

BACKGROUND

- Stellate ganglion blocks (SGBs) have been utilized in a variety of conditions such as complex regional pain syndrome, ventricular tachyarrhythmias, and post-traumatic stress disorder (1).
- Single image-guided SGB approaches with either ultrasound or fluoroscopy have been proposed to improve accuracy and pain indexes and limit procedural complications such as accidental intravascular injection of local anesthetic agents, pneumothorax, and vascular puncture (2,3).

PURPOSE

- To enhance the safety of imaging of localized structures, visualize contrast spread to desired locations, and prevent the vascular spread of the local anesthetics, the authors propose a novel SGB approach using combined ultrasound and fluoroscopic guidance.

CASE DESCRIPTION

- A 58-year-old female with a past medical history of seizures, restless leg syndrome, migraines, and depression underwent dual image-guided SGB for atypical facial pain.
- She was placed supine on the procedure table with the neck slightly extended with a pillow beneath the shoulders, and the head rotated slightly to the opposite side to be blocked (**Figure 1**).
- Under sterile technique, a fluoroscopic beam was directed via an anterior-posterior approach to locate the C6 transverse process.
- A 20-gauge, 110-mm Pajunk® ultrasound needle was advanced in the plane under ultrasound guidance, avoiding any vascular structures to the posterior border of the longus colli muscle beneath the carotid artery (**Figure 2**).
- After negative aspiration, 3 cc of iopamidol contrast dye was injected under live fluoroscopy. If there was no vascular uptake of contrast dye or spread to the C7-T1 level, 5 cc of 0.25% bupivacaine was slowly injected with frequently intermittent aspirations (**Figure 3**).
- If the contrast spread was unsatisfactory, ultrasound was utilized, and the above procedure was repeated until a satisfactory contrast spread was obtained.

Combined ultrasound and fluoroscopic techniques for stellate ganglion blocks may offer a comprehensive and safer approach to prevent procedural complications

Proposed Technique

Patient Placement



Identify C6 Transverse Process with Fluoroscopy



Identify Soft-Tissue Structures Under Ultrasound



Repeat Fluoroscopy and Contrast and Anesthetic Injection

Repeat if there was unsatisfactory contrast spread



Figure 1: Patient is placed supine with head rotated away



Figure 2: Ultrasound image of successful needle placement avoiding local vascular structures during stellate ganglion block



Figure 3: Fluoroscopic image of successful needle placement and contrast spread for stellate ganglion block

DISCUSSION

- The current standard for SGB is to either use ultrasound or fluoroscopic-guided techniques. SGBs have traditionally been performed blindly by palpating the C6 transverse process or Chassaignac tubercle and injecting local anesthetic in the junction of the transverse process and vertebral body medially (4).
- Ultrasound-guided technique offers the ability to directly visualize vascular structures (i.e., carotid arteries) and soft tissue structures (i.e., thyroid) but is limited to identifying bone and deeper tissues and contrast spread, which can be performed with fluoroscopic approaches (5).

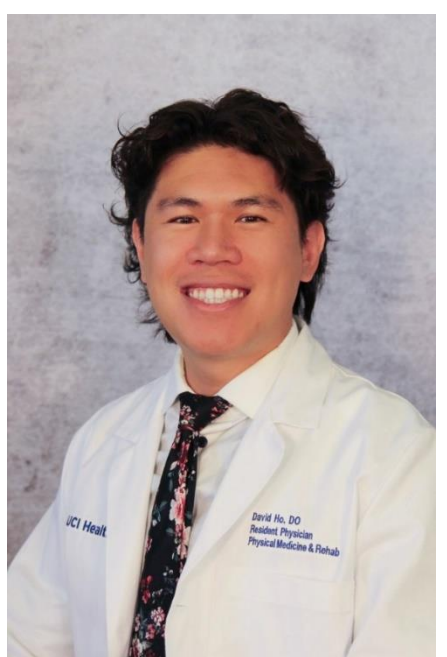
CONCLUSION

- This study, to the authors' knowledge, illustrates the first combined image-guided approach for SGBs.
- A limitation of this combined approach requires accessibility to both ultrasound and fluoroscopic imaging devices and expertise in both techniques.
- Further longitudinal studies are warranted to determine its clinical feasibility, and effectiveness in reducing complications compared to single image-guided approaches.
- This novel SGB technique has been performed on more than 100 patients in our institution without post-procedural complications reported.

REFERENCES

1. Kirkpatrick K, Khan MH, Deng Y, Shah KB. A Review of Stellate Ganglion Block as an Adjunctive Treatment Modality. Cureus. 2023;15(2):e35174. doi:10.7759/cureus.35174
2. Piraccini E, Munakomi S, Chang KV. Stellate Ganglion Blocks. In: StatPearls. StatPearls Publishing; 2024. Accessed July 21, 2024. <http://www.ncbi.nlm.nih.gov/books/NBK507798/>
3. Imani F, Hemati K, Rahimzadeh P, Kazemi MR, Hejazian K. Effectiveness of Stellate Ganglion Block Under Fluoroscopy or Ultrasound Guidance in Upper Extremity CRPS. J Clin Diagn Res. 2016;10(1):UC09-12. doi:10.7860/JCDR/2016/14476.7035
4. Rae Olmsted KL, Bartoszek M, Mulvaney S, et al. Effect of Stellate Ganglion Block Treatment on Posttraumatic Stress Disorder Symptoms: A Randomized Clinical Trial. JAMA Psychiatry. 2020;77(2):130. doi:10.1001/jamapsychiatry.2019.3474
5. Ghai A, Kaushik T, Wadhera R, Wadhera S. Stellate ganglion blockade-techniques and modalities. Acta Anaesthesiol Belg. 2016;67(1):1-5.

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