JSES Reviews, Reports, and Techniques 4 (2024) 91–95

Contents lists available at ScienceDirect

JSES Reviews, Reports, and Techniques

journal homepage: www.jsesreviewsreportstech.org

Intermuscular lipoma in the supraspinatus fossa: a case report

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ARTICLE INFO

Keywords:
Suprascapular nerve entrapment
Intramuscular lipoma
Spinoglenoid notch
Rotator cuff tear
Supraspinatus fossa
Shoulder pain
Arthroscopic rotator cuff repair

Suprascapular nerve entrapment syndrome is an uncommon and often overlooked source of shoulder pain. Clinical presentation varies, but frequently persistent shoulder pain and weakness with forward flexion, external rotation, and fatigue with overhead activities are noted. Pain from suprascapular nerve impingement is described as dull and achy and is typically localized to the posterior and posterolateral aspects of the shoulder. Identified causes of suprascapular nerve entrapment include direct compression to the nerve by a space-occupying lesion, most commonly cystic in nature, or traction injuries to the nerve, which may be secondary to tearing or retraction of the rotator cuff.[1,3,5,10,14] We present a case of a 78-year-old female with an acute onset of shoulder pain and weakness after a ground-level fall. In addition to a rotator cuff tear, her magnetic resonance imaging (MRI) revealed a large homogenous mass in the supraspinatus fossa extending into the spinoglenoid notch. Surgical repair of the rotator cuff and excision of the lipoma led to the resolution of the patient's symptoms.

Case report

Patient presentation

A 78-year-old, right-hand dominant woman with a medical history of hypertension, atrial fibrillation, and anemia presented to an outside clinic complaining of pain and weakness in her left shoulder after a ground-level fall. Plain radiographs were negative at the time, and she was prescribed a course of physical therapy. Further conservative treatment, including anti-inflammatories, rest, and activity modification, failed to provide further improvement of her symptoms, and two months after her original injury, she was referred to us for treatment. She presented to our clinic complaining of ongoing pain, weakness, and decreased active range of motion. She was having trouble reaching away from her body and performing activities of daily living. She did not have shoulder symptoms prior to her fall.

Physical examination

On examination, palpation of the left shoulder revealed a large, soft, palpable mass in the supraspinatus fossa and tenderness to palpation over the proximal bicipital groove. There was no appreciable atrophy within the infraspinatus fossa. The acromioclavicular joint was nontender to palpation. Passive left shoulder range of motion was flexion to 150°, abduction to 90°, external rotation to 70°, and internal rotation to 50°. There was evidence of scapular compensation to accommodate decreased cuff strength. Specialty exams revealed positive empty can sign and weakness with external rotation. The remainder of her motor exam, including function of her deltoid, biceps, and forearm musculature was entirely normal. Her sensory exam was normal.

Imaging

Repeat radiographs, including three views of the left shoulder, revealed no obvious abnormalities with a well-maintained glenohumeral joint space and minimal degenerative changes. MRI without contrast revealed a 3.8 × 2.7 x 5.9 cm homogeneous fatty mass within the supraspinatus muscle extending through the spinoglenoid notch into the infraspinatus muscle (Fig. 1, *a* and *b*).

Insitutional review board approval was not required for this case report.

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https://doi.org/10.1016/j.xrrt.2023.09.004

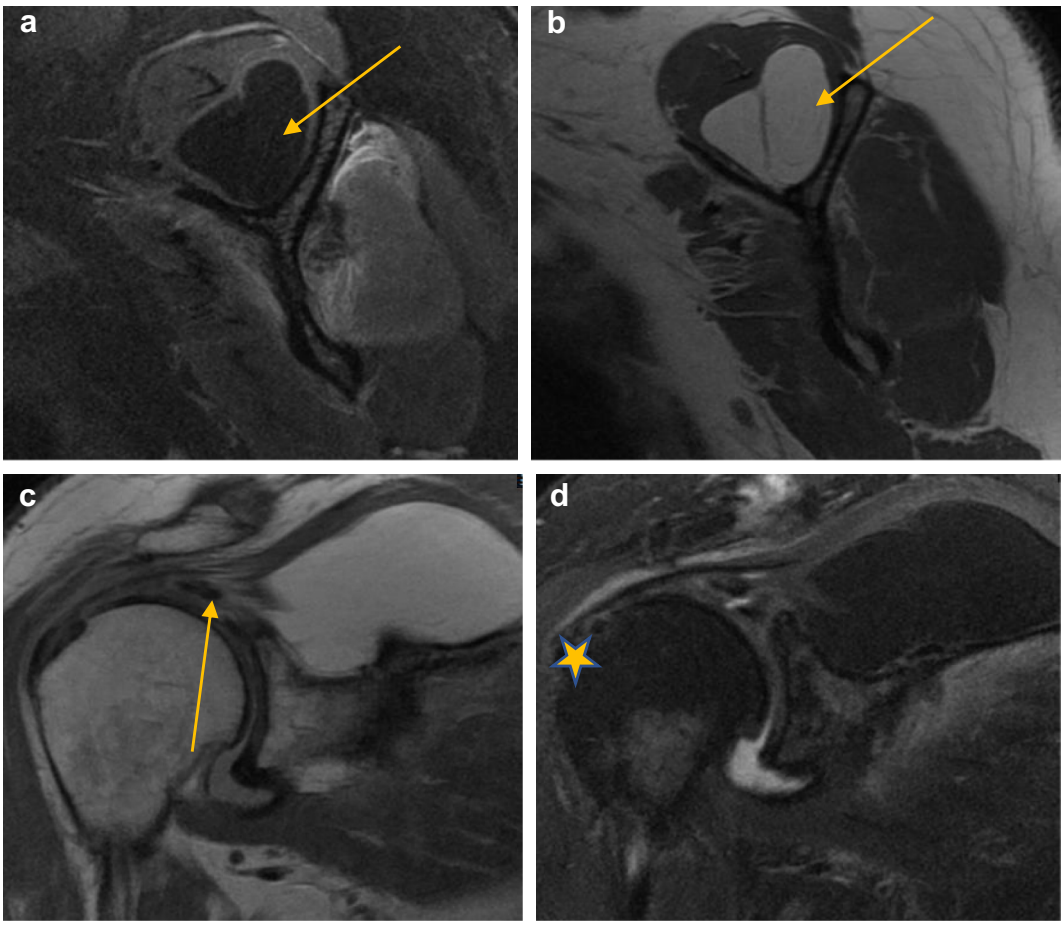

Figure 1 Represents preoperative MRI without contrast. (**a** and **b**) T2 & T1 sagittal view illustrating fatty mass (yellow arrows) within the supraspinatus muscle extending through the spinoglenoid notch into the infraspinatus muscle, (**c** and **d**) T1 & T2 coronal view illustrating partial-thickness articular-sided supraspinatus tear (yellow arrow and star). *MRI*, magnetic resonance imaging.

There was edema in the infraspinatus musculature, but no evidence of fatty atrophy of any of the cuff musculature. The MRI also demonstrated a partial-thickness articular-sided tearing of supraspinatus involving 50% of the tendon thickness, tendinosis of the infraspinatus tendon, and medial subluxation of the biceps into a partial-thickness articular-sided tear of the superior subscapularis (Fig. 1, *c* and *d*).

Treatment options consisted of ongoing conservative management vs. an operative treatment plan. Surgical management options included isolated treatment of the rotator cuff tear, isolated excision of the lipoma, or a combined approach to both. At this point, after eight weeks of conservative management, including non-steroidal anti-inflammatory drugs, physical therapy, and activity modification, the patient wished to proceed with surgical treatment. Given the large size of the mass, in combination with the acute onset of symptoms after her fall, we elected to proceed with a combined surgical approach to address the mass as well as the rotator cuff tear.

Operative details

The patient was placed in the beach chair position, and a diagnostic arthroscopy was performed. Diagnostic arthroscopy revealed mild degenerative changes of the articular cartilage, mild anterior labral fraying, no evidence of a loose body, severe biceps tendinitis, fraying of the superior subscapularis, and a full-thickness tear of the anterior portion of supraspinatus (Fig. 2, *a*). At this point, the superior subscapularis tear was gently débrided, a biceps tenotomy was performed, and the scope was placed in the subacromial space. A subacromial bursectomy was performed, further exposing a 2.0 cm full-thickness crescentic-shaped tear of the supraspinatus and anterior infraspinatus tendons with minimal retraction. The footprint was débrided to a healthy bed of bleeding bone, and double-row rotator cuff repair of the supraspinatus and the anterior portion of the infraspinatus tendon was performed using two single-loaded 4.5 mm PEEK Healicoil anchors (Smith & Nephew, Andover, MA, USA) medially and two 5.0 mm PEEK Healicoil Knotless anchors (Smith & Nephew, Andover, MA, USA) laterally (Fig. 2, *b*). Once the repair was complete, a subacromial decompression was performed from the posterior portal, and attention was turned to excision of the supraspinatus mass. A 10-cm incision was made on the posterior aspect of the shoulder along the spine of the scapular. The plane between the trapezius and supraspinatus was identified. Careful inspection of the mass revealed a well-circumscribed, homogenous fatty tumor deep to the supraspinatus muscle belly extending into the spinoglenoid notch. Because of the classic findings on MRI, the homogenous, well-encapsulated appearance of the mass, and the age of the patient, the decision was made to proceed with excisional rather than incisional biopsy. Care was taken to avoid injuring the suprascapular nerve while the fatty mass was removed in its entirety, along with its capsule extending from within the supraspinatus

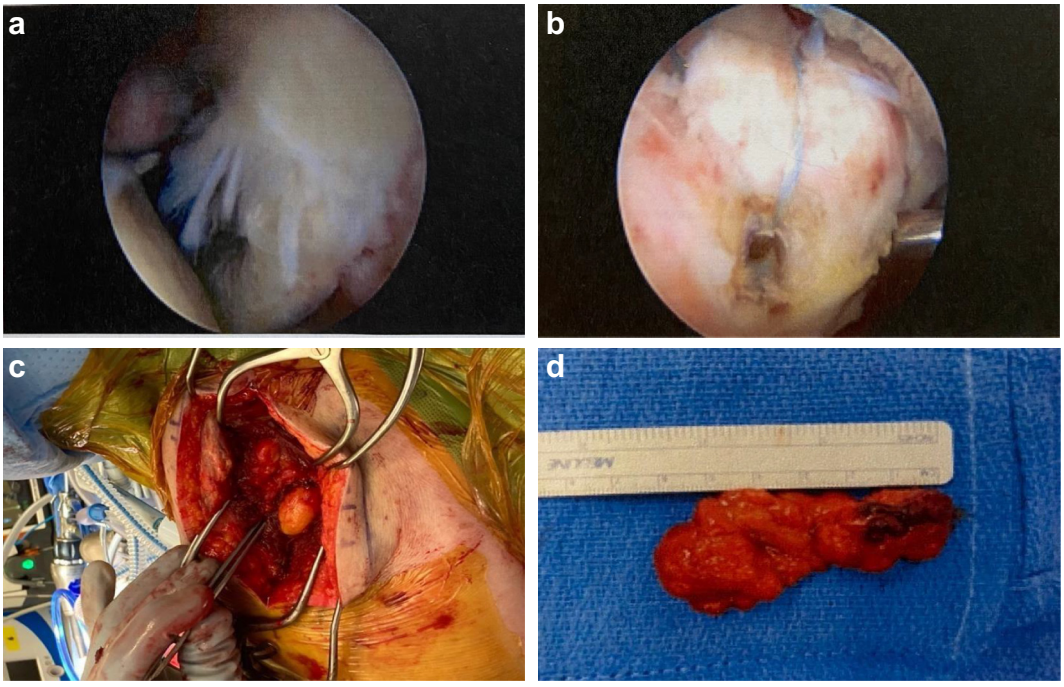

Figure 2 Intraoperative pictures showing findings of the left shoulder: (**a**) full-thickness tear of the anterior portion of supraspinatus; (**b**) rotator cuff repair using PEEK Healicoil anchors; (**c**) posterior shoulder incision and mass; (**d**) large lipoma was completely excised.

fossa and into the spinoglenoid notch. It was noted that a single branch of the suprascapular nerve was compressed proximally as it entered the spinoglenoid notch (Fig. 2, *c*). The nerve was of normal caliber throughout the remainder of the supraspinatus fossa. No spinoglenoid ligament was appreciated from this superior approach, so the decompression of the nerve relied solely on excision of the fatty mass. Dissection was not taken posterior to the scapular spine since we were able to decompress the nerve from above. The mass did not extend anteriorly, so the transverse scapular ligament was not released. The mass, measuring 10 cm × 5 cm × 3 cm, was removed in entirety and sent to pathology (Fig. 2, *d*). Meticulous hemostasis was achieved with Bovie electrocautery, and we did not feel that a drain was necessary. After routine wound closure and application of a sterile dressing, the patient was transferred to the postanesthesia care unit in stable condition, without any complications.

Pathology

Sections of the specimen demonstrated adipose tissue, traversed by bands of bland fibrous connective tissue. No conspicuous atypia or lipoblasts were identified.

Postop course

The patient presented for follow-up 11 days postsurgery. She had been wearing an abduction sling, was neurovascularly intact, experienced minimal pain, and had no new complaints. She was instructed to begin scapular stabilization exercises and pendulums at that time. At 4 weeks postoperatively, the patient started supervised physical therapy protocol, progressing from passive to active range of motion over the following 4 weeks. The patient had a standard postop course and at 9 weeks postoperatively, shoulder range of motion was: active flexion to 160 degrees, passive external rotation to 70 degrees, passive internal rotation to 50 degrees, and passive abduction to 80 degrees. She rated her pain as 1/10. At the final follow-up, 6 months postoperation, she remains pain-free, her strength, and active and passive motion are equivalent with her contralateral side. She is satisfied with her treatment.

Discussion

The suprascapular nerve provides motor innervation to the supraspinatus and infraspinatus muscles of the rotator cuff.[3] The nerve arises from the upper trunk of the brachial plexus, receiving nerve fibers from C5 and C6 nerve roots. It travels deep through the suprascapular notch going underneath the superior transverse scapular ligament to innervate the supraspinatus muscle. From there, the nerve descends through the spinoglenoid notch to innervate the infraspinatus muscle. The suprascapular nerve also provides sensory innervation to the glenohumeral and acromioclavicular joints. This sensory branch explains the posterior shoulder pain that is associated with injuries or lesions to the nerve.[1-3]

Studies suggest that 1-2% of all shoulder pain cases are associated with compression or traction of the suprascapular nerve.[3] Additionally, certain individuals are considered high-risk for having suprascapular nerve entrapment, including repetitive overhead athletes or individuals with large rotator cuff tears and associated muscle atrophy. Space-occupying lesions, such as a lipoma or, more commonly, a ganglion cyst in the spinoglenoid notch, can cause similar symptoms.[3,4,11,15,17]

Intramuscular lipomas can occur in large muscles of the trunk and limbs, with the most common location being the thigh and shoulder.[12,17] There is limited evidence on lipomas causing compression of the suprascapular nerve. Martinez et al reported on a 51-year-old male with a lipoma of the supraspinatus muscle causing impingement syndrome.[16] Hasan et al reported on an 87-year-old woman with an intermuscular lipoma displacing the

supraspinatus and infraspinatus muscles and compressing the axillary and suprascapular nerves, causing symptoms of rotator cuff dysfunction.[10] Zvijac et al reported on a 47-year-old right woman who presented clinically with suprascapular entrapment neuropathy, a 2-year history of progressive weakness and shoulder pain, attributed to a lipomatous tumor in the spinoglenoid notch, whose symptoms resolved after excision of the mass.[22] Kim et al reported on a 61-year-old male with shoulder pain and weakness that started suddenly after hard labor, a lipoma at the spinoglenoid notch that was not previously symptomatic, causing transient suprascapular nerve palsy that mimicked a rotator cuff tear, whose symptoms resolved with surgical removal of the lipoma.[12]

This case presents an interesting discussion from a treatment perspective. Generally, this patient's traumatic onset of pain after a fall in a previously asymptomatic shoulder would be a relatively straightforward indication for surgery. However, results of rotator cuff repair in the elderly are a topic of debate. Nonoperative treatment consisting of therapy, ice, anti-inflammatory medication, and injections has been shown to be effective treatment for rotator cuff pathology in the elderly.[7,8,13,14] While conservative treatments may be sufficient for some patients, there are a significant number of patients whose asymptomatic partial thickness tear may eventually become symptomatic, and conservative treatment may not be sufficient.[6,18,19] Rotator cuff repairs are increasingly considered in elderly patients with greater functional demands. Age, in itself, does not appear to be an independent risk factor for failure. Instead, factors such as comorbidities, tear size, and degree of fatty infiltrates should be carefully evaluated.[6,18,20] Several recent studies, including those by Gwark and Whitney-Lagen, demonstrated that tear size is a more significant contributor to clinical success than chronologic age.[9,21] Geary demonstrated that 81.5% of elderly patients achieved healing and functional improvement after rotator cuff repair, a similar healing rate to younger counterparts. Elevated retear rates were linked with large or massive tears. The most significant predictor of retear was the extent of fatty infiltration, particularly at stage two or three.[6]

We felt that given the acute nature of our patient's onset of symptoms, the lack of improvement with conservative treatment, and the intraoperative findings of a full-thickness, medium-sized tear, arthroscopic repair of the tear would offer her the most reliable and predictable outcome. Given the discovery of the full-thickness supraspinatus tear, it could be argued that we should not have exposed our patient to the increased morbidity associated with an open approach to the supraspinatus fossa. Although we believed that her external rotation weakness was secondary to the tear of the rotator cuff given the size of the lipoma, we were concerned that our patient would have ongoing postoperative symptoms related to a mass effect on the suprascapular nerve or an increase in the size of the mass through the spinoglenoid notch resulting in further compression of the nerve and atrophy of the infraspinatus musculature.

Conclusion

We present a case report of an elderly female with a concomitant traumatic rotator cuff tear and a large lipomatous mass in the supraspinatus fossa. While the indication for surgical repair of the supraspinatus tendon was relatively straightforward, the surgical indication for excision of the mass was less so. Because we were concerned that ignoring a large mass in her supraspinatus fossa could potentially result in unresolved postoperative pain or lead to compression of the nerve in the future, we elected to proceed with operative treatment of both, resulting in decreased pain, improved function, and excellent patient satisfaction.

Disclaimers:

Funding: No external funding was provided for this work.
Conflicts of interest: The authors, their immediate families, and any research foundation with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.
Patient consent: Obtained.

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