

IRISH ASSOCIATION FOR EMERGENCY MEDICINE



IAEM Clinical Guideline

Ultrasound-guided Erector Spinae Plane Block for the Management of Rib fractures in the Emergency Department

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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.

GLOSSARY OF TERMS

ED	Emergency Department
ESPB	Erector Spinae Plane Block
SAPB	Serratus Anterior Plane Block
UGNB	Ultrasound-guided Nerve Block

Ultrasound-guided Erector Spinae Plane Block for the management of rib fractures in the Emergency Department

INTRODUCTION

The ultrasound-guided erector spinae plane block (ESPB) is a safe and effective opioid-sparing single-injection technique to anaesthetise the chest wall in patients with multiple rib fractures, providing optimal emergency department (ED) care.

The ESPB targets the erector spinae plane which lies between the anterior surface of the erector spinae muscle and the posterior surface of the spinal transverse processes. Local anaesthetic blocks the dorsal rami of the spinal nerve providing anaesthesia to the posterior chest wall.¹

In general, ESPB is more effective for posterior rib fractures while the Serratus Anterior Plane Block (SAPB) is effective for anterior rib fractures. Please refer to the [IAEM SAPB clinical guideline](#).

Ultrasound-guided nerve block (UGNB) techniques are a useful adjunct for pain management. In the ED, UGNB may reduce opioid use and improve ventilation earlier for patients with predicted respiratory compromise. In patients with contraindications to procedural sedation, UGNB techniques may be the only reliable alternative for targeted pain control.

PARAMETERS

Target audience: Emergency Physicians with previous experience using UGNB techniques (this guideline assumes that the provider has previous training in basic ultrasound transducer manipulation and needle guidance techniques).

Patient population: Adult patients presenting to the ED with acute traumatic rib fractures.

Exclusion criteria:

- Consent not provided or procedure refused.
- Allergy to local anaesthetic agent.
- Infection at the injection site.

AIMS

This guideline aims to introduce ESPB 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.

PREPARATION AND ASSESSMENT

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

- Local anaesthetic solution (suggested levobupivacaine 0.25% - max dose is 2 mg/kg)
- High frequency linear or low frequency curvilinear transducer (depending on target depth)
- Sterile transducer cover
- Blunt tip block needle
- Lipid emulsion therapy 20% solution ready, if needed

Prepare patient

- Prepare the patient and your equipment for a sterile procedure.
- Connect the patient to a continuous heart rate monitor and pulse oximetry.
- Document consent, patient weight and time of administration of local anaesthetic.
- Special considerations - see below.

Identify surface anatomy and sono-anatomy (see figure A).

- The transverse process is bounded superiorly by the erector spinae, rhomboid and trapezius muscles.
- The paravertebral space lies deep to the transverse process.
- Use an in-plane approach with the ultrasound machine on the contralateral side of the bed to the chest wall. This setup will maximise first pass success for the block.
- Place the transducer in a craniocaudal orientation at the T5-7 level in a parasagittal plane.
- Using the in-plane technique, introduce the needle tip through the muscles until contact is made with the appropriate transverse process (see figure B).

- Observe the injectate spread deep to the erector spinae muscle and superficial to the transverse processes in the myofascial space.

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

Figure A

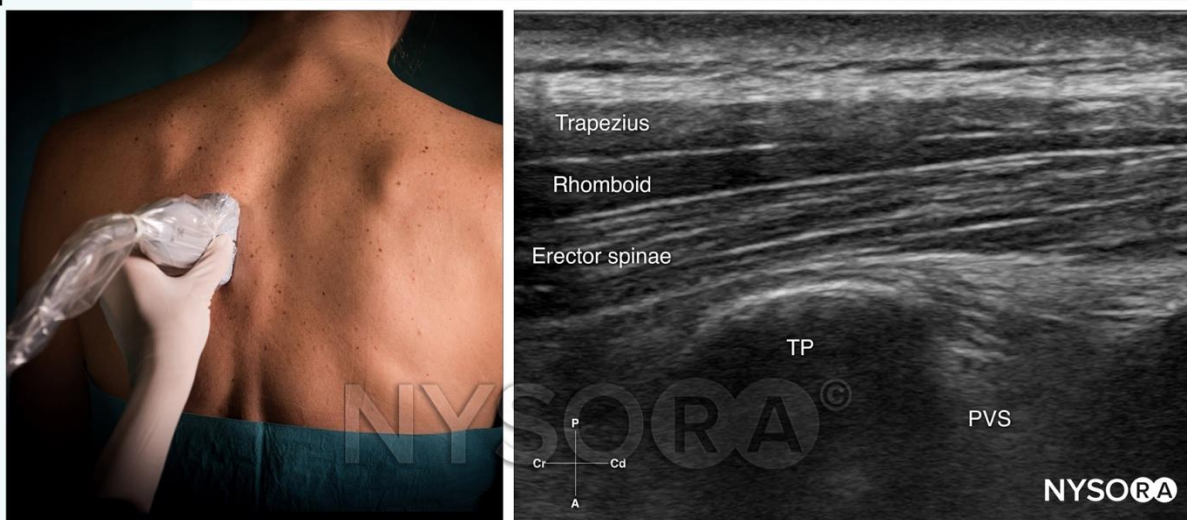
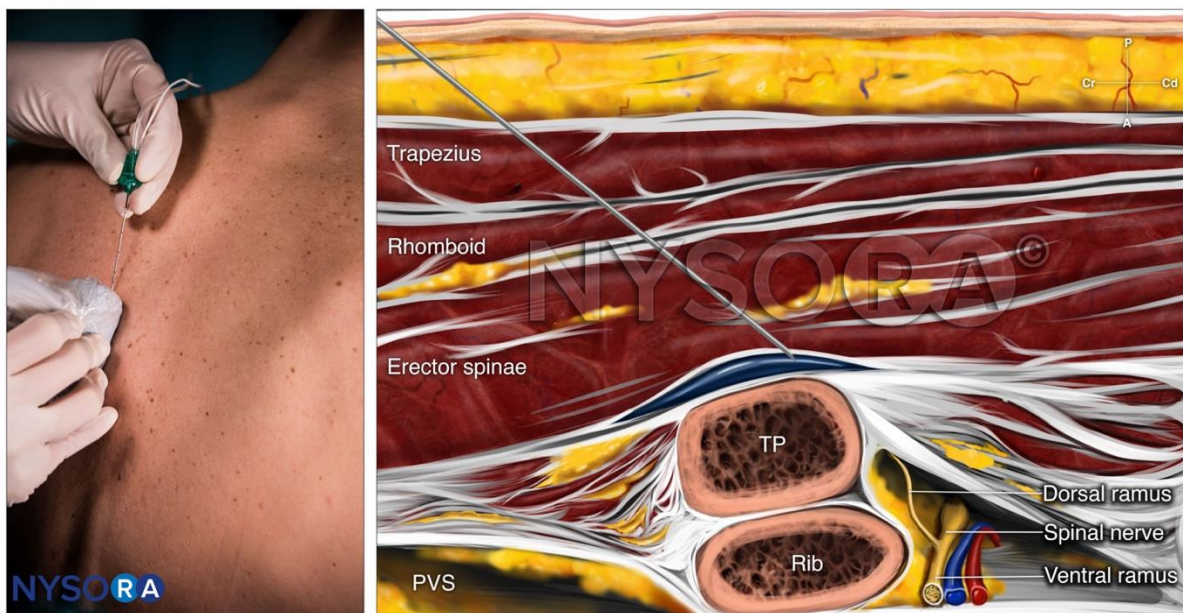


Figure B



SPECIAL CONSIDERATIONS

- In practice, the dose will range from 20ml to 40ml of 0.25% levobupivacaine (100mg = 4 vials of 0.25%).
- Dexamethasone 4mg mixed with local anaesthetic solution may be used to prolong the duration of the block by up to 9 hours.
- Dual operators should be used for a large volume block (>10ml injectate).
- Hydro-dissection with a small volume of saline can be used to localise the correct plane before injecting the local anaesthetic solution.
- Continuous cardiac monitoring and pulse oximetry is recommended during the procedure and for 15 minutes afterwards for a plane block technique.
- Reduce the injectate volume by 20% if your patient is known to have renal impairment, liver impairment or is cachectic (elderly - consider reducing dose).
- Onset of analgesia may take 15 to 30 minutes for planar blocks.

REFERENCES

1. Kumar G, Kumar Bhoi S, Sinha TP, Paul S. Erector spinae plane block for multiple rib fracture done by an Emergency Physician: A case series. *Australas J Ultrasound Med.* 2021;24: 58–62.
2. Krishnan, Sandeep, and Marco Cascella. 2021. "Erector Spinae Plane Block." In *StatPearls*. Treasure Island (FL): StatPearls Publishing.
3. "How to Perform an Erector Spinae Plane Block - ACEP Now." 2021. September 3, 2021. <https://www.acepnow.com/article/how-to-perform-an-erector-spinae-plane-block/>.
4. "Erector Spinae Plane Nerve Block." 2020. December 3, 2020. <https://www.nysora.com/erector-spinae-plane-block/>.
5. "How to Implement Ultrasound-Guided Nerve Blocks in Your ED - ACEP Now." 2018. July 18, 2018. <https://www.acepnow.com/article/how-to-implement-ultrasound-guided-nerve-blocks-in-your-ed/>.
6. May, L., C. Hillermann, and S. Patil. 2016. "Rib Fracture Management." *BJA Education* 16 (1): 26–32.