

LETTER TO THE EDITOR

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OXFORD

Ultrasound-Guided Diagnosis and Management for Quadrilateral Space Syndrome

Dear Editor,

A 54-year-old female presented with progressive dull pain in her left posterolateral shoulder for the last six months. There were no specific exacerbating/relieving factors regarding the pain, nor did she have any numbness or subjective weakness in the ipsilateral arm. She denied any systemic disease or related antecedent injury.

Physical examination revealed focal dimpling of soft tissue on the left lateral deltoid region with free shoulder range of motions. There was no weakness in shoulder abduction, external/internal rotation, or elbow flexion. Sensory testing was also normal. Electrodiagnostic evaluations (performed in a previous medical center) showed normal nerve conduction velocities of median, ulnar, and radial nerves of the left arm, with unremarkable needle electromyographic findings for left deltoid, biceps, and brachioradialis muscles.

Ultrasonography (US) was then performed to clarify the etiology. The probe was placed slightly below the posterior glenohumeral joint, parallel to the long axis of the humeral shaft (Figure 1A), and it revealed dilated

posterior circumflex humeral artery (PCHA) around the axillary nerve at the left quadrilateral space. The left deltoid muscle was also found to be slightly thinner and hyperechoic, suggesting mild atrophy (Figure 1). Magnetic resonance imaging (MRI) confirmed the dilated PCHA without any other space-occupying lesion (Figure 2). Quadrilateral space syndrome (QSS) with axillary nerve entrapment was suspected. US-guided diagnostic axillary nerve block using 2 mL 1% xylocaine was performed (Figure 3). She had immediate partial pain relief after the injection and later on reported greater than 50% pain reduction after a two-week follow-up. Physical modalities and stretching for pain relief were arranged as she declined further surgical consultation.

Quadrilateral space syndrome (QSS) is a rare neurovascular entrapment syndrome that results due to the compression of axillary nerve (neurogenic QSS) and/or PCHA (vascular QSS) [1] in the quadrilateral space, which is bounded by humerus laterally, long head of the triceps muscle medially, teres minor muscle superiorly, and teres major muscle inferiorly [2]. The etiologies of the entrapment may be structural, including fibrous muscle bands, hypertrophy of the surrounding muscles, paralabral shoulder cysts, ganglions, tumors, and

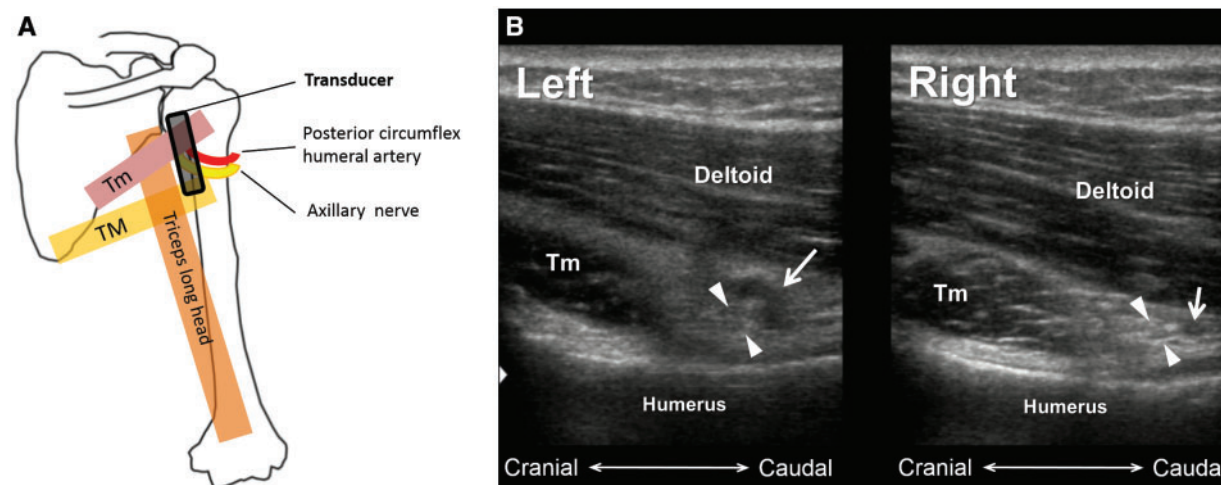


Figure 1 Ultrasonographic imaging of the quadrilateral space. (A) The probe was placed parallel to the long axis of the humeral shaft, around 2 cm below the posterolateral border of the acromion on the dorsal aspect of the arm. (B) Ultrasonographic imaging shows tortuous posterior circumflex humeral artery (arrow) around the axillary nerve (arrowheads) on the left shoulder. Also note mild thinning in the left deltoid muscle. Tm = teres minor muscle; TM = teres major muscle.

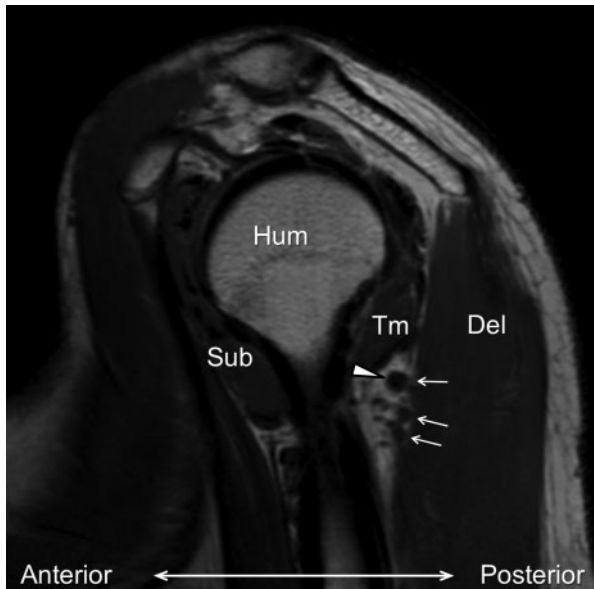


Figure 2 Magnetic resonance imaging of the left shoulder. Proton density-weighted image, sagittal section, shows dilated posterior circumflex artery (arrows) around the axillary nerve (arrowhead) at the quadrilateral space. Del = deltoid muscle; Hum = humerus; Sub = subscapularis muscle; Tm = teres minor muscle.

hematoma in the quadrilateral space [3]. It could also ensue due to dynamic compression during shoulder abduction and external rotation. Besides, repetitive mechanical injuries to the PCHA as it passes through the tight quadrilateral space could lead to thrombosis and/or aneurysm formation with distal embolization and digital ischemia, and sometimes concomitant neurogenic QSS [4].

Typical presentation of QSS is that of poorly localized posterior shoulder pain, exacerbated by overhead activities. The pain is not necessarily localized to the quadrilateral space and can radiate in a nondermatomal pattern. Paresthesia is not a consistent symptom, and weakness occurs in severe cases with teres minor and deltoid muscle atrophy [4]. Some patients, as demonstrated in the present case, compensate well with limited disability if rotator cuff function is preserved [5].

Because of a lack of pathognomonic symptoms and signs, QSS is difficult to diagnose clinically and it may mimic other conditions such as thoracic outlet syndrome and rotator cuff pathologies [6]. There is currently no “gold standard” imaging for diagnosing QSS. Even though MRI may help identify the etiology, there is limited literature regarding its accuracy in the diagnosis. As such, US-guided axillary nerve imaging/block serves well in suspected cases [7].

The management of QSS is mainly conservative, and surgery should be considered if there is no evidence of clinical improvement or electrophysiological recovery after physical therapy. US confers several advantages for imaging [8] and performing interventions for QSS [6,9],

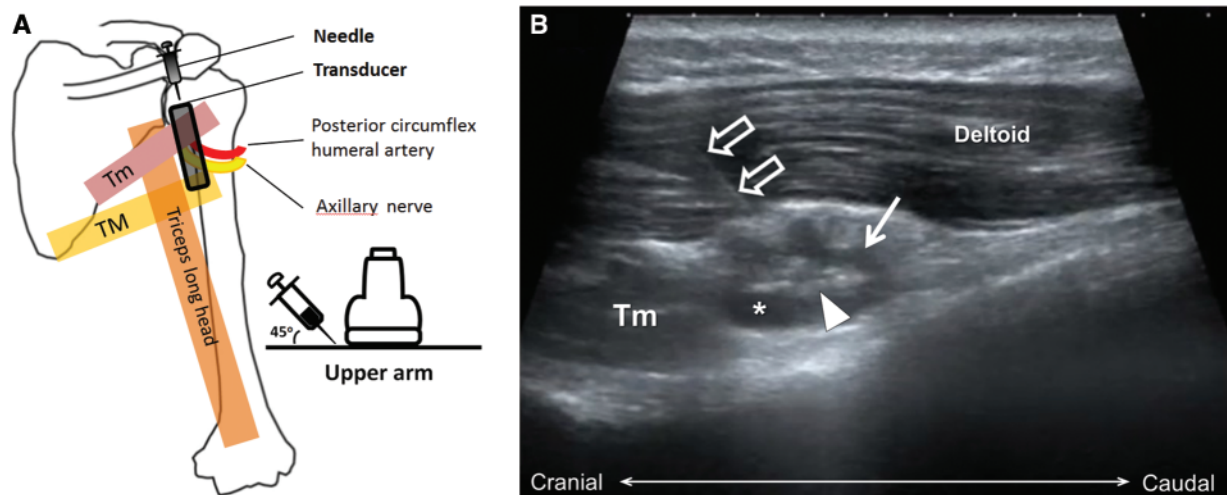


Figure 3 Ultrasonography-guided axillary nerve block. (A) Placement of the probe and the needle. (B) Ultrasound-guided perineural injection of the axillary nerve (arrowhead) with direct in-plane technique. Arrow represents posterior circumflex humeral artery, void arrows the needle, and asterisk the injectant. Tm = teres minor muscle; TM = teres major muscle.

especially for patients who do not respond to conservative treatments. US-guided perineural steroid injections or pulsed radiofrequency neuromodulation of the axillary nerve can be considered in patients in whom a diagnosis of QSS has been established based on temporary pain relief following a diagnostic US-guided block with local anesthetics.

Conflicts of interest: None.

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