



Cervical Erector Spinae Block: An Alternative to Interscalene Block in The Setting of Severe Chronic Obstructive Pulmonary Disease

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Abstract

Hemi-diaphragm paralysis from interscalene nerve blocks (ISB) is almost 100%. This can be detrimental for respiratory function in patients with severe respiratory disease. We present a case of a patient with severe COPD who alternatively received regional anesthesia via an erector spinae plane (ESP) block catheter using ropivacaine. The patient had adequate pain control and tolerated the block without any complications or decline in respiratory status.

History and Procedure

HPI

- An 82-year-old female presented for a primary left total shoulder arthroplasty for severe shoulder arthropathy.
- PMH: Hypertension, hyperlipidemia, severe chronic obstructive pulmonary disease with 3L oxygen dependency, cerebrovascular accident, atrial fibrillation, history of deep vein thrombosis and pulmonary embolism status-post inferior vena cava filter placement, peripheral neuropathy, anxiety, and depression.
- Medications: losartan, spironolactone, furosemide, atorvastatin, albuterol, budesonide/formoterol, fluticasone furoate/umeclidinium/vilanterol, apixaban, metoprolol, gabapentin, and escitalopram.
- PFTs revealed FEV1 of 37%.

Procedure and Methods

- An ultrasound guided left cervical ESP block was performed at the level of T2.
- With patient in the sitting position, the T2 transverse process was identified.
- An 18G, 3.5-inch Tuohy needle was used. After saline hydro-dissection of the erector spinae muscle fascial plane, a catheter was threaded 9 cm cranially.
- She tolerated the procedure well and there were no post-procedure complications.

Intra-Operative

- Her surgery was performed under general anesthesia and intra-operative pain management included acetaminophen and ketorolac.

Post Operative

- After recovery in the PACU she was admitted for pain control.
- Pain catheter infusion of 0.1% ropivacaine was started at 8ml/hour.
- POD1: Max pain scores were 7/10 requiring 3 doses of 5mg/325mg oxycodone acetaminophen
 - Basal infusion rate was increased to 10ml/hour.
- POD2 and 3: Max pain scores 2/10 and no additional opioid requirement.
- POD4: Catheter removed at bedside prior to discharge to rehabilitation facility.
- Respiratory status remained stable for entire post operative period on 3L NC.

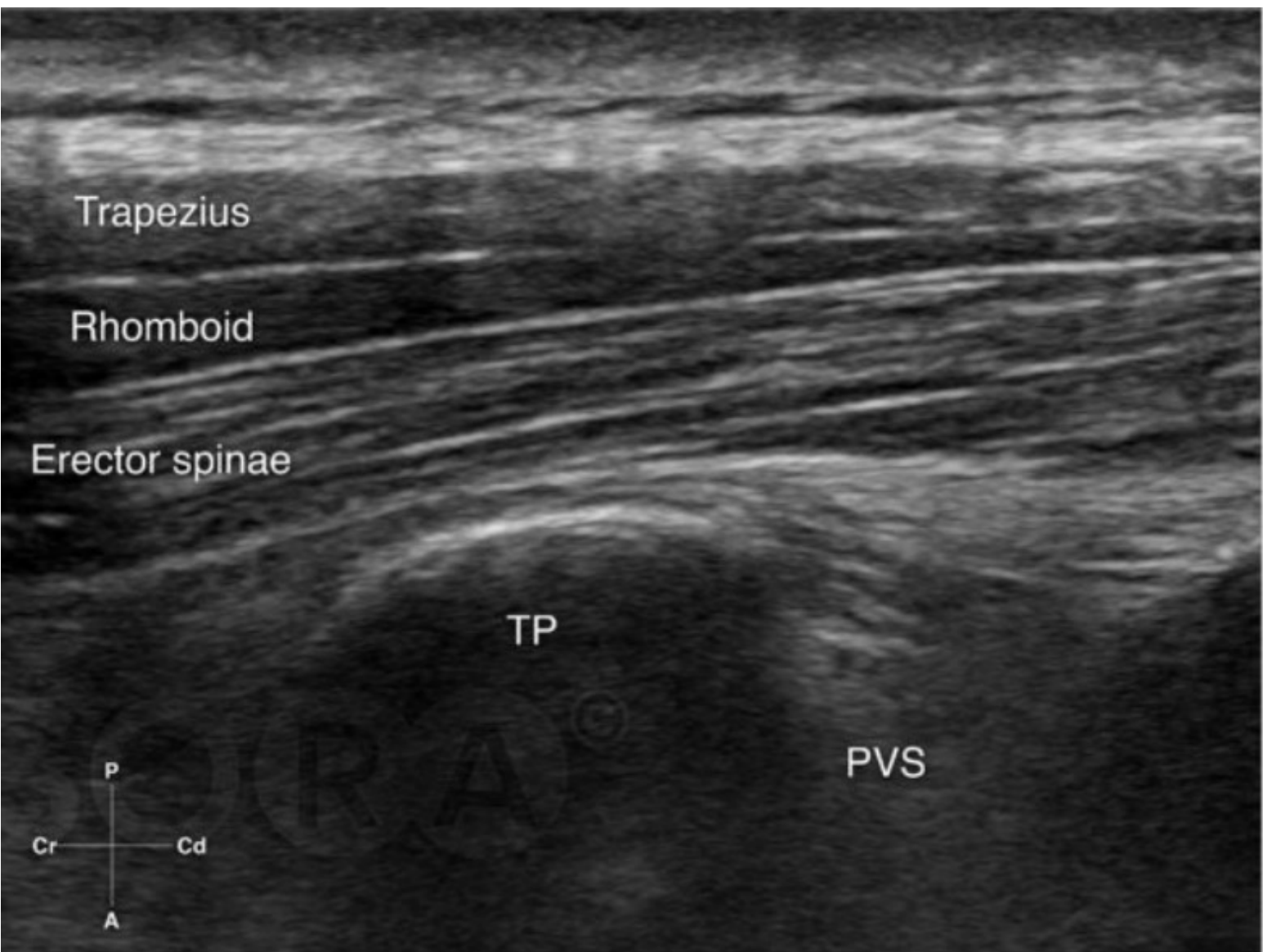


Figure 1: Ultrasound guided ESP block landmarks. ⁵

Discussion

Efficacy of ESPB

- Post operative pain is highest in the first 24-48 hours post shoulder surgery.
 - Pain scores that are reported are comparable to those after open surgeries.
- ESP block has been shown in several meta-analyses of varying quality, across multiple surgery types, to reduce postoperative opioid consumption and pain scores for up to 24 h compared with placebo or regular systemic analgesia.⁸
- When given as a single shot injection, the ESP block has been shown to be inferior to ISB, with reported pain scores being higher up to 48 hours post op.
 - However, there are limited studies comparing ESP block catheters to ISB.
- When compared to peri-articular joint injections intraoperatively, ESP block provided lower post-operative pain scores.
 - Mean pain score of 5 vs 2.5 between the two groups⁷

Placement and mechanism

- Local anesthesia is injected in the erector spinae plane fascia, superficial to the tip of the transverse process of the vertebrae and deep to the erector spinae muscles (Figure 1).
- Anesthetizes the dorsal and ventral rami of spinal nerves at the involved level.⁵
- When placed at T2, the local anesthetic likely spreads to the C4-C8 level³, however some literature reports variability in local anesthesia spread.⁹
- Provides a unilateral cutaneous sensory block of the branches of brachial plexus, musculocutaneous, axillary, median, radial, and ulnar nerves.⁵
- Despite the shoulder joint capsule innervation being C3-C4 from the superficial cervical plexus, studies show ESP block may provide sensory block to the shoulder joint as well.⁵
- It is a fascial plane block therefore success depends on the volume of local anesthetics between the muscle and the transverse process.⁵

Dosing Guidelines:

	Local Anesthetic	Concentration	Volume
Single shot	Ropivacaine	0.375% 0.25%	20-30 mL
Continuous Catheter Infusion	Bupivacaine	0.2%	-Infusion: 8-10 mLs -PCA bolus 5mLs -Lockout interval 60 minutes

Figure 2: Dosing of local anesthetic for ESP blocks. ⁵

Local Anesthesia Spread and Safety Profile

- Multiple MRI studies of local anesthetic spread report consistent spread into erector spinae muscles, paravertebral space, and neural foramina.
- There is reported inconsistency in cephalocaudal spread.
- Epidural spread or local anesthetic systemic toxicity is possible but has not been commonly observed. ^{9,10}

Conclusion

Despite the lack of literature comparing ESP block catheters with other alternative blocks, our case re-demonstrates the successful use of a cervical erector spinae plane catheter for post operative pain control in a patient with severe COPD undergoing shoulder surgery. Our patient did not experience any side effects from the block, which further supports the literature that ESP blocks are shown to have a low complication rate and are a safe alternative.

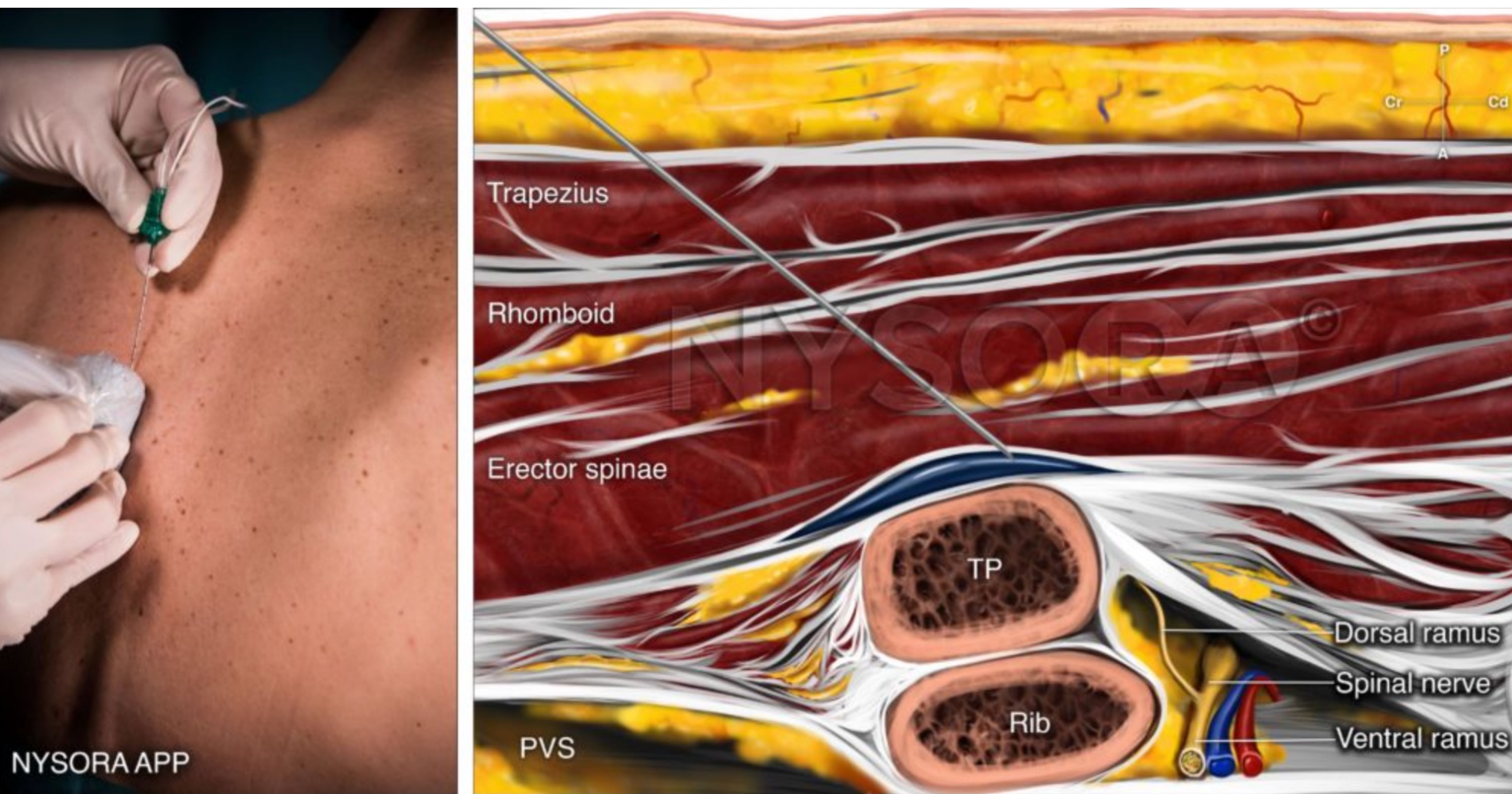


Figure 3: Ultrasound placement and needle path for ESP blocks. ⁵

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