Arthroscopic release and labral repair for bifocal compression of the suprascapular nerve

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Abstract

We present a rare case of combined proximal and distal compression of the suprascapular nerve causing supra- and infraspinatus weakness and wasting in a 17-year-old rower. Clinical findings, magnetic resonance imaging and electromyographic studies confirm this. The case was managed with an arthroscopic approach, consisting of arthroscopic labral repair and decompression of a paralabral cyst, combined with arthroscopic release of the transverse scapular ligament. An excellent result was achieved, with the patient returning to full competitive rowing prior to the 6-month clinical review. This case highlights the interesting nature of bifocal compression of the suprascapular nerve, as well as the successful use of arthroscopic techniques to manage the problem.

Keywords

labral cyst, labral tear, SLAP, spinoglenoid cyst, suprascapular nerve

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Introduction

Suprascapular nerve entrapment accounts for 1% to 2% of all cases of shoulder pain.¹ It is a rare entity that can often be missed. The suprascapular nerve is a mixed nerve originating from the upper trunk of the brachial plexus. Running laterally beneath trapezius and omohyoid, it enters the supraspinous fossa through the suprascapular notch, below the transverse scapular ligament. By contrast, the suprascapular artery runs superficial to the transverse scapular ligament, making it vulnerable to damage during surgery in this region. The nerve gives off branches to the supraspinatus muscle here. It continues past the spinoglenoid notch to the infraspinous fossa, giving branches to infraspinatus. The nerve generally has two sites of compression: proximal lesions at the suprascapular notch will result in weakness to both supra- and infraspinatus muscles, whereas compression at the spinoglenoid notch results in weakness of infraspinatus.²

Lesions causing compression of the suprascapular nerve have become increasingly recognized in the recent literature. Kopell and Thompson initially described suprascapular nerve dysfunction at the suprascapular notch in 1959.³ Subsequently, trauma/

fracture, overuse, overhead sports, anatomic variations, excessive scapular motion or spinoglenoid cysts have all been implicated.^{1,4,5} Non-operative therapy has had limited success where anatomical lesions cause suprascapular nerve dysfunction and surgical intervention is usually required.^{6,7} Pain relief is generally achieved after surgery, although recovery of strength and shoulder function is much less consistent, with varying results.^{2,7–9}

There is a significant body of literature now reporting the advantages of an arthroscopic technique over traditional open procedures for suprascapular nerve decompression.^{6,9–14} Rarely, a proximal suprascapular neuropathy is caused by a bifocal compression at the spinoglenoid and suprascapular notch. We report a case of a multicameral paralabral cyst causing such

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Figure 1. T2-weighted, axial slices demonstrating large cystic structure at the spinoglenoid notch.

Figure 3. T2-weighted coronal slice demonstration of a large cyst extending to transverse scapular ligament.

Figure 2. T2-weighted, axial slice demonstrating large cystic structure extending to the suprascapular notch.

Figure 4. Arthroscopic view of labral and superior labral anterior posterior (SLAP) tear. Arthroscope view from the posterior portal.

compression, as well as the results of arthroscopic treatment aimed at repairing the glenoid labrum in conjunction with decompression of the suprascapular notch.

Case Report

A 16-year-old male, right-handed rower in secondary school presented with a 12-week history of right-sided

shoulder pain, preventing him from participating in his sporting activities. There was no history of trauma. The pain had developed after rowing training, and had initially improved somewhat with rest and physiotherapy. With further attempts to resume rowing training in preparation for an upcoming competition, the pain had become increasingly severe with associated weakness.

Clinical examination demonstrated marked wasting of both supra- and infraspinatus muscles on the right side. Abduction and external rotation were grade 4/5 in strength, O'Brien's test was positive. The patient demonstrated full range of motion (ROM) with no signs of anterior or posterior instability. Clinical tests for subscapularis were normal.

Figure 5. Arthroscopic view of labral and superior labral anterior posterior (SLAP) tear. Arthroscope view from the posterior portal.

Figure 7. Suprascapular notch view pre-decompression.

Figure 6. Posterior arthroscopic view post-labral repair.

Figure 8. Suprascapular notch view post decompression of suprascapular nerve.

Magnetic resonance imaging (MRI) revealed a large cyst arising from the postero-superior glenoid labrum extending past the spinoglenoid notch into the suprascapular notch. There was significant atrophy of supra and infraspinatus muscles. No rotator cuff tears evident. Electromyography (EMG) studies showed severe denervation to the right infraspinatus muscle with moderate denervation of supraspinatus. The remainder of the brachial plexus was normal to examination.

At arthroscopy, all chondral surfaces were found to be normal. There was a small tear under the superior labrum and a separate posterior labral tear. The paralabral cyst was decompressed from within the joint by the use of shaver suction as well as pressure with the probe over the cyst. The superior labral tear was repaired via two anchors placed both anterior and posterior to the biceps tendon using the anterosuperior portal. The posterior labral tear was repaired with an additional two anchors via the posterolateral portal. The arthroscope was then introduced into the

subacromial space via the lateral portal and the transverse scapular ligament identified medial to the conoid ligament insertion. Dissection in this area can be time consuming and difficult, and is aided by the use of a modified Neviaser portal. This portal lies between the clavicle and spine of the scapula, approximately 7 cm medial to the lateral border of the acromium as described by LaFosse et al.¹⁰ Importantly, the suprascapular artery is identified running superficial to the transverse scapular ligament. Care is taken to protect this vessel, to prevent post-operative bleeding. The ligament was divided under direct vision and the suprascapular nerve released.

Post-operatively, the patient was placed in a sling for 4 weeks with active ROM exercises allowing elevation to shoulder height. Thereafter, full ROM with physiotherapy was commenced. Repeat EMG studies at 3 months post-operatively demonstrated an excellent level of reinnervation of both supra- and infraspinatus

Figure 9. Three-monthly post-operative T2-weighted Magnetic resonance imaging (MRI) (axial) demonstrating resolution of a paralabral cyst.

Figure 10. Three-monthly post-operative T2-weighted magnetic resonance imaging (MRI) (coronal) demonstrating resolution of a paralabral cyst.

muscles with resolution of fibrillations in infraspinatus. MRI studies at 3 months post-operatively showed complete resolution of the complex paralabral cyst. Clinical review revealed mild residual wasting but improved strength of supra- and infraspinatus.

The patient returned to rowing shortly after the 3-month review and, within 6 months post-operatively, had returned to the 'First VIII' winning a prestigious event for his school at a regatta. Interestingly, in conjunction with his physiotherapist, the patient switched

to the strokeside of the boat (port) to reduce the load on the biceps and labrum during the catch phase of the rowing cycle.

Discussion

Spinoglenoid cyst formation is now a well-recognized cause of shoulder dysfunction and pain. Classically, it causes infraspinatus weakness. This case demonstrates that a large cyst tracking proximally to the suprascapular notch can result in both infra- and supraspinatus weakness. This contrasts with the notion that proximal suprascapular nerve lesions are generally caused by local anatomical variations of the suprascapular notch. Narrow V-shaped notches, variations to the superior transverse ligament, including calcification, bifid, trifid or hypertrophied ligaments, have all been identified.^{5,15,16}

It is well documented in the literature that conservative therapy for suprascapular nerve lesions associated with structural abnormalities is often unsuccessful.^{4,6,7,10,17} It is our view that, in the absence of weakness or muscle atrophy, a period of conservative therapy consisting of rest, physiotherapy and stretching may be pursued. In the setting of muscle atrophy and weakness, such an approach is unlikely to be successful. Other studies have advocated an operative approach in the setting of compression due to a space occupying lesion,^{8,18} although spontaneous resolution of ganglion cysts has been documented with MRI.¹⁹ There is still some controversy regarding the exact treatment algorithm for each issue. Various methods have been described for the treatment of spinoglenoid cysts associated with labral tears causing suprascapular nerve impingement. These include open excision of the cyst, arthroscopic evacuation of the cyst via an intra-articular approach or a subacromial approach, or simple treatment of the associated labral tear only. All have had reports of success.^{2,4,6,8-10,12,13,17,20}

The combination of a labral tear and a proximal suprascapular nerve lesion is much less frequently reported in the literature. Hosseini et al. reported on a case of concurrent superior labral anterior posterior (SLAP) tear and proximal suprascapular nerve entrapment with good success after arthroscopic repair of the labrum and release of the superior transverse ligament.⁹ This case differed from our reported case in that there was a SLAP tear evident, with proximal suprascapular nerve compression confirmed on EMG testing, but no cyst formation. On release of the superior transverse ligament, strangulation marks were noted on the suprascapular nerve. Excellent recovery was made in this case soon after arthroscopic treatment.

Werner et al. described a technique of arthroscopic labral repair with a subacromial exposure of a large

spinoglenoid cyst causing pain and weakness to both supra- and infraspinatus muscles.¹⁷ In their technique, the subacromial exposure of the paralabral cyst allowed evacuation of the cyst under direct vision and, at 3-month review, the patient's symptoms had improved dramatically.

We feel that the mechanism of injury here is particularly interesting. Our hypothesis is the repetitive stress during the catch phase of the rowing cycle was a significant contributor to the development of the labral tearing and subsequent cyst formation. Previous studies have implicated overhead sports such as tennis, volleyball, baseball and weight lifting in traction and repetitive microtrauma to the suprascapular nerve resulting in conduction impairment.^{8,21} As such, in conjunction with the patient's physiotherapist and rowing coach, he was switched to the opposite side of the boat in an attempt to prevent further injury to the patient's damaged labrum.

This case highlights the clinical scenario whereby a glenoid labral tear with resulting cyst formation has caused a proximal suprascapular neuropathy. We found the mechanism of injury interesting in that the patients position in the rowing boat, in conjunction with the particulars of his technique, possibly contributed to the site of development of the labral tearing. In keeping with other published data, a fully arthroscopic approach to these lesions can result in excellent outcomes.

Declaration of conflicting interests

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