

Infraclavicular block

Approaches to the infraclavicular brachial plexus are attractive because they provide reliable anaesthesia of the whole upper limb below the shoulder and have a theoretically lower risk of pneumothorax as the infraclavicular brachial plexus is further from the lung.

Compared to the axillary block the approach is also able to be performed with the arm by the side. The vessels are however deeper and needle visibility may be difficult, the ultrasound guided block should be reserved for operators with experience in other ultrasound guided blocks.

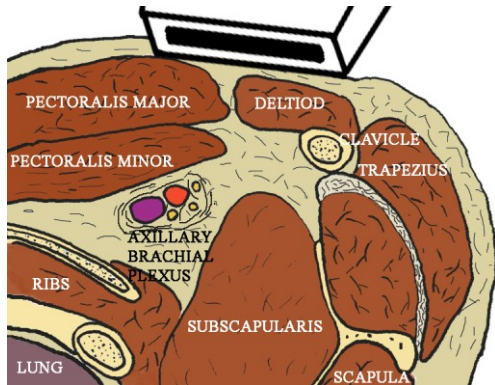


Fig 2.17 Infraclavicular brachial plexus, medial to coracoid

The axillary vessels are imaged with the probe positioned beneath the clavicle in a parasagittal plane (short axis). Scanning medially the vessels move posterior to the clavicle and laterally become deeper as they go into the arm. Medial to the coracoid the axillary artery is imaged 2 to 5 cm beneath the skin depending on the thickness of the pectoral muscles.

In muscular subjects the highly attenuating muscular tissue often obscures fine sonographic detail around the vessels, although the vessels themselves can be readily identified. It is often difficult to identify individual cords of the brachial plexus at this level. Laterally the artery lies

postero-superior to the vein, moving more posterior in the medial course as the vessels move deep to the clavicle.

The probe will be angulated medially to image a true short axis view of the vessels because they become deeper as they pass laterally. This medial angulation is unnecessary and it brings the guided needle closer to the pleura.

The infraclavicular brachial plexus may be blocked with ultrasound using a variation on the traditional vertical infraclavicular block or with a posterior approach from behind the clavicle.

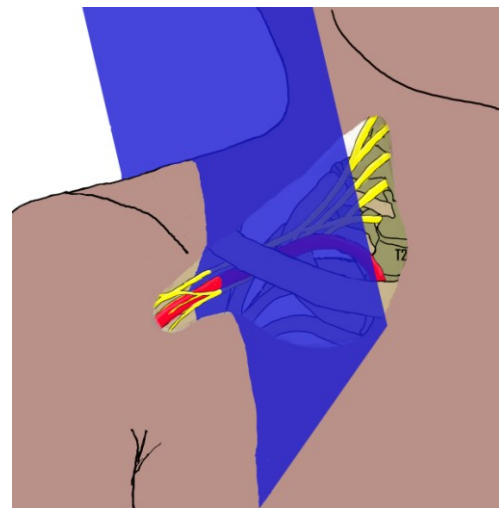


Fig 2.18 Plane of imaging of the infraclavicular brachial plexus.

Ultrasound is first used to establish a position where the axillary artery is well separated from the pleura. In the variation on the vertical approach the needle is passed in the plane of the beam, between the end of the probe and the clavicle. A 100 mm needle is directed steeply downwards to the plexus around the artery. The steep approach to the plexus makes needle visibility sometimes difficult.

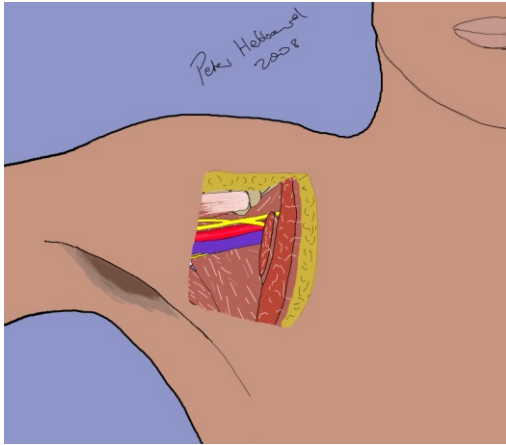


Fig 2.19 Section showing position of pectoralis major and minor overlying the infraclavicular axillary vessels and brachial plexus

The needle can be directed both superiorly and inferiorly to the artery to perform the block using 20 to 25 ml of ropivacaine 0.75% to 1% or lignocaine 2% with adrenaline.

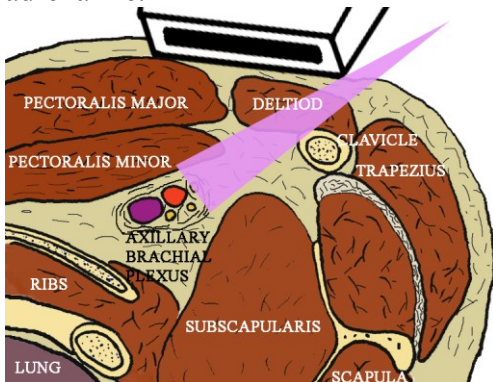


Fig 2.20 "Vertical" ultrasound approach to the infraclavicular brachial plexus (needle course in purple)

As the plexus is mostly posterior and superior to the artery at this level an approach from inferior to the probe on the chest wall has the disadvantage of both having both vein and artery between the approaching needle and most of the plexus.

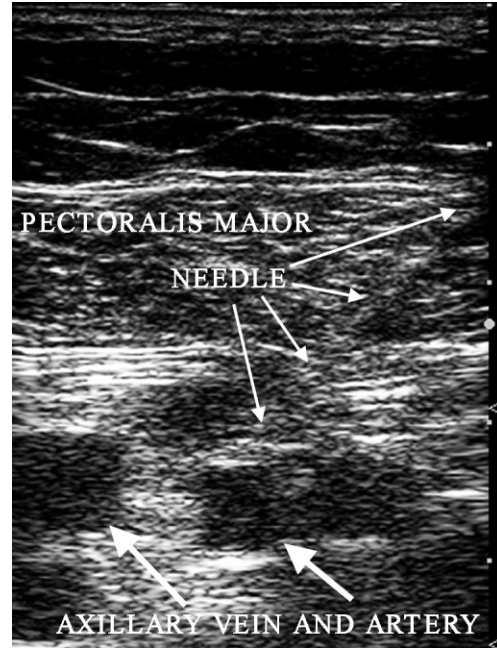


Fig 2.21 Sonogram of "vertical" approach to the infraclavicular brachial plexus



Fig 2.22 Needle and hand position for "vertical" in plane approach to infraclavicular block

Posterior Approach

Alternatively the infraclavicular brachial plexus can be approached using an in plane perpendicular needle from posterior to the clavicle. The ultrasound probe is placed over the anterior chest wall medial to the coracoid to identify the axillary artery and establish the position of the ribs medially. The needle entry point is over the trapezius muscle in line with the

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ultrasound beam and sufficiently posterior to pass between the clavicle and the scapula. The needle approaches the artery perpendicular to the ultrasound beam.

The approximate distance from the entry point to entry into the beam is noted to guide the insertion. With one hand holding the probe the other inserts a 100 mm 21g needle from the point determined posterior to the clavicle in line with the ultrasound beam. The needle is passed in to the point where it should become visible in the image. If the needle itself is not seen often some movement of tissue around the needle can help identify the needle, which is seen as a bright perpendicular bar in the ultrasound image.

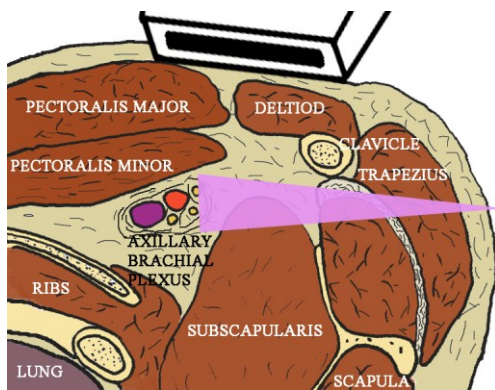


Fig 2.23 Posterior approach to the infraclavicular brachial plexus (needle course in purple)



Fig 2.24 Needle and hand position for posterior approach to infraclavicular brachial plexus.

Angulation of the probe is the main movement used to bring the needle into view. The needle is then directed deep and superficial to the artery and 20 to 25 ml of ropivacaine 0.75% to 1% or lignocaine 2% with adrenaline injected.

As the artery is displaced by the injection of local anaesthetic it is easier if the anterior injection is made first as it can sometimes be difficult to pass the needle anterior enough after the artery has been pushed up by local anaesthetic behind it. The injection of local anaesthetic should be imaged to ascertain the correct deposition around the target.

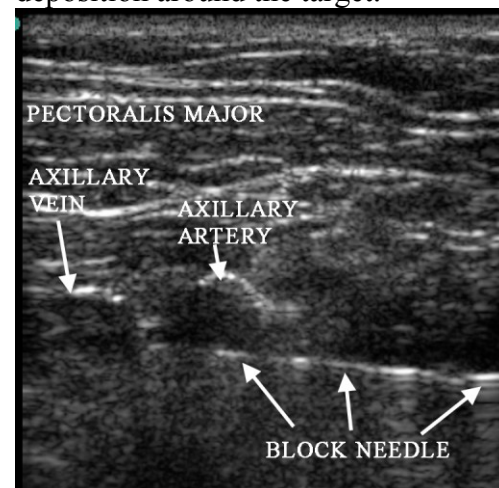


Fig 2.25 Sonogram of block needle in position posterior to axillary artery

The individual nerves are often indistinct at this level however periarterial deposition of the local anaesthetic is effective.

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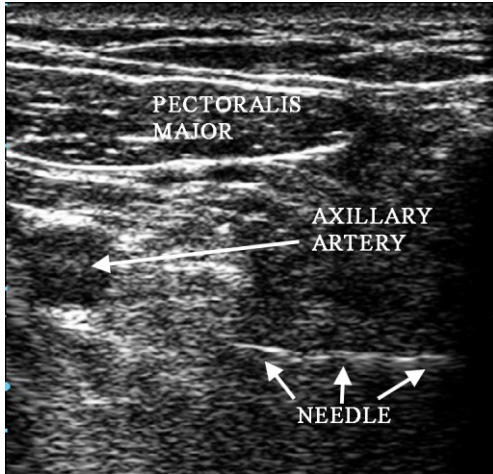


Fig 2.26 Needle approaching axillary artery, infraclavicular block posterior approach.

The posterior approach has several advantages over the vertical technique. The needle tip is more surely located, as even at depth, a perpendicular 21 g needle is easily seen. The preparation of the probe is also easier as there is often 7 to 8 cm between the probe and the insertion site which takes it out of the immediate sterile field. Infraclavicular block under ultrasound guidance (vertical approach) has recently been reported in a series of adults with a mean volume of 16.1 ml lignocaine 2%.

In describing this ultrasound guided procedure it has been assumed that attention has been paid to appropriate location, personnel, sterility, preparation, doses and technique necessary for the safe conduct of major nerve blocks and other procedures. These medical procedures should not be attempted without suitable qualifications

Acknowledgements

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