

First Report of Bilateral Proximal Intercostal Blocks as an Alternative to Stellate Ganglion Block for Post-Traumatic Stress Disorder in a Patient with Myasthenia Gravis

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BACKGROUND

STELLATE GANGLION BLOCK (SGB) AND PTSD

SGB, a cervical sympathetic block, has gained recognition as a therapeutic intervention for Post-Traumatic Stress Disorder (PTSD) by modulating autonomic nervous system activity. PTSD is characterized by an overactive sympathetic response, and SGB attenuates this dysregulation by blocking the cervical sympathetic chain. Clinical studies have demonstrated its efficacy in alleviating PTSD symptoms, including anxiety, hypervigilance, and sleep disturbances.

CHALLENGES AND RISKS OF SGB

Contraindication for same-day bilateral procedures, bilateral phrenic, vagus, and recurrent laryngeal blocks could result in significant respiratory compromise. SGB carries some procedural risks that may limit its application in some patients. Though rare, these risks include:

- Recurrent laryngeal nerve blockade
- Vagus nerve blockade
- Phrenic nerve blockade, which leads to hemidiaphragmatic paralysis, reducing lung function and increasing the risk of respiratory depression – particularly concerning for patients with pre-existing neuromuscular weakness and/or diminished lung function.
- Contraindication for same-day bilateral procedures**, bilateral phrenic vagus and recurrent laryngeal nerve block could result in significant respiratory compromise.

DEFINING THE ASSESSMENT SURVEYS

- PCL-5**
(PTSD Checklist for DSM-5)
→ 20-item self-report tool for PTSD symptoms
→ Score 0-80 (≥ 31-33 suggests PTSD)
→ Higher scores = more severe symptoms
- GAD-7**
(Generalized Anxiety Disorder-7)
→ 7-question screening for anxiety
→ Score 0-21
→ Mild (5-9), Moderate (10-14), Severe (≥15)
- PHQ-9**
(Patient Health Questionnaire-9)
→ 9-item scale for depression
→ Score 0-27
→ Mild (5-9), Moderate (10-14), Mod-Severe (15-19), Severe (≥20)

MATERIALS AND METHODS

PATIENT DETAILS

- 51-year-old female with severe PTSD and well-controlled myasthenia gravis.
- Pre-procedure survey scores:
 - PCL-5 > 65 (severe PTSD)
 - GAD-7 > 21 (severe anxiety)
 - PHQ-9 > 19 (moderately severe depression)

PROCEDURE

- Rationale** > SGB risks (phrenic/recurrent laryngeal/vagus nerve blockade) contraindicated same-day bilateral block.
- Alternative** > Bilateral proximal intercostal blocks (PICBs) at T1-T2.
- Patient Positioning** > Seated, slight forward flexion for optimal ultrasound visualization.
- Ultrasound Localization** > High-frequency linear probe targeting posterior T1-T2 intercostal spaces.
- 1% buffered lidocaine at insertion site.
- Needle** > 21G × 100mm Facet S Tip (Pajunk).
- Injection Technique** >
 - Hydrodissection with normal saline confirmed positioning before injection.
 - 0.5% ropivacaine, 50 mg per side, in divided doses.
 - Procedures performed 15 minutes apart to monitor for adverse effects.
- No sedation required.**

POST-PROCEDURE

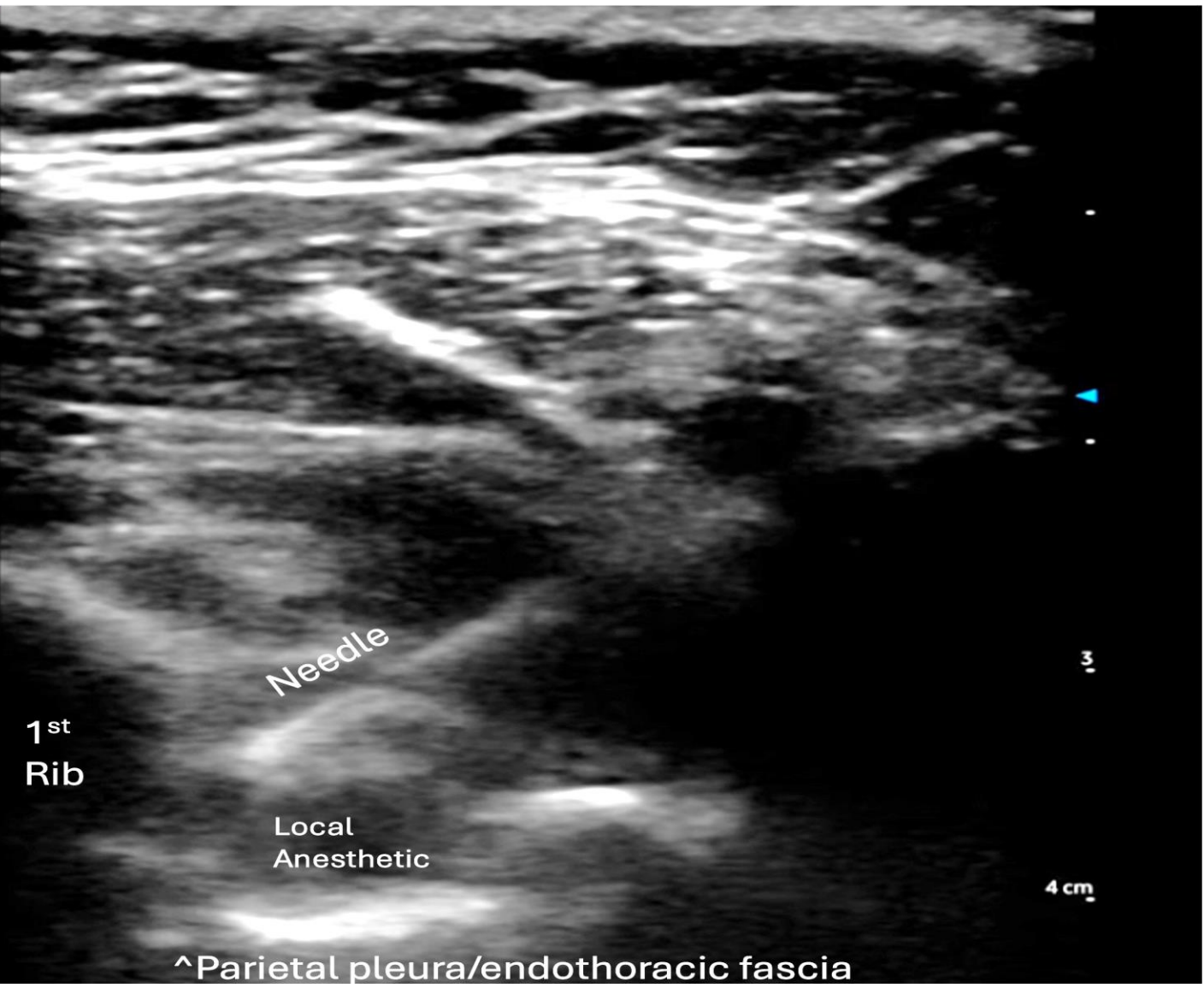
Patient discharged within 1hr with follow-up at 1 week, 1 month, 3 months. Survey Assessments are validated tools to track symptom changes pre- and post-intervention.

- Vitals, respiratory function, and symptom assessment were monitored for 30 minutes.
- No complications were observed (*respiratory distress, hemodynamic instability, neural blockade*).
- Patient discharged within 1 hour with follow-up at 1 week, 2 months, and 3 months.

BILATERAL PICBs

A Safe and Effective Alternative to SGB for PTSD

ULTRASOUND IMAGES



ANATOMICAL ILLUSTRATION

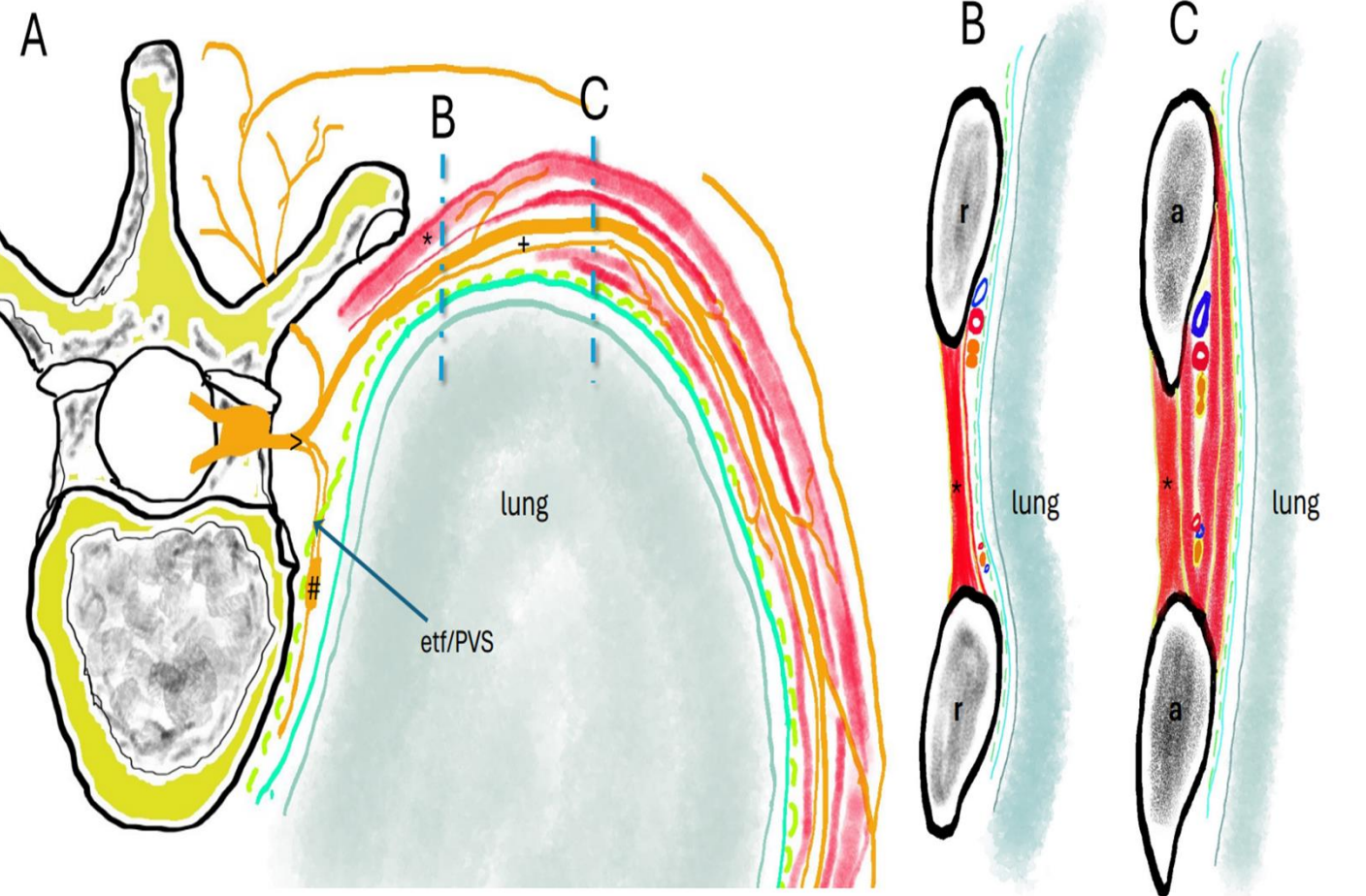


Figure 1A
Mid-thoracic axial plane view: > spinal nerve before branching; # sympathetic ganglion with the associated rami communicantes; + intercostal space containing the branching of the intercostal nerves) in orange; *external intercostal muscle (EIM below); etf/PVS and arrow - designating the previously described division of the paravertebral space (PVS) by the endothoracic fascia into posteromedial and anterolateral (the latter containing the sympathetic chain)²⁵

Figure 1B
Sagittal plane view (interrupted line B) of the proximal intercostal space; r - rib;

Figure 1C
Sagittal plane view (interrupted line C) of the intercostal space at or just lateral to the level of the costal angle - letter a. Enlarged intercostal spaces - vp - visceral pleura; pp - parietal pleura; etf - endothoracic fascia; EIM - external intercostal muscle; iim - internal intercostal muscle; iIM - innermost intercostal muscle; iIM - innermost intercostal muscle; scM - subcostal muscle; 1-nav - intercostal nerve, artery, vein; C-nav - collateral intercostal nerve, artery, vein.

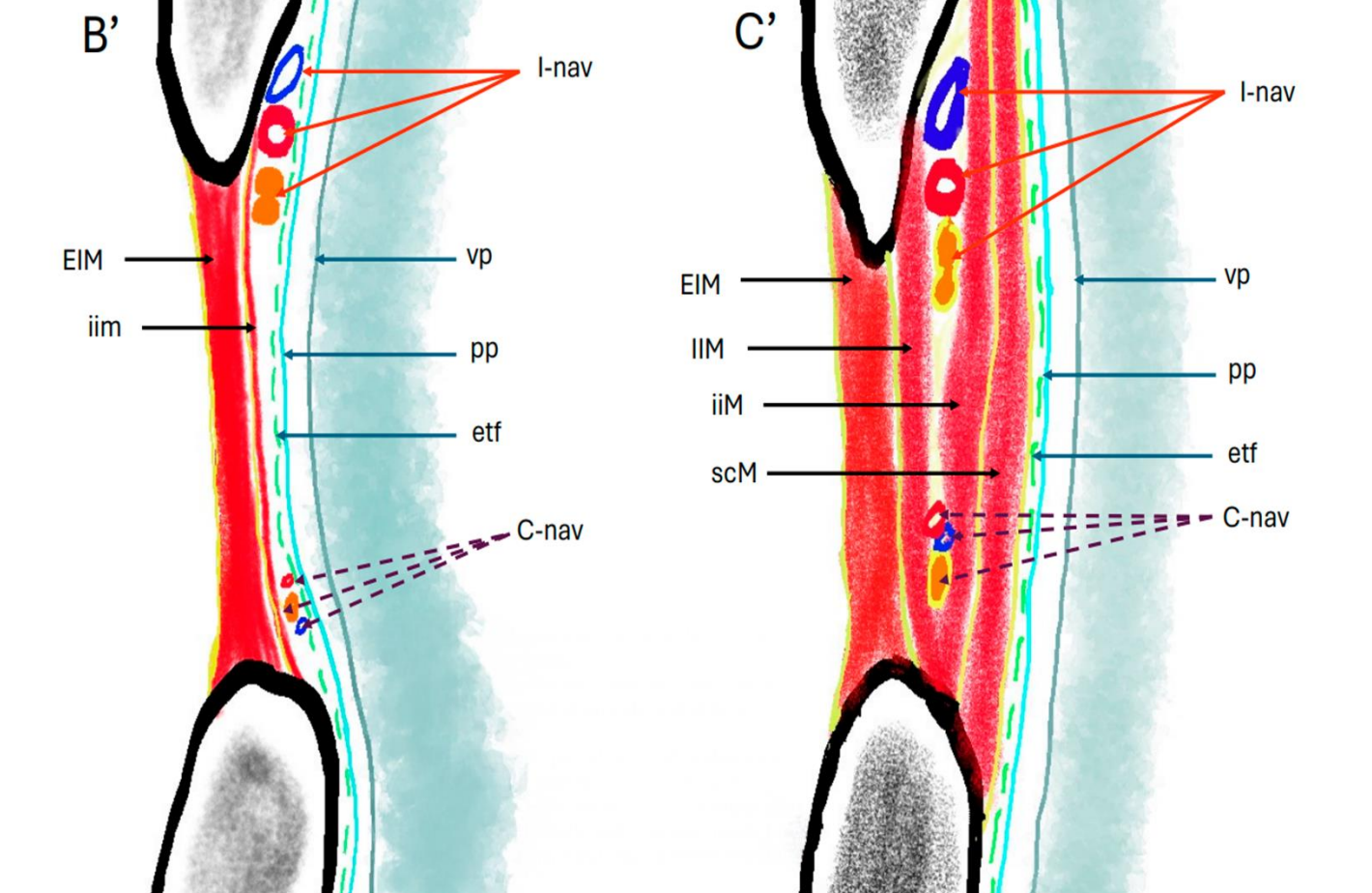


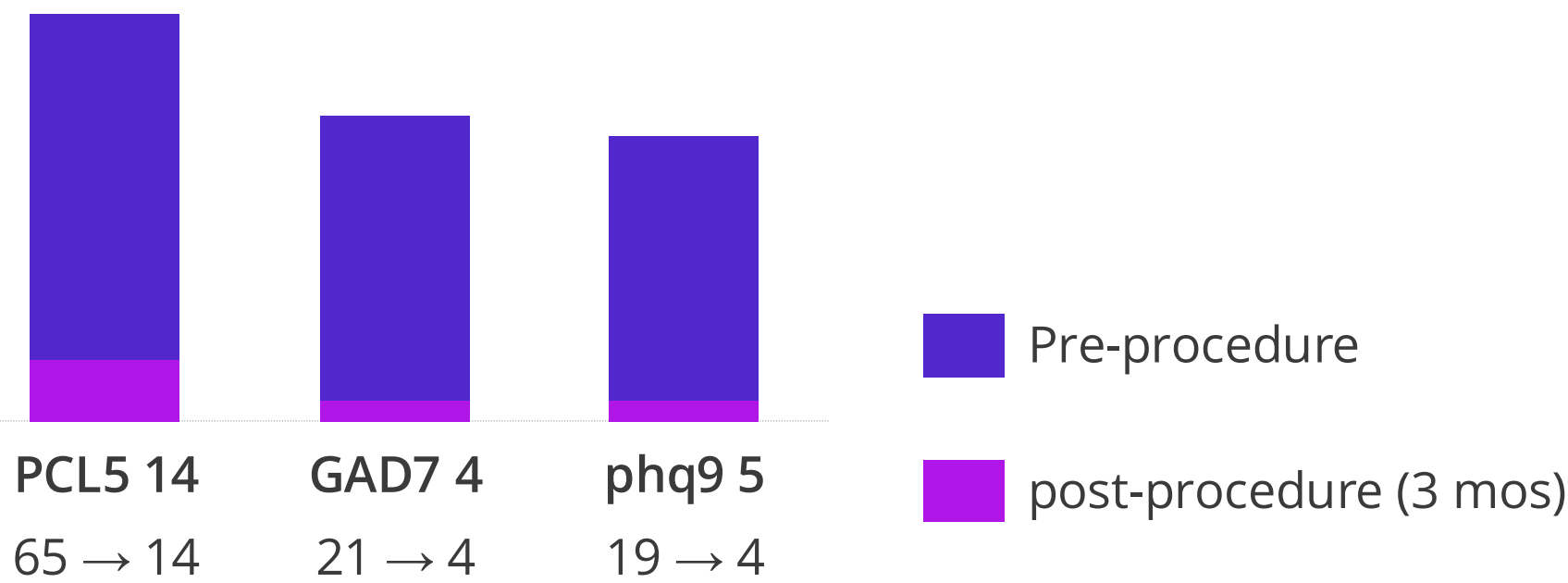
Figure 1B
Sagittal plane view (interrupted line B) of the proximal intercostal space;

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Sagittal plane view (interrupted line C) of the intercostal space at or just lateral to the level of the costal angle.

VP - visceral pleura; pp - parietal pleura; etf - endothoracic fascia; EIM - external intercostal muscle; iim - internal intercostal muscle; iIM - innermost intercostal muscle; iIM - innermost intercostal muscle; scM - subcostal muscle; 1-nav - intercostal nerve, artery, vein; C-nav - collateral intercostal nerve, artery, vein.

RESULTS

SURVEY	PRE	1 WEEK POST	1 MONTH POST	3 MOS POST
PCL5	65	16	20	14
GAD7	21	4	5	4
PHQ9	19	5	4	5



FINDINGS

- Bilateral PICBs demonstrated safety and efficacy for PTSD
- Alternative to SGB in complex comorbidity cases.
- No myasthenia gravis symptom exacerbation.
- Same-day bilateral blocks are safe.

ADVANTAGES OF PICB

- Targets sympathetic pathway while avoiding:
 - Recurrent laryngeal nerve, Vagus, and/or Phrenic nerve blockade.
- Anatomical basis for safer bilateral procedures.
- Effective autonomic nervous system modulation.

FUTURE DIRECTIONS

- Long-Term Outcomes:** Assess symptom relief and improvement at 1, 6, and 12 months post-procedure.
- Comparative Trials:** Conduct RCTs comparing PICB vs. SGB for PTSD and autonomic dysfunction.
- Mechanism Exploration:** Investigate PICB's effects on autonomic regulation, vagal tone, and sympathetic modulation.
- Expanded Indications:** Evaluate PICB for additional autonomic and neurological conditions:
 - Long COVID (autonomic dysfunction, neuroinflammation)
 - POTS and dysautonomia
 - Perimenopausal symptoms (hot flashes, sleep, mood)
 - Functional Neurological Disorders (FND)
 - Traumatic Brain Injury (TBI) (post-concussive syndrome)
 - Chronic pain syndromes (CRPS)
- Dose Optimization:** Determine ideal anesthetic concentration, volume, and duration for efficacy and safety.
- Safety Profiling:** Establish contraindications, patient selection criteria, and best practices for high-risk populations.

CONCLUSION

This is a single case report that can serve as a proof of concept for an alternative autonomic modulation method applicable to PTSD.

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