoic 11th rib can be traced up to a certain point, beyond which, being a 'floating' rib, it will disappear [Figure 1f and g]. This helps us to identify the 11th rib. Sliding the ultrasound transducer posteriorly, the 12th rib (another floating rib) margin) is also visualised. After identifying the 11th thoracic rib, the transducer is moved cephalad

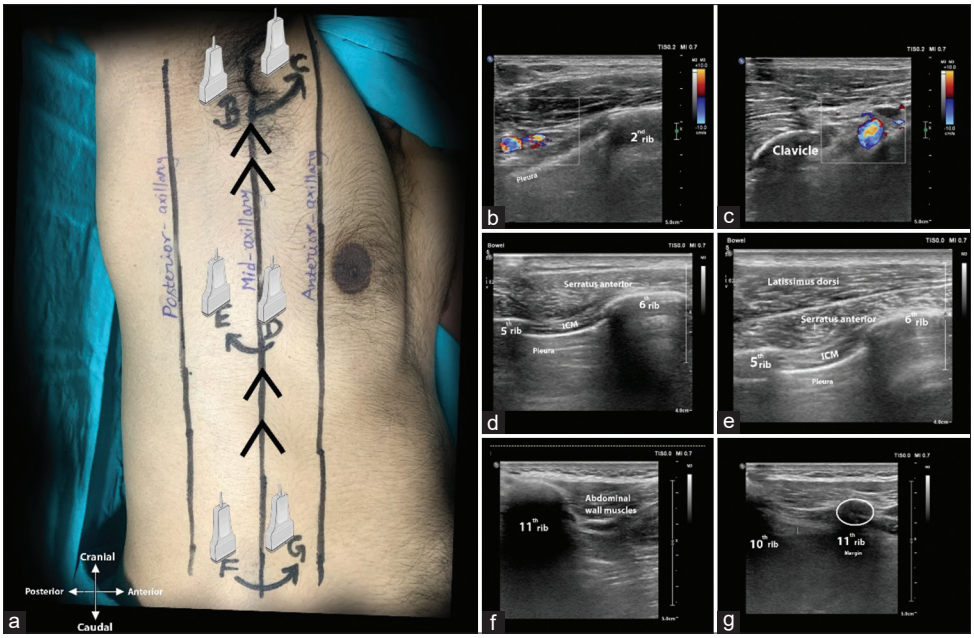

Figure 1: Sequential coronal sonogram from caudal to cephalad for rib counting (same subject). (a) Image of the lateral chest wall and different transducer positions. (f and g) The 11th rib disappears when the transducer is moved anteriorly. (d and e) Serratus plane between latissimus dorsi and serratus anterior visible on moving transducer posteriorly. (b) 2nd rib with adjoining neurovascular bundle seen. (c) Scanning beyond the 2nd rib, the lateral margin of the clavicle is visible

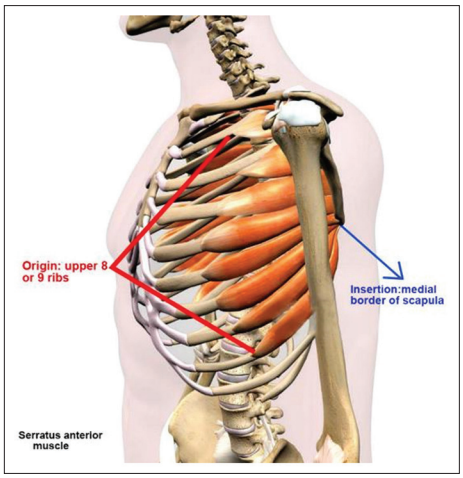

Figure 2: Origin and insertion of serratus anterior muscle (Courtesy: iStockphoto.com)

to the 9th and 8th thoracic rib; the serratus anterior muscle appears in the visual field. The serratus anterior muscle, which originates as 9–10 muscular slips from the external surface of the 1st to the 9th rib, covers most of the lateral chest wall and is inserted into the medial border of the scapula [Figure 2]. As one moves the transducer posteriorly, the inferolateral border of the latissimus dorsi muscle is seen lying superficial to the serratus anterior muscle [Figure 1d and e]. Continue scanning and counting the lower nine thoracic ribs till the transducer is positioned cranially at the apex of the axilla to identify the 2nd rib [Figure 1b]. Scanning beyond this, the hyperechoic shadow of the lateral margin of the clavicle and neurovascular structures can be seen [Figure 1c]. The 1st rib may be difficult to visualise by the lateral approach. After identifying the 5th rib for SAP block, one can inject the drug in the myofascial plane between latissimus dorsi and serratus anterior muscle or deep to serratus anterior muscle.

We chose to scan upwards, beginning from the lower end of the rib cage, as the target structures were easily viewed due to less fatty tissues. In contrast, we encountered axillary fat while scanning from the axilla downwards, which makes scanning and viewing difficult and time-consuming. Glass *et al.* found that 5%–8% of patients have a missing 12th rib.[4] This supports the use of the 11th rib as the starting point.

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Conflicts of interest

There are no conflicts of interest.

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