Treatment of Thoracic Outlet Syndrome with Scalene Brachial Plexus Block: A Case Report

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Introduction

Thoracic outlet syndrome (TOS) results from compression of the brachial plexus or subclavian vessels within the thoracic outlet and may be classified as neurogenic, venous, or arterial based on structures affected. Patients commonly present with upper extremity pain, numbness, paresthesias, and weakness. A scalene brachial plexus block is a diagnostic and therapeutic tool, as temporary symptom relief supports the diagnosis by identifying scalene muscle compression as the source of symptoms.

Case Report

A 37-year-old woman developed persistent right upper extremity pain, numbness, paresthesias, and episodic finger cyanosis following a low-speed motor vehicle collision with her outstretched arm on the hood of the vehicle. Initial imaging was unremarkable, and symptoms persisted despite physical therapy. A computed tomography angiography (CTA) of chest with provocative positioning demonstrated severe right brachiocephalic vein narrowing between the first rib and clavicle during arm elevation, consistent with dynamic venous compression. She was referred for an anterior scalene block as a diagnostic and therapeutic evaluation for suspected thoracic outlet syndrome.

Materials and Methods

A 12-MHz linear ultrasound transducer was used to identify the anterior and middle scalene muscles, subclavian artery, and cervical plexus to plan the needle trajectory. Following sterile skin preparation and ultrasound probe setup, a 2.5-inch, 25-gauge needle was advanced under continuous ultrasound guidance with fluoroscopic confirmation to the cervical plexus along the middle scalene muscle. After negative aspiration, 5 mL of a solution containing 1% lidocaine, 0.25% bupivacaine, and 10 mg dexamethasone was injected. The needle was withdrawn, and the patient tolerated the procedure without complications. Institutional Review Board oversight was not required for this case report following review by the SLUHN IRB, and all patient identifiers were removed to maintain anonymity.



Figure 1: Fluoroscopic imaging of needle tip placement for right sided scalene brachial plexus block

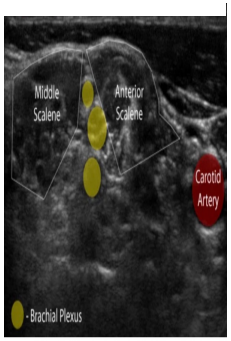


Figure 2: Ultrasound imaging demonstrating anatomical location of brachial plexus in relation to scalene muscles

Results

A scalene brachial plexus block was performed in April 2026, resulting in near-complete symptom relief for several hours before recurrence of right upper extremity pain, numbness, and paresthesias later that day. The positive but transient response supported the diagnosis of thoracic outlet syndrome and identified the patient as an appropriate candidate for first rib resection, which was performed one month later. At follow-up in August 2026, the patient reported sustained improvement in pain, range of motion, swelling, and discoloration with overhead activity.

Conclusions

Scalene block is a valuable adjunct in both the diagnosis and management of thoracic outlet syndrome (TOS). By temporarily anesthetizing the brachial plexus, the procedure helps determine whether scalene muscular compression contributes to a patient's symptoms, thereby improving diagnostic accuracy, providing temporary relief, and aiding in patient selection for surgical intervention.

References

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