

IRISH ASSOCIATION FOR
**EMERGENCY
MEDICINE**



IAEM Clinical Guideline

Regional Anaesthesia in the Emergency Department – ultrasound guided serratus anterior plane block for the management of rib fractures

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DISCLAIMER

IAEM recognises that patients, their situations, Emergency Departments and staff all vary. These guidelines cannot cover all clinical scenarios. The ultimate responsibility for the interpretation and application of these guidelines, the use of current information and a patient's overall care and wellbeing resides with the treating clinician.

Revision History

Date	Version	Section	Summary of changes	Author
February 2020	V1.0	All	Final version	ET/CMcD
August 2024	V1.1	All Front cover Contents References	Updated formatting Added guideline referencing information Added table of contents Added references to main document	C. Briant C. Briant C. Briant C. Briant

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GLOSSARY OF TERMS

UGNB	Ultrasound-guided Nerve Block
SAPB	Serratus Anterior Plane Block
In plane approach	Ultrasound-guided needle guidance technique in which the needle is introduced in the same plane as the ultrasound beam as it is advanced towards the target
LAST	Local Anaesthetic Systemic Toxicity
LA	Local Anaesthesia

Regional Anaesthesia in the Emergency Department – ultrasound guided serratus anterior plane block for the management of rib fractures

INTRODUCTION

The ultrasound-guided serratus anterior plane block (SAPB) is a safe and effective opioid-sparing single-injection technique to anaesthetise the anterior chest wall in patients with multiple rib fractures, providing optimal Emergency Department care.

Ultrasound guided planar nerve blocks (UGNB) reduce opioid use and improve ventilation for elderly patients with predicted respiratory compromise. In patients with contraindications to procedural sedation, UGNB may be the only reliable alternative for targeted pain control.

AIMS

This guideline aims to introduce SAPB as an alternative pain control technique for the management of painful conditions such as rib fractures. The guideline will act as a signpost to expert authors that have previously described the technique in video and written format rather than attempt to describe the block in full detail here.

PARAMETERS

Target audience	Emergency Physicians with some experience using ultrasound-guided nerve block techniques (this guideline assumes that the provider has previous training in basic ultrasound transducer manipulation and needle guidance techniques)
Patient population	<ul style="list-style-type: none">- Adult patients presenting to the ED with acute traumatic rib fractures- Elderly patients are a high risk group that benefit greatly from this technique
Exclusion criteria	<ul style="list-style-type: none">- Consent not provided or procedure refused- Documented allergy to local anaesthetic agent- Infection at the injection site

ULTRASOUND-GUIDED SERRATUS ANTERIOR PLANE BLOCK

Preparation

Gather necessary equipment - a dedicated block trolley or block pack is recommended

- local anaesthetic agent solution (suggested levobupivacaine 0.25% - max dose is 2 mg/kg)
- linear array ultrasound transducer
- Sterile transducer cover
- Blunt tip block needle or 22G spinal needle
- Lipid emulsion therapy 20% solution

Assessment

Identify relevant surface and sono-anatomy landmarks (serratus anterior muscle crossing over the top of a rib bounded superiorly by latissimus dorsi and teres muscle)

Prepare the patient and your equipment for a sterile invasive procedure

Connect the patient to a heart rate monitor and pulse oximetry

Place the ultrasound machine on the contralateral side of the bed to the chest wall that you intend to inject. This setup will maximise first pass success rates for the block

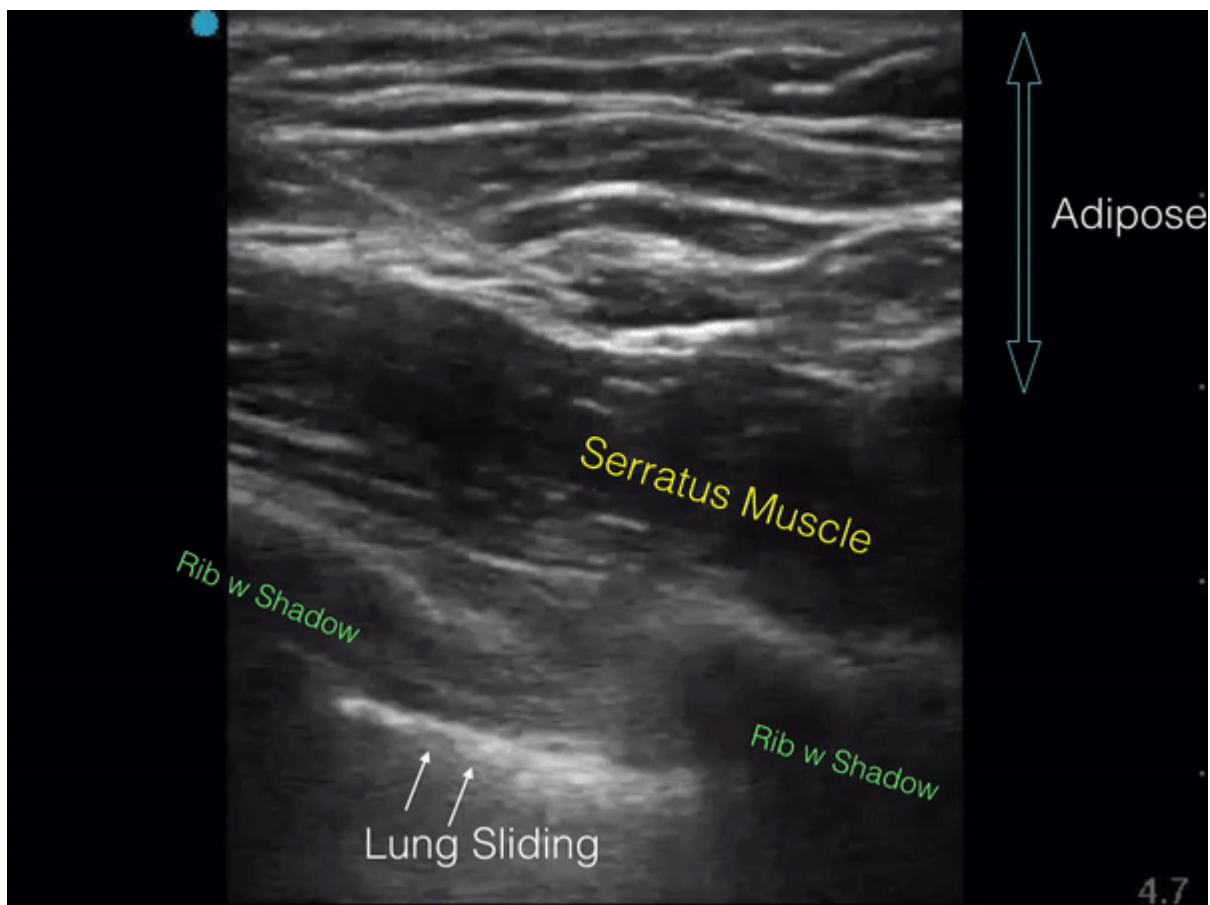
Document consent, patient weight and time of administration of local anaesthetic agent

SAPB technique

Ultrasound is used to locate serratus anterior muscle that runs over the rib in the mid axillary line. Using an in-plane approach in real time the needle tip is guided to the interfascial plane above serratus muscle. A large volume of dilute local anaesthetic agent infiltrates this space. As the patient breathes, the local anaesthetic agent is distributed in cranial and caudal directions. The lateral cutaneous branches of the thoracic intercostal nerves (T2 - T12) emerge through serratus anterior muscle are blocked using this technique.

There are variations to this technique - please follow this link for a [video demonstration](#).

Figure 1. SAPB Sono-anatomy landmarks



SPECIAL CONSIDERATIONS

- Local anaesthetic dose ranges from 20ml to 40ml of 0.25% levobupivacaine. Reduce the local anaesthetic agent volume by 20% if your patient is known to have renal impairment, liver impairment or is cachectic
- Dexamethasone 4mg/8mg may be used to prolong the duration of the block by several hours. This may be given with local anaesthetic agent or delivered intravenously
- Dual operators should be used for a large volume block (>10ml local anaesthetic)
- Hydro-dissection with a small volume of saline is recommended to localise the correct interfascial plane before injecting the local anaesthetic solution
- Continuous cardiac monitoring and pulse oximetry is recommended during the procedure and for 15 minutes following a plane block technique
- Local anaesthetic systemic toxicity is a potential side effect of any nerve block. Lipid emulsion therapy is used as an antidote
- Onset of analgesia for this block may take 15 to 30 minutes although patients often report an immediate analgesia effect

REFERENCES

The ultrasound-guided serratus anterior plane block. ACEP Now. 2017;36(3):12-13

Ultrasound-guided serratus plane block for ED rib fracture pain control Am J Emerg Med. 2017 Jan;35(1):197.e3-197.e6 (doi: 10.1016/j.ajem.2016.07.021)

Serratus plane block: a novel ultrasound-guided thoracic wall nerve block Anaesthesia. 2013 Nov;68(11):1107-13 (doi: 10.1111/anae.12344)

Rib Fracture Management BJA Education, Volume 16, Issue 1, 1 January 2016, 26–32 (doi: 10.1093/bjaceaccp/mkv011)

How to Implement Ultrasound Guided Nerve Blocks in your Emergency Department (www.acepnow.com/article/how-to-implement-ultrasound-guided-nerve-blocks-in-your-ed/)

Serratus Anterior Plane Block Training Video (<https://vimeo.com/183512172>)