Predominant infraspinatus muscle weakness in suprascapular nerve compression

Case illustration

ROBERT J. SPINNER, M.D., ROBERT L. TIEL, M.D., AND DAVID G. KLINE, M.D.

Department of Neurosurgery, Louisiana State University Medical Center, New Orleans, Louisiana

KEY WORDS • suprascapular nerve • nerve compression • anatomical variation

Isolated infraspinatus muscle atrophy from distal suprascapular nerve compression at the spinoglenoid notch has become increasingly recognized. Predominant infraspinatus muscle weakness combined with subtle clinical or electrical signs of suprascapular involvement results from suprascapular nerve compression more proximally at the transverse scapular ligament, a site that typically produces a more equal pattern of supra- and infraspinatus muscle dysfunction. Such preferential infraspinatus muscle weakness may occur as a result of selective fascicular injury or variant anatomy of the suprascapular nerve.

This 38-year-old man had right shoulder pain for 2 years and external rotation weakness for 6 months. He could not hit a tennis backhand as strongly as he used to, and switched to a slice and then a two-handed shot. Complete muscle testing demonstrated weakness only in the infraspinatus (3/5) and supraspinatus (4+/5) muscles, as well as selective atrophy in the infraspinous fossa. The patient’s sensation, reflexes, and range of motion were normal. Electromyography demonstrated 3+ positive sharp waves and diffuse fibrillations in the infraspinatus but only 1+ polyphasic units in the supraspinatus muscle without fibrillations or positive waves. Erb’s point stimulation to the infraspinatus and supraspinatus muscles induced prolonged latencies at 5.3 msec and 5.2 msec and reduced amplitudes of 0.665 mV and 9.089 mV, respectively. Magnetic resonance (MR) imaging of the shoulder revealed denervation of the infraspinatus muscle with no other pathological features, and results of MR imaging of the neck were normal. Through a posterior approach, the suprascapular nerve was identified proximal to the transverse scapular ligament. The major nerve branch to the supraspinatus muscle passed over (rather than under) the ligament along with the scapular artery (Fig. 1). A pseudoneuroma located directly under the ligament was identified once the ligament was incised. The major nerve branch to the supraspinatus muscle had arisen proximal to the pseudoneuroma, and a smaller branch to the supraspinatus muscle was identified more distally; hence, most (but not all) of the supraspinatus muscle was spared by this lesion, which predominantly affected the infraspinatus. Neurolysis was performed and proximal stimulation yielded contraction in both muscles. The patient’s shoulder pain resolved immediately after surgery. He returned to playing tennis 8 months later and regained normal abduction, nearly full external rotation, and shoulder bulk after 18 months.

The suprascapular nerve is a mixed motor/sensory nerve. Normally it passes beneath the transverse scapular ligament, whereas the transverse suprascapular artery and vein pass above the ligament. Beneath or within 1 cm of the ligament, the nerve gives off one to two branches to the supraspinatus muscle and twigs to the posterior shoulder capsule. It then passes around the lateral margin of the scapular spine (spinoglenoid notch), variably through an inferior transverse scapular ligament, and provides three or four branches to the infraspinatus muscle.

This anatomical branching variation has been identified in up to 3% of cadavers, yet it is rarely mentioned in clinical descriptions of suprascapular nerve lesions. Knowledge of this phenomenon is important in understanding the pattern of clinical presentation and avoiding incorrect localization or iatrogenic injury at surgery.

References


Fig. 1. Normally, the major supraspinatus nerve (n.) branch arises distal to the transverse scapular ligament and passes under it, whereas the artery (a.) runs over it (A). However, it may arise proximal to the ligament and run over the ligament together with the artery (B). m. = muscle.