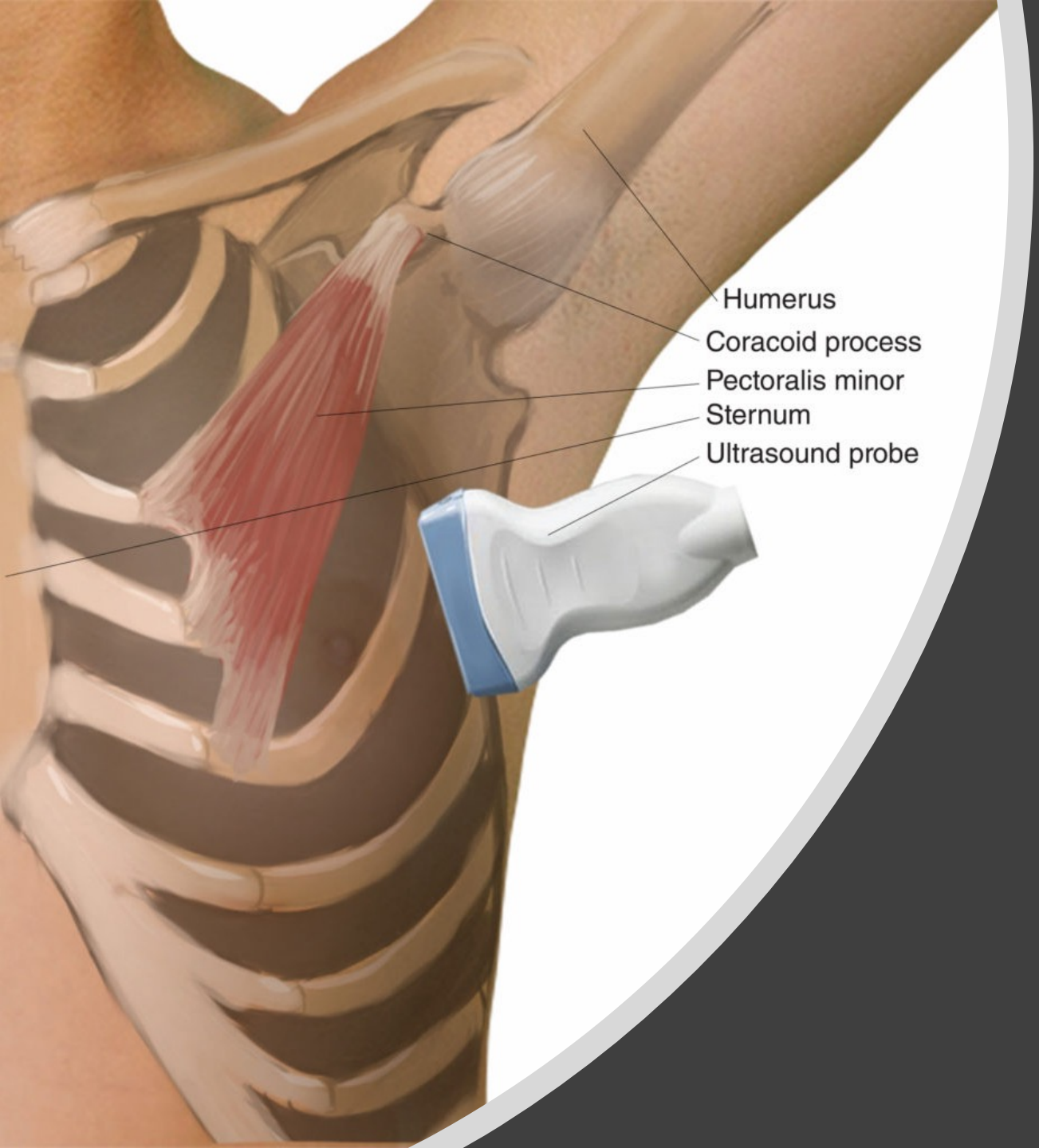
Serratus Anterior Plane Block

Overview

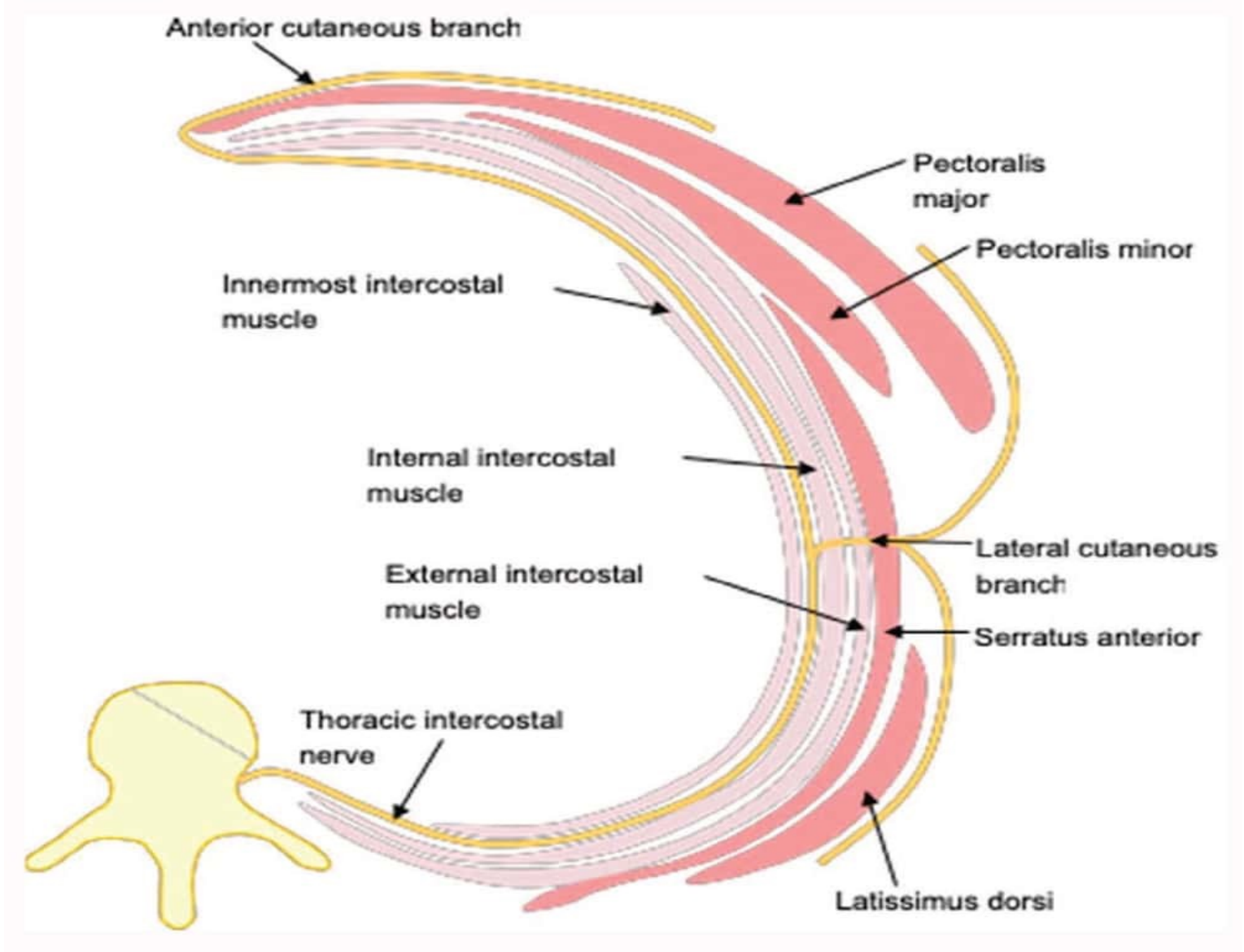
Dr.Lauren Tully – for Piezofest Sept 22



What is it? (1)

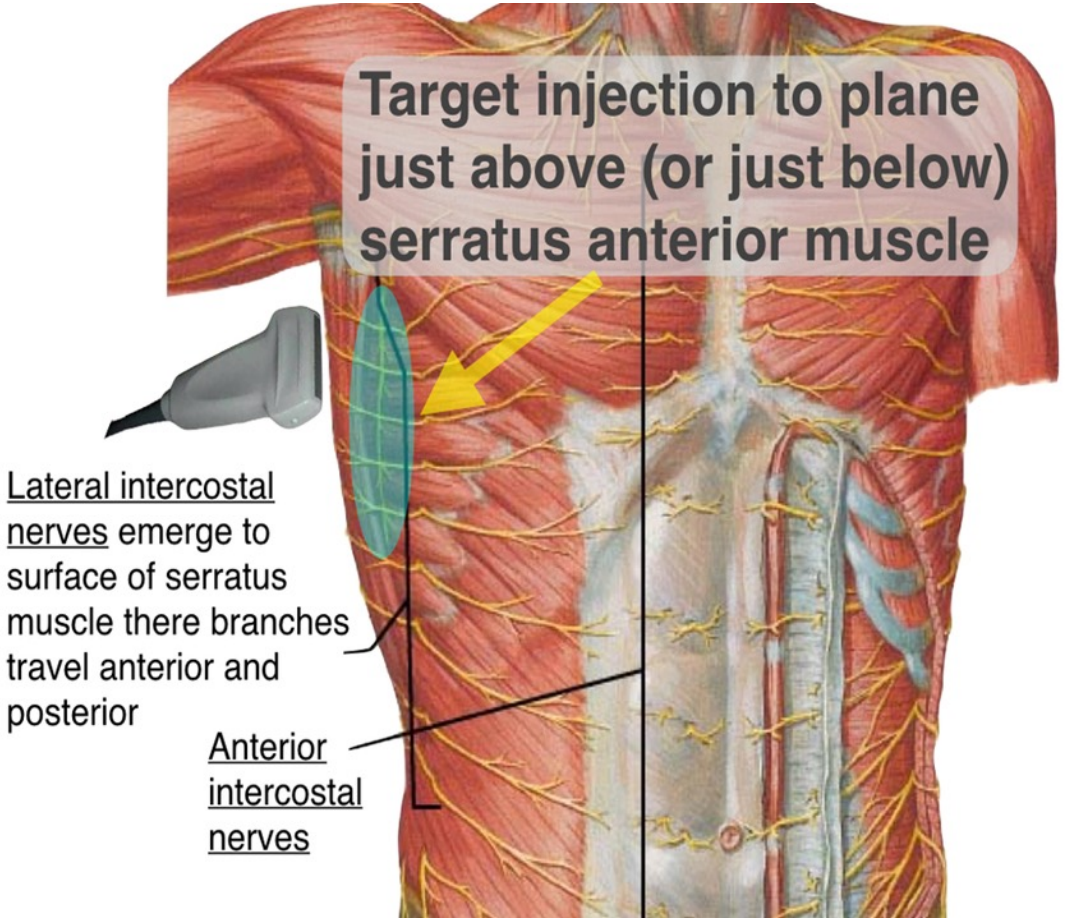
- **Serratus plane block is a simple, effective and safe thoracic fascial plane block.**
- **Its clinical effect is likely to be due, at least in part, to blockade of the lateral cutaneous branches of the intercostal nerves.**
- **Indications include breast surgery, chronic pain after mastectomy, rib fractures, thoracoscopy and thoracotomy.**
- **The exact point of injection and the volume of injectate are important determinants of the spread of local anaesthetic.**
- **It is a regional anaesthesia technique amenable to the insertion of a catheter.**

Anatomy

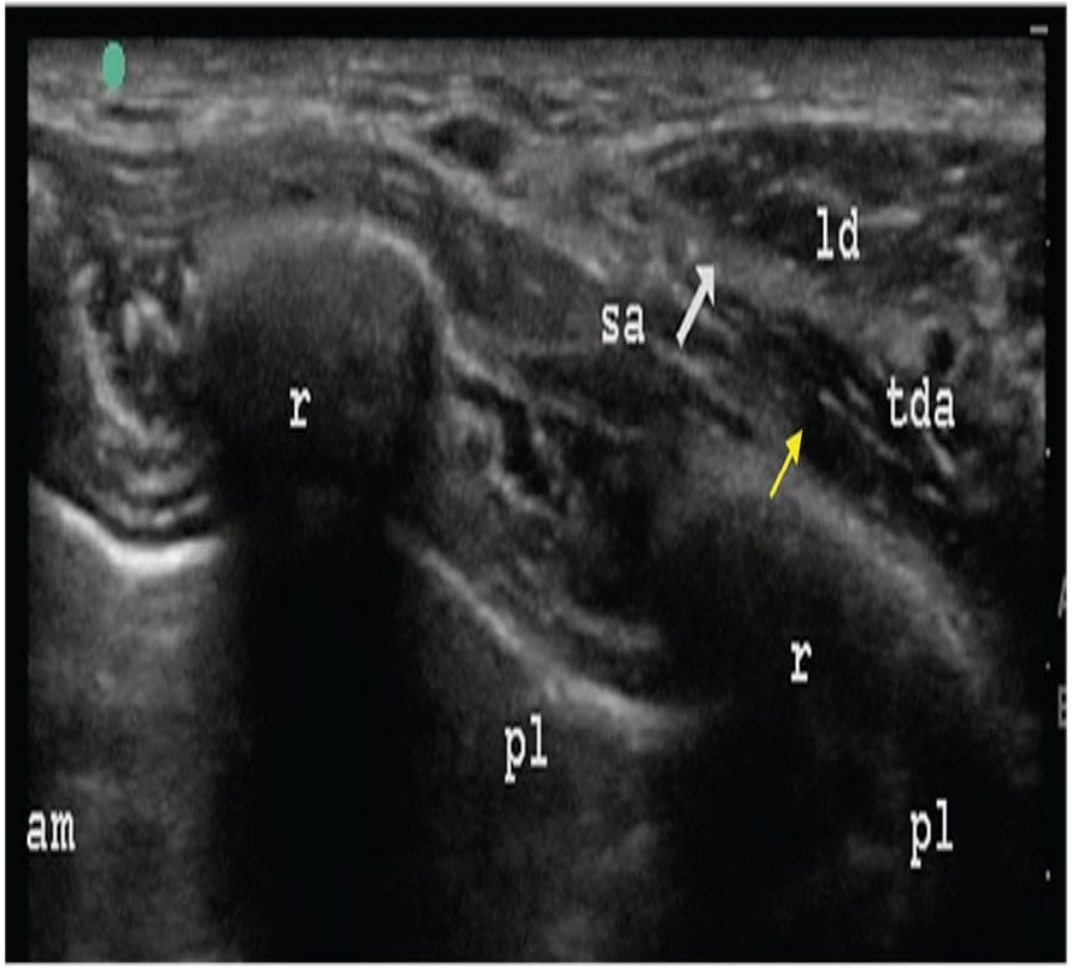

Anterior cutaneous branch
Pectoralis major
Pectoralis minor
Innermost intercostal muscle
Internal intercostal muscle
Lateral cutaneous branch
External intercostal muscle
Serratus anterior
Thoracic intercostal nerve
Latissimus dorsi

Serratus Anterior

- Originates on the anterior surface of ribs 1-8 and inserts onto the medial border of the scapula.
- Lies between latissimus dorsi above, and the ribs and pleura below.
- The thoracic intercostal nerves pierce serratus anterior.
- A potential space exists superficial and deep to serratus anterior.
- Within this space run the intercostal nerves (lateral cutaneous branches), long thoracic nerve and thoracodorsal nerve. The thoracodorsal artery runs along with the thoracodorsal nerve.



Sonoanatomy



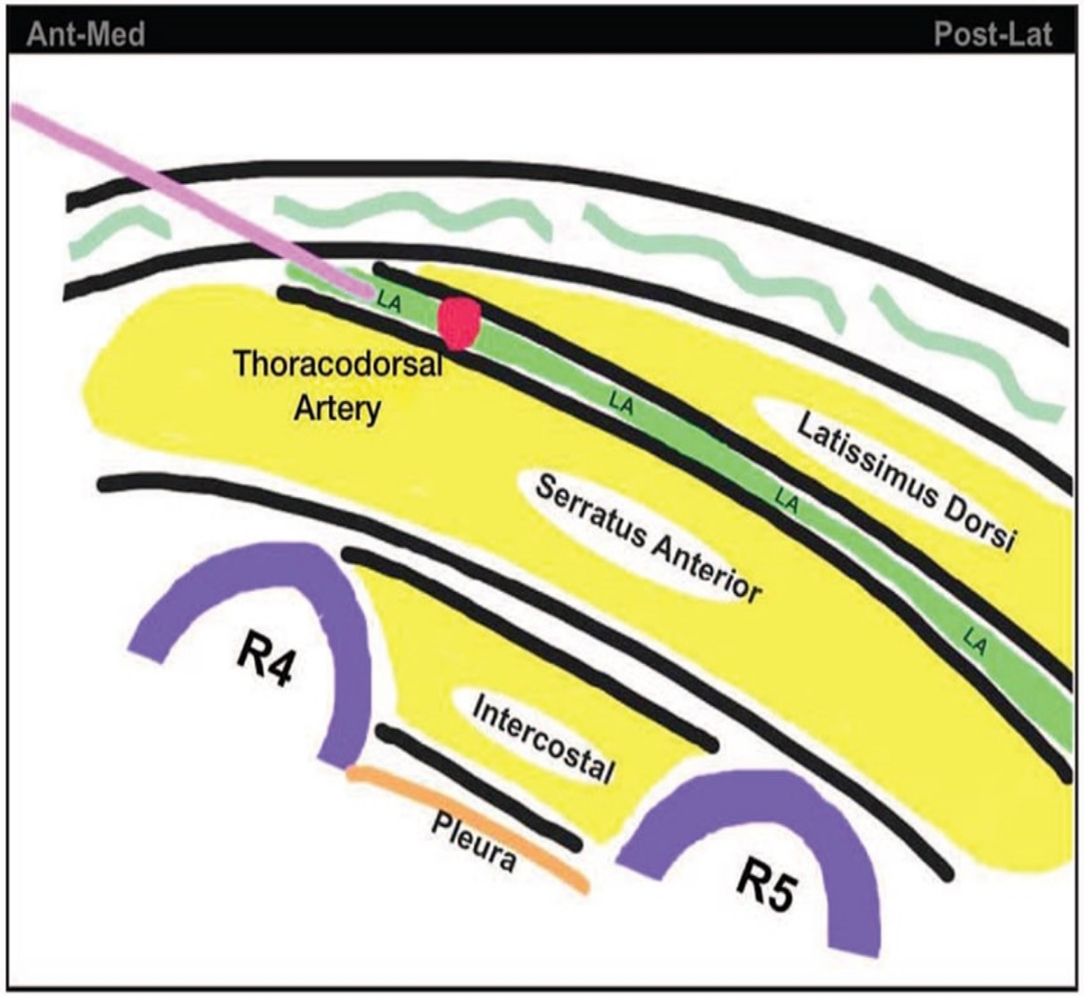
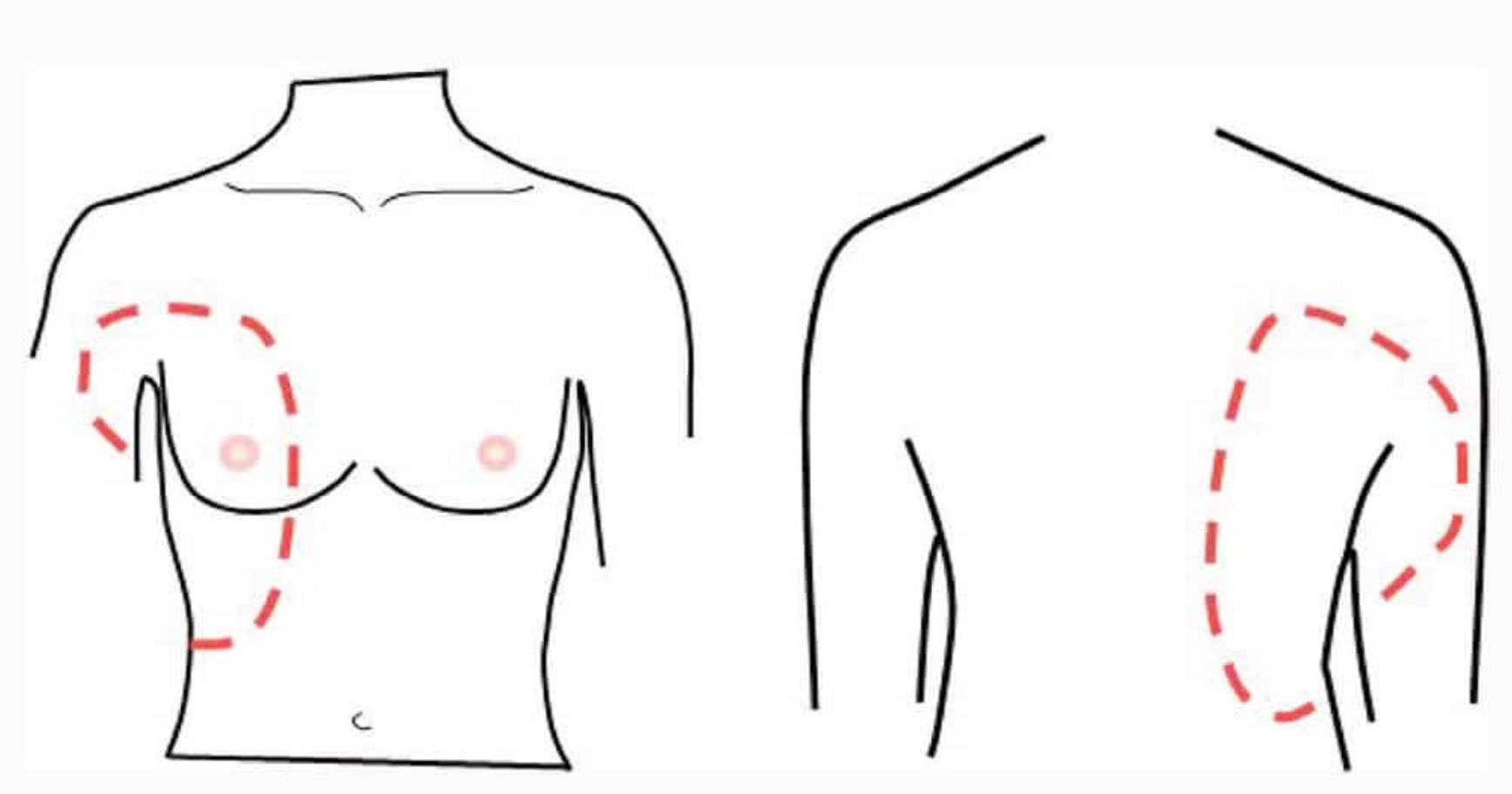


Illustration of the expected area of sensory loss following serratus plane block. (1)



Performing the Block

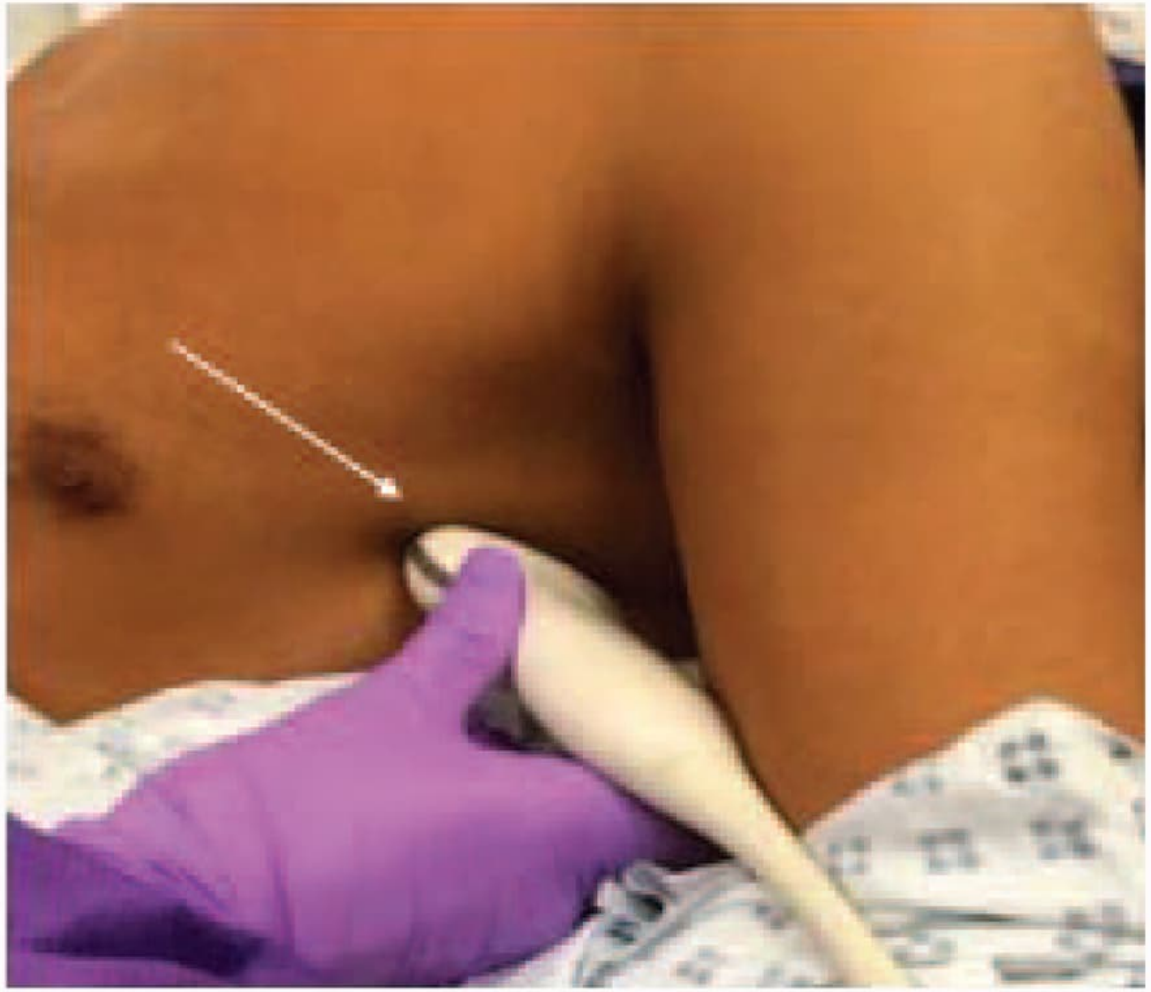
- Levobupivacaine is the local anaesthetic of choice due to its duration of action (10-12 hours). The maximum dose of Levobupivacaine is 2mg/kg.
- SAPB is a volume block; to be effective, a reasonable volume must be injected.
- 40mls of 0.25% levobupivacaine (100mg) is a standard dose in patients over 50kg.
- If using 0.5% levobupivacaine, 20ml of 0.5% levobupivacaine (100mg) can be diluted in 20ml of 0.9% saline to give a total volume of 40ml.
- If patients are below 50kg, the dose must be adjusted.

Essentials [1]

Parameter	Specification
Position	Supine with the arm abducted to 90° or lateral, ultrasound machine on the ipsilateral side
Ultrasound probe	High-frequency linear ultrasound probe, 6-13 MHz
Needle	22G regional block needle, 50-100 mm in length
Approach and depth	In plane or out of plane, 1-4 cm
Local anaesthetic	0.3-0.4 mL/kg of 0.25% levobupivacaine, aiming for a minimum local anaesthetic volume of 20 mL, within maximum recommended doses for the patient

Technique

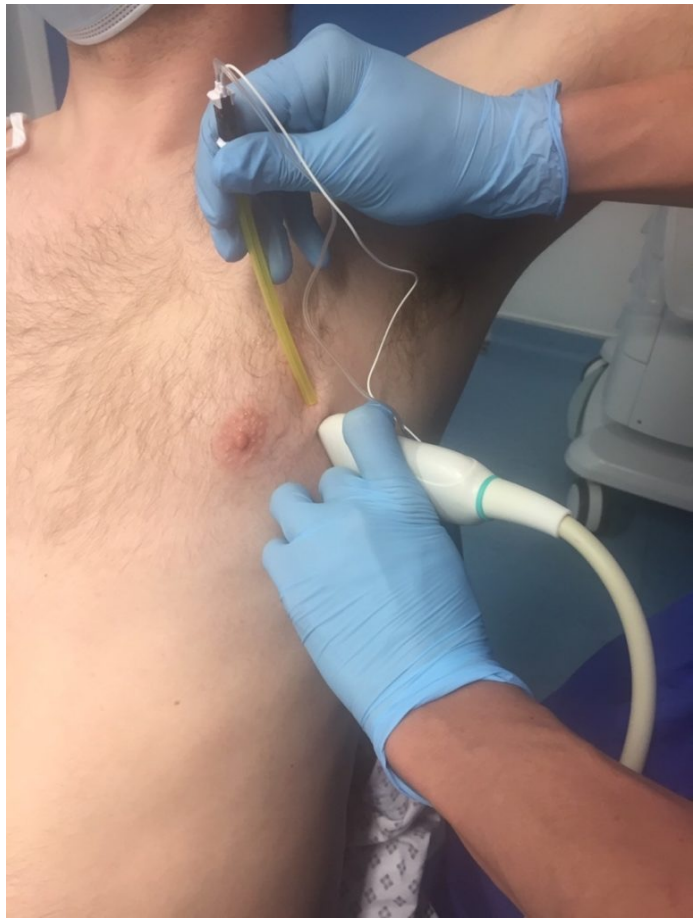
Ideal ultrasound probe position for the serratus plane block at the level of the fifth rib in the mid-axillary line. The arrow indicates the point of insertion and the direction of the needle.

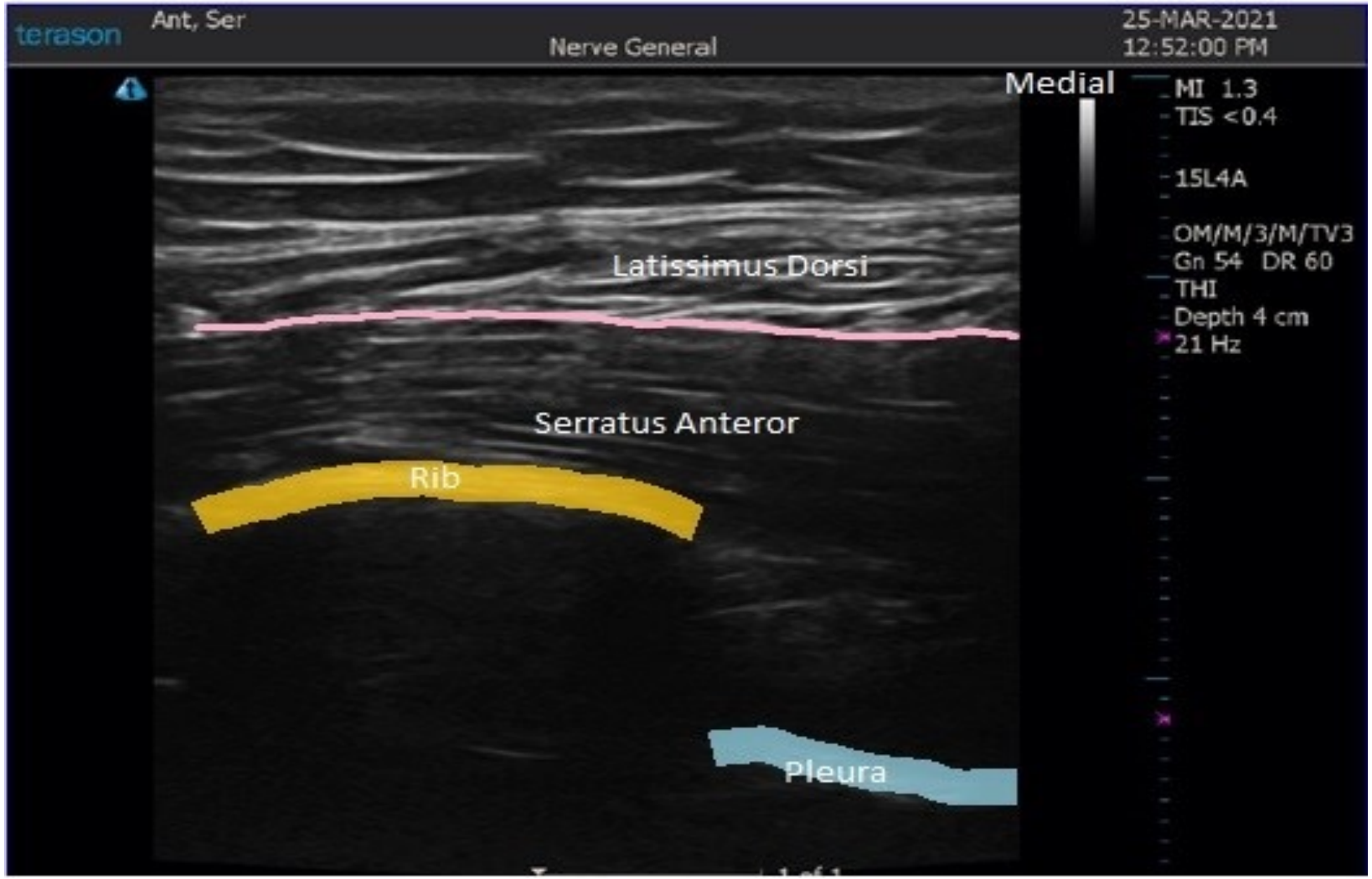


- In SPB, local anaesthetic is injected into the fascial plane either :
- **Superficial** to the serratus anterior muscle Between the latissimus dorsi and serratus anterior muscles
- **Deep** to the serratus anterior muscle, between the serratus anterior muscle and intercostal muscles and ribs.
- It can be performed in the area delineated by the anterior and posterior axillary lines and the second to seventh ribs.

Needling Technique

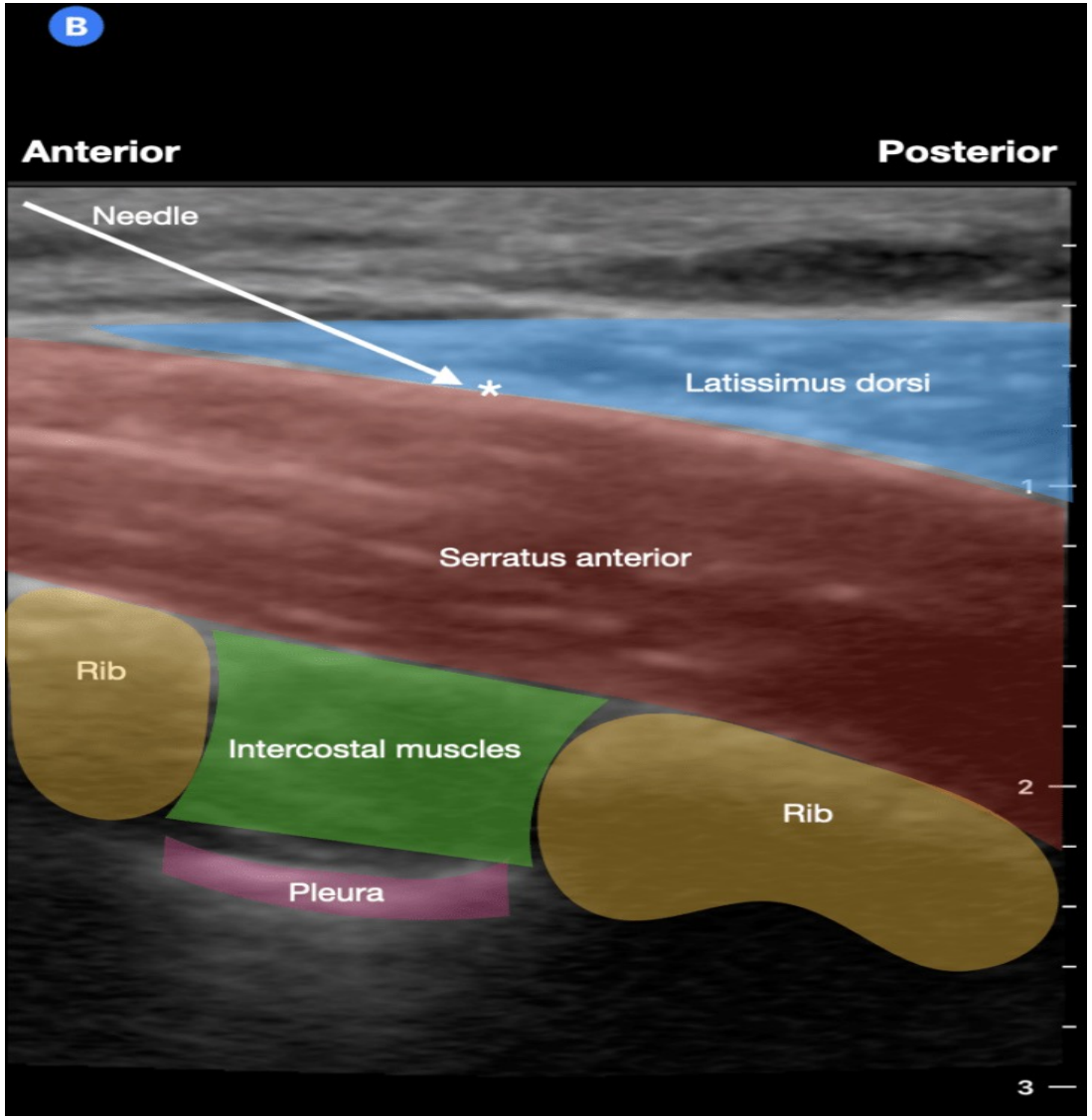
With the probe positioned as in Figure below, the following image is obtained





Superficial Block (4)

- The needle is placed into the fascial plane between latissimus dorsi and serratus anterior around 1-2cm below the skin.
- Local anaesthetic (around 40mls) is then injected to hydrodissect between the muscles.

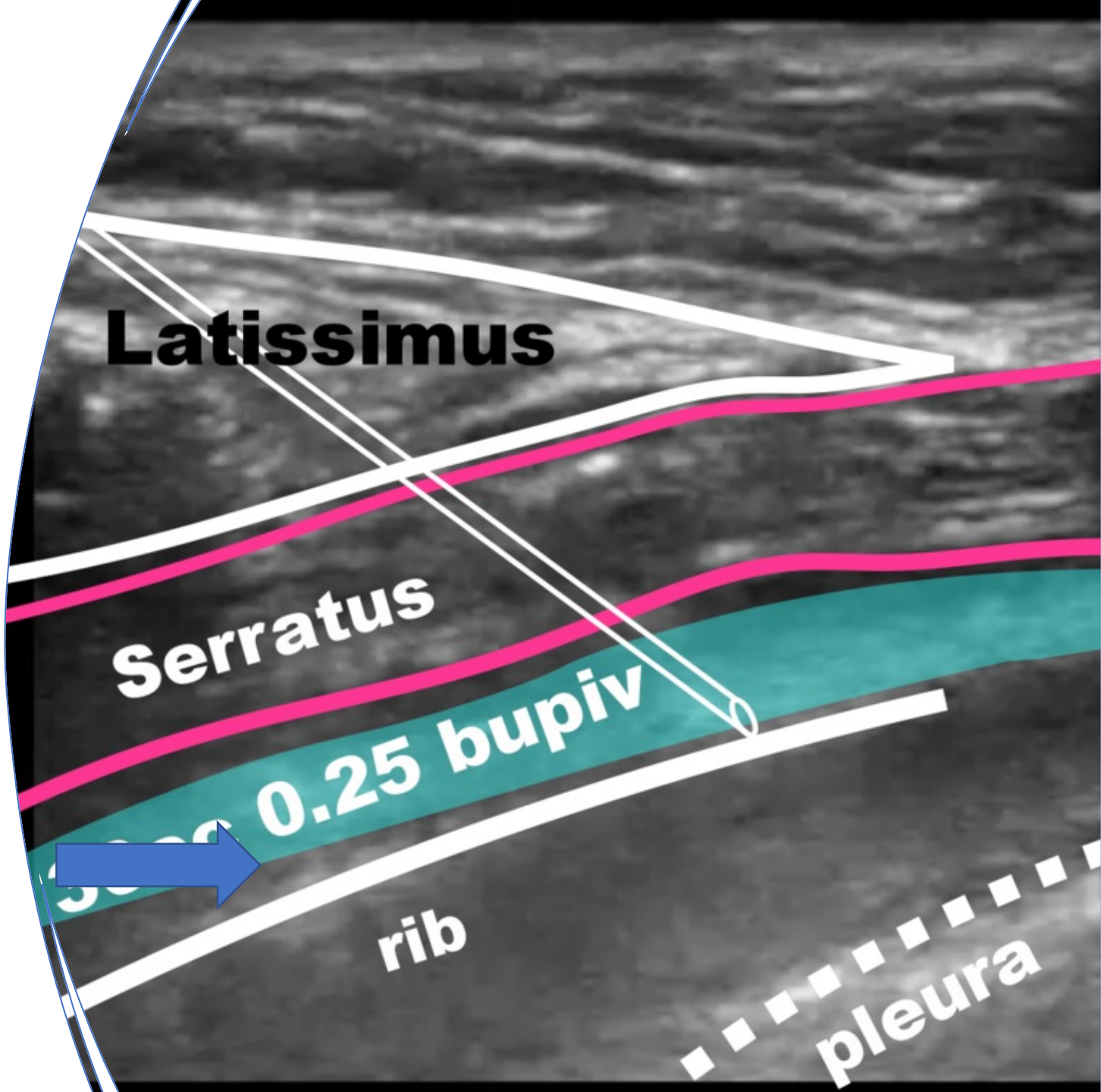


Deep SAP block approach

- Direct the needle toward the fifth rib

(this will form a bony safety back stop and reduce the risk of puncture of the pleura)

- Use hydrolocation with either local anaesthetic or saline to verify the needle tip is positioned in the space **between the serratus anterior muscle and the fifth rib in the mid-axillary line.**



Complications

Generic

- Bleeding, bruising and/or haematoma
- Difficulty and inadequate or failed block
- Intravascular injection
- Local anaesthetic systemic toxicity
- Infection

Specific

- Pneumothorax, secondary to the proximity of the pleura

References

- 1 Serratus Plane Block : WFSA - Resources (wfsahq.org)
- 2 ESRA | ESRA (esraeurope.org)
- 3 Pectoralis and Serratus Plane Nerve Blocks - NYSORA | NYSORA
- 4 Serratus Anterior Plane Block • LITFL • Nerve Block Library