Case Report

A rare presentation of a large suprascapular fossa lipoma causing suprascapular nerve traction injury leading to massive rotator cuff tear, treated arthroscopically – case report

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ABSTRACT

Suprascapular fossa lipoma extending to the suprascapular notch causing traction injury to the suprascapular nerve is a rare presentation. We report a 47-year-old male with progressive weakness of the right shoulder joint of 8 months duration, with a palpable mass over the spine of the scapula was noticed 2 months earlier and developed a sudden drop in arm following a moderate strain. A magnetic resonance imaging (MRI) scan revealed a rotator cuff tear involving the supraspinatus and infraspinatus muscles with a tumor-like lesion in the suprascapular fossa, displacing the supraspinal mass muscle mass and extending into the suprascapular notch. Electromyography and nerve conduction velocity studies revealed suprascapular neuropathy. After histopathologic confirmation, an arthroscopic excision of the mass with decompression of the suprascapular notch was performed along with repair of the rotator cuff. Six months after the procedure, the patient had improved considerably in terms of function and postoperative MRI revealed a complete excision of the mass, and further follow-up of 2 years showed no recurrence.

Level of evidence: Level IV.

1. The case

- 47-year-old male executive with large lipoma in the suprascapular fossa causing chronic traction injury to the suprascapular nerve leading to supraspinatus and infraspinatus tear.
- He was treated with lipoma excision, with suprascapular nerve decompression, and double row repair of supraspinatus and infraspinatus.
- 6 months postoperatively, he had a full active and passive range of movement, with unrestricted occupational and recreational activity, and an MRI scan showed complete resection of the supraspinatus fossa mass with healing of the rotator cuff tendons.

2. Lessons learned

- Supraspinatus fossa space-occupying lesions can cause traction injury to suprascapular nerve, thereby leading to a rotator cuff tear.
- Arthroscopic excision of the lipoma, after histological confirmation with nerve decompression yields good results when combined with a massive rotator cuff repair.

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INTRODUCTION

Suprascapular nerve entrapment can be easily misdiagnosed as it can present with dull aching pain in the shoulder joint with weakness of the rotator cuff muscles [1]. Such a nerve entrapment in the longer term can lead to degeneration and tear of the supraspinatus and infraspinatus supplied by it, or the nerve dysfunction can be caused by a massive retracted rotator cuff which can cause a traction injury. A lipoma in the supraspinatus fossa can present as a slowly growing swelling in the subcuteaneous region or as a monoarticular swelling, when it is present deep inside a joint, with dull pain or intermittent joint effusions. An undiagnosed suprascapular nerve entrapment and dysfunction is a reason for failure of rotator cuff repairs. A chronic compression of the nerve can present on the MRI scan as a hyperintensity of the compressed muscles and would warrant a nerve release to be performed along with the tendon repair.

Lipoma excision can be done as an open surgery, but it leaves a large scar. There will also be difficulty evaluating and treating the nerve compression at the suprascapular notch as these anatomical areas are deep, making dissection difficult and associated with surgical morbidity. Arthroscopy allows us to reach difficult areas of the shoulder joint safely while maintaining the advantages of a smaller incision and less soft tissue dissection.

Electromyography and nerve conduction velocity studies help to detect suprascapular neuropathy, even though neuropathy can be present in spite of a negative electromyography as the false negativity is high due to various factors including posture, machine, and technician dependent confounding factors [2].

CASE REPORT

We report a 47-year-old male patient, a finance consultant by profession, who had pain and discomfort of the right shoulder joint with weakness of the shoulder girdle, who had pain and discomfort of the right shoulder joint of 8 months duration, with a progressive difficulty in activities of daily living and light recreational badminton, which he was attempting in spite of the problem. There were no medical comorbidities, including diabetes or thyroid dysfunction. The shoulder weakness had increased in the last 2 months, and he noticed a painless swelling over the back of the shoulder immediately above the spine of the scapula in the same period. Two weeks before clinical presentation, while playing badminton, the pain suddenly increased, and he was unable to lift the arm.

He was treated initially with analgesics and rest by the primary care physician. The arm abduction power hadn’t improved even after the period of rest and passive stretches for 2 weeks, and therefore he was referred for further evaluation.

On clinical examination, there was a non-tender swelling over and just above the spine of scapula, which was 2.5 cm in supero-inferior and medio-lateral dimensions (Fig. 1). The passive range of movement were 160° of forward flexion, 90° abduction, 45° external rotation, and internal rotation up to L2, with pain at the extremes of forward flexion and rotations. The drop arm sign was positive. An empty can test and a resisted external rotation test demonstrated 2/5 power pointing towards dysfunction of the supraspinatus and infraspinatus muscles. The subscapularis muscle showed 5/5 power on the bear hug test.

The radiographs were essentially normal, except for mild sclerosis under the acromion. An ultrasound scan demonstrated a cystic mass in the subdeltoid region with a tear of the rotator cuff with minimal retraction. An MRI scan demonstrated a large, discrete, well-circumscribed, homogeneous mass with thin septa in the supraspinatus fossa, entending into the suprascapular notch and subcutaneously over the spine of the scapula (Fig. 2A–C), with a rotator cuff tear involving the supraspinatus and infraspinatus tendons with Patte 1 retraction (Fig. 2D). Core needle biopsy revealed a benign lipomatous mass and, therefore, an arthroscopic excision along with rotator cuff repair was planned for a definitive surgical correction of the condition.

SURGICAL TECHNIQUE

Video 1 demonstrates the arthroscopic removal of supraspinatus fossa lipoma with suprascapular nerve decompression and double-row repair of supraspinatus and infraspinatus tendons.

The surgical procedure was done under an interscalene block with general anesthesia in beach chair position. Diagnostic arthroscopy revealed a large lipomatous mass in the subacromial region extending medially to the suprascapular notch and vertically displacing the suprascapular muscle belly downwards. The lipomatous mass was pulled laterally and delivered through the lateral portal, after radiofrequency ablation around the mass, and this was done en-mass as much as possible. The rest of the fatty tissue was cleared using an arthroscopic shaver, completing this superficially by applying pressure from the skin downward, resecting the mass palpable subcutaneously. As the mass was extending deep, to the region above the suprascapular notch and obliterating the vision in that area, the visualization of the suprascapular notch was done using the anterior medial transpectoralis portal (Fig. 3A). The transverse scapular ligament was visualized under the mass, and this was resected using a narrow basket punch, decompressing and releasing the suprascapular nerve and artery.

The supraspinatus and infraspinatus were found to be torn and retracted up to mid-humeral level. The tendons were thinned, but healthy and reducible over the footprint on the greater tuberosity (Fig. 3B). The lipomatous mass was found in the subacromial region, displacing the supraspinatus muscle belly (Fig. 3D), and extending into the infraspinatus fossa, displacing the infraspinatus muscle belly (Fig. 3E). The suprascapular nerve was found to be compressed by the lipomatous mass straddling the transverse scapular ligament (Fig. 3F). The long head of biceps was found to be grossly inflamed (Fig. 3C) and was tenodesed in

![Fig. 1. Clinical picture showing (A) external swelling over the scapular spine of 2.5 cm diameter, (B) wasting of muscles in suprascapular and infra-scapular fossa, (C) view from a superior aspect.](image-url)
Fig. 2. MRI scan showing the lipomatous mass in (A) coronal section showing the lipomatous mass extending into the suprascapular notch and superiorly to the subcutaneous plane (B) axial section showing the mass involving the whole of the supraspinatus fossae, (C) sagittal section showing the mass displacing the supraspinatus muscle belly and extending from the subcutaneous plane (D) supraspinatus tendon tear. MRI = magnetic resonance imaging.

Fig. 3. Arthroscopy images showing (A) Notch portal and medial transpectoralis portal (B) the rotator cuff torn from the greater tuberosity and degenerated (C) long head of biceps degenerated and inflamed (D, E) lipomatous mass in the subacromial space viewed from the lateral portal (F) lipoma viewed from the anterior portal, seen to stretch the suprascapular nerve under the transverse scapular ligament.
the bicipital groove using a double loaded all-suture anchor (Fig. 4A). The suprascapular notch was accessed using the Notch portal (Fig. 4B) and transection of the transverse scapular ligament (TSL) done using a narrow basket punch. These torn rotator cuff tendons were repaired in double-row fashion using two all-suture anchors in the medial row and a lateral row anchor (Fig. 4D). Postoperatively the arm was kept in a sling for 6 weeks and further mobilization and strengthening progressed as per postero-superior rotator cuff rehabilitation protocol.

The resected specimen revealed mature adipose tissue on histopathological examination consistent with the diagnosis of lipoma (Fig. 5).

Fig. 4. (A) Biceps tenodesis in the groove (B) probe in the suprascapular notch portal (C) basket punch inserted from the notch portal to divide the TSL (D) supraspinatus and infraspinatus tendons repaired in double-row fashion. TSL = transverse scapular ligament.

Fig. 5. Histopathology image showing benign lipoma.

Fig. 6. Postop clinical images at 6 months showing (A) healed portals (B) supraspinatus strength; (C) forward flexion range of motion; and (D) external rotation power.
A patient recovered well with shoulder scores improving satisfactorily in subsequent visits, and he had attained full active painless range of motion at a 3 month review (Fig. 6). At 6 months the constant shoulder score had improved to 88 (pre-op 21), ASES score 93.3 (pre-op 11.67), and DASH score 0.8 (pre-op 73.3) (Fig. 8). A follow-up MRI scan at 6 months revealed no recurrence of the mass with complete resection and adequate radiological rotator cuff healing (Fig. 7). He resumed overhead sporting activity at 8 months postoperatively and after two years there is no recurrence of swelling and shoulder scores remained good [Fig. 8].

**DISCUSSION**

Lipoma in the supraspinatus fossa is a rare occurrence with a few reports in the literature, but none causing suprascapular neuropathy and a massive rotator cuff tear. These are usually slow growing tumors but can cause a mass effect, displacing the muscle bellies and presenting with shoulder pain. The earlier reports in the literature about lipoma in the shoulder joint had pain as the main presenting symptom [1,3,4] and a few with small rotator cuff tears associated with it. The major differential diagnoses for this condition are ganglion cysts, rheumatoid synovitis, pigmented villonodular synovitis, synovial chondromatosis [5]. In this patient, it was due to the large size of the tumor displacing the supraspinatus muscle and causing entrapment of the suprascupperal nerve at the suprascapular notch. It could have been the chronic compression due to the large mass in the supraspinatus fossa which leads to the supraspinatus and infraspinatus dysfunction, thereby leading to a tear in the tendons during a game of badminton.

Lipoma presents as lobular structures on an MRI scan with low signal intensity on T1 weighted images and enhances on T2 weighted images (Fig. 2) with signal intensity equal to subcutaneous fat on T1, T2, and fat suppression images [6]. Pigmented villonodular synovitis presents with low signals in T1 and T2 weighted images and enhances with gadolinium contrast [6]. In rheumatoid arthritis mass effect can be caused by rheumatoid nodule, which will have mixed signal intensity with similarity to joint fluid and subcutaneous fat. A rheumatoid pannus may present as scattered lesions with slightly low signal intensity areas with similarity to joint fluid and subcutaneous fat. A rheumatoid pannus may present as scattered lesions with slightly low signal intensity areas with similarity to joint fluid and subcutaneous fat. A rheumatoid pannus may present as scattered lesions with slightly low signal intensity areas with similarity to joint fluid and subcutaneous fat. A rheumatoid pannus may present as scattered lesions with slightly low signal intensity areas with similarity to joint fluid and subcutaneous fat. A rheumatoid pannus may present as scattered lesions with slightly low signal intensity areas with similarity to joint fluid and subcutaneous fat. A rheumatoid pannus may present as scattered lesions with slightly low signal intensity areas with similarity to joint fluid and subcutaneous fat.

A prior histological diagnosis helped in differentiating this large mass from ganglion cysts, rheumatoid soft tissue masses, other rare conditions like a sarcomatous lesion and this makes an arthroscopic excision safe. Care was taken not to penetrate the mass and coagulate the edges to separate it from the surrounding structures like muscle, bone, and neurovascular structures visualizing from the posterior and anterior medial coracoid portals, so that most of it could be removed as one mass through the lateral portal.

**Fig. 7.** Postoperative MRI scan showing complete resection of the lipomatous mass in (A) axial image, (B) coronal image, and (C) sagittal image, with (B) good healing of the supraspinatus and infraspinatus tendons. MRI = magnetic resonance imaging.

**Fig. 8.** Shoulder scores showing steady improvement, which reached a good to excellent level in 6-month time.
The nerve dysfunction could be explained by a compression injury \cite{8,9} of the nerve caused by the large lipomatous mass, displacing the suprascapularis in the supraspinatus fossa. This can be confirmed by electromyography and nerve conduction velocity studies, although negative values do not preclude the diagnosis of suprascapular neuropathy. Movements like forceful abduction during overhead activity creates extra stress on the supraspacular nerve, as would have occurred in this active male person, causing a neuropathy and subsequent tear in the rotator cuff tendons, which were already compressed and weak \cite{2,10,11}.

Although there are reports of open and arthroscopic surgery for the removal of lipoma from subdeltoid region \cite{1,3,4,12} there are no reports in the literature regarding successful arthroscopic removal of such a mass in the supraspinatus fossa, compressing the suprascapularis and causing an injury to the suprascapular nerve. Arthroscopy allowed a thorough examination of the supraspinatus fossa and a complete resection of the adipose mass clearing the suprascapular notch, decompressing the nerve.

**CONCLUSION**

Supraspinatus fossa space-occupying lesions should be considered in chronic shoulder pain and these can cause neuropraxia to the suprascapular nerve, which can in turn lead to posterior superior rotator cuff dysfunction or tears. Arthroscopic excision of lipomatous mass with decompression of the compromised suprascapular nerve gives good results when combined with a rotator cuff repair.

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**Declaration of competing interest**

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**Appendix A. Supplementary data**

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jisako.2024.05.005.

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