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Arthroscopic marginal resection of a lipoma under the supraspinatus muscle: a case report



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Lipoma is a common, benign soft tissue tumor, but it rarely occurs around rotator cuff muscles. Lipoma within the supraspinatus muscle can cause subacromial impingement syndrome due to thickening of the supraspinatus muscle and tendon,^{2,13} and cases of open or arthroscopic marginal resection of lipoma in the superficial part of the supraspinatus muscle have occasionally been reported.^{6,7,14} However, lipoma occurring between the supraspinatus muscle and supraspinatus fossa does not appear to have been reported.

This paper describes a case of symptomatic lipoma occurring under the supraspinatus muscle, in which arthroscopic resection successfully relieved the symptoms.

The patient provided consent for data concerning this case to be submitted for publication.

Case report

A 65-year-old woman had been suffering from left shoulder pain for 1 year and had been treated conservatively at a nearby clinic. No clear cause of onset had been identified. Since her shoulder pain had worsened from 2 months earlier, she was referred to our hospital. She had a history of epilepsy, but no family history of note. She described severe pain in the left shoulder, especially during horizontal adduction (visual analogue score: 8/10). Active range of motion (ROM) of the left shoulder joint was markedly restricted due to pain, with forward flexion to 120°,

abduction to 120°, external rotation to 30°, and internal rotation of the 5th lumbar vertebral level behind the back (Fig. 1A). No side-to-side difference in passive ROM was apparent. Positive results were obtained for the horizontal adduction test, Hawkins-Kennedy test, and Neer test. The American Shoulder and Elbow Surgeons (ASES) shoulder score was 25.0 of a maximum 100 points. Electromyography showed no abnormalities in the infraspinatus, deltoid, or biceps muscles, and nerve conduction velocity testing revealed no abnormal findings in sensory or motor nerve conduction velocities in the involved upper extremity.

Although plain radiographs did not show any obvious abnormalities, magnetic resonance imaging (MRI) showed a 14 mm × 18 mm × 30 mm homogeneous tumor under the supraspinatus muscle (Fig. 1, B–D). This tumor appeared uniformly hyperintense on both T1- and T2-weighted sequences, and was suppressed on T2-weighted fat-suppression MRI. These radiographic findings suggested benign lipoma. The supraspinatus tendon showed slightly hyperintense areas on T2-weighted fat-suppression images and some degree of thickening, indicating damage to the rotator cuff. We attributed the shoulder pain to subacromial impingement resulting from a space-occupying lesion under the supraspinatus muscle. Since activities of daily living were severely restricted by the symptoms, surgical resection was scheduled.

The operation was performed arthroscopically with the patient in a beach chair position. Severe synovitis was found in the subacromial space from the posterior viewing portal, whereas no rotator cuff tears or synovitis were evident in the glenohumeral joint. The supraspinatus muscle protruded at its musculotendinous junction, and narrowing of the subacromial space was found during shoulder abduction (Fig. 2A). In addition, the bursal side of the supraspinatus tendon was slightly frayed, indicating subacromial

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

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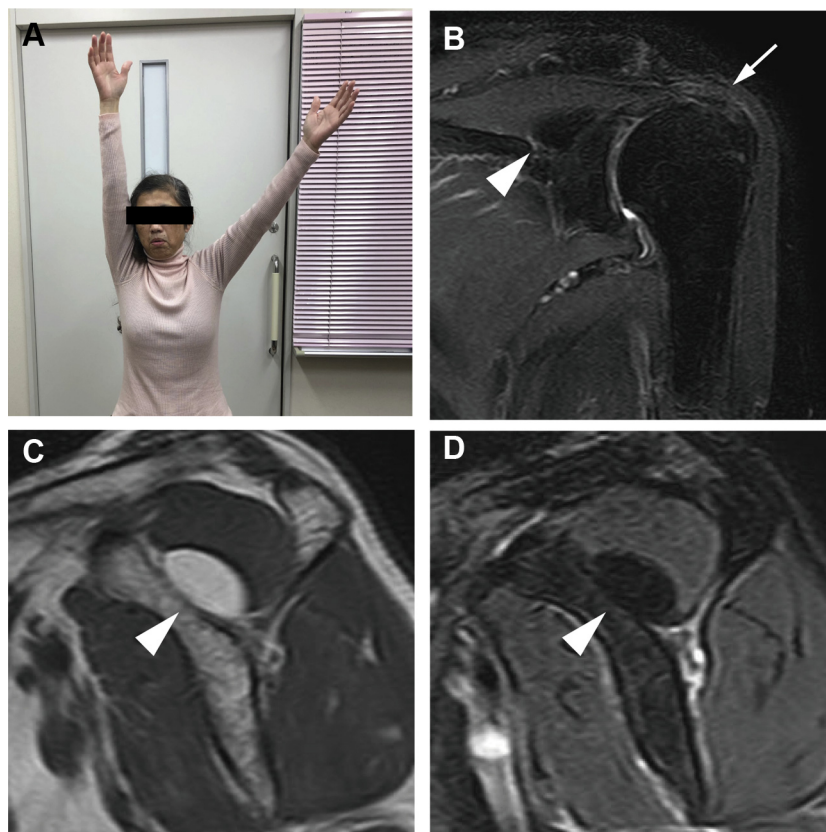


Figure 1 (A) Active ROM of the left shoulder joint is restricted, with forward flexion of 120°. (B–D) Preoperative oblique coronal and sagittal MRI show a 14 × 18 × 30-mm homogeneous tumor under the supraspinatus muscle (arrowhead). The tumor appears signal-hyperintense on both T1- and T2-weighted images (C) and suppressed on T2-weighted fat-suppression images (B, D). The supraspinatus tendon appears injured in T2-weighted fat-suppression images based on the slightly hyperintense areas and slight thickening (B, arrow).

impingement occurring at that area. We therefore performed arthroscopic subacromial decompression first. Subsequently, the superior transverse scapular ligament and suprascapular artery were detected in the medial area beyond the base of the coracoid process from the anterolateral portal view. Since adhesion of the lipoma to the suprascapular nerve was anticipated and traction of the tumor risked damage to the nerve, the suprascapular nerve was released by cutting the superior transverse scapular ligament before tumor resection (Fig. 2B). The tumor was identified after widening the anterior margin of the supraspinatus muscle (Fig. 2C). After the periphery of the tumor was carefully released using a blunt switching stick, the tumor was able to be removed through the Neviaser portal (Fig. 2D).

The tumor was confirmed as lipoma on pathological examination (Fig. 2, E and F). After surgery, shoulder pain and active ROM promptly improved. At the final follow-up 2 years after the surgery, active ROM of the left shoulder was 170° in flexion, 170° in abduction, 70° in external rotation at the side, and to the 10th thoracic vertebral level in internal rotation behind the back (Fig. 3A). ASES shoulder score had improved from 25.0 to 96.6. No tumor recurrence was apparent on MRI as of 2 years postoperatively (Fig. 3B).

Discussion

Lipomas are among the most common soft tissue tumors. Despite their frequency in the subcutaneous tissues, only four cases of lipoma in rotator cuff muscles have been reported. Three cases involved tumors in the supraspinatus muscle,^{6,7,14} whereas the

remaining case showed the tumor in the subscapularis muscle.⁹ All those cases were resected under open or arthroscopic surgery, and postoperative courses were good. In the present case, the lipoma occurred under the supraspinatus muscle, and arthroscopic resection combined with subacromial decompression and suprascapular nerve release successfully relieved all clinical symptoms. We believe that arthroscopic resection is a viable and minimally invasive treatment option for symptomatic lipoma in the rotator cuff muscles.

Subacromial impingement between the acromion and rotator cuff^{2,11–13} was thought to be the main cause of shoulder pain in the present case. The previous 3 cases with intramuscular lipoma of the supraspinatus muscle reportedly showed subacromial impingement syndrome due to thickening of the supraspinatus muscle.^{6,7,14} Although our case involved lipoma under the supraspinatus muscle, differing from those cases, prominence of the musculotendinous part of the supraspinatus muscle and narrowing of the subacromial space during shoulder abduction was evident during arthroscopy. In addition, suprascapular nerve entrapment compressed by the lipoma could be another possible cause of shoulder pain. In this case, the lipoma developed between the supraspinatus muscle and supraspinatus fossa, and the suprascapular nerve running in the supraspinatus fossa could have been injured. The suprascapular nerve reportedly contains sensory branches, with the sensory branch branching at the periphery of the branch to the supraspinatus.^{8,16} Although MRI showed no obvious hyperintensity in the rotator cuff muscle and electromyography showed no abnormalities, sensory branches of the suprascapular nerve might have been involved. However, a key limitation of this report was

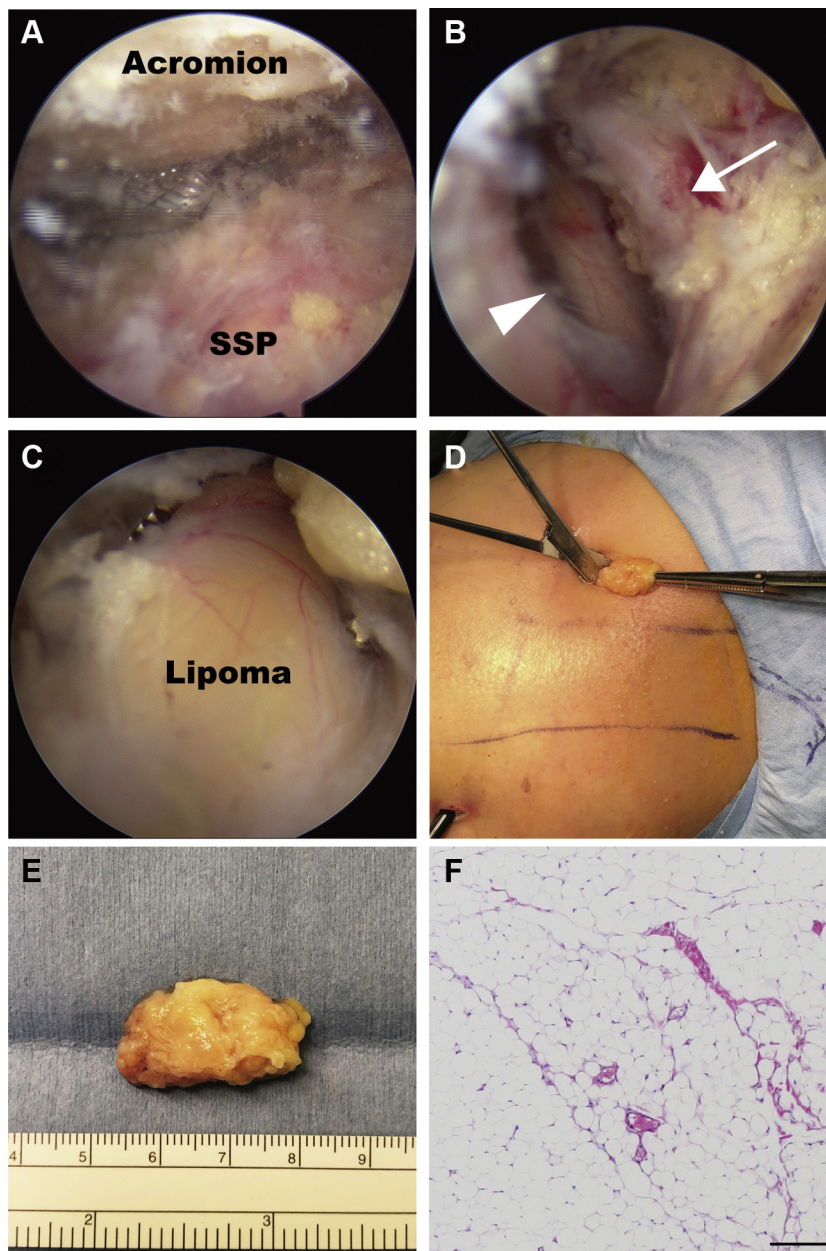


Figure 2 (A) The supraspinatus muscle protrudes at the musculotendinous junction (SSP), and subacromial impingement has developed. (B) The suprascapular nerve (*arrowhead*) is released by cutting the superior transverse scapular ligament (*arrow*) before tumor resection. (C) The tumor is identified after widening the anterior margin of the supraspinatus muscle. (D) The tumor is removed through the Neviaser portal. (E) Gross view of the resected tumor. (F) Histological examination reveals that the tumor originated from the mature lipoma cells and slight fibrous connective tissue, with no malignancy (hematoxylin and eosin stain; $\times 40$ magnification).

that sensory nerve conduction velocity was not specifically determined in the suprascapular nerve.

In this case, we arthroscopically resected a lipoma occurring under the supraspinatus muscle. The shoulder pain was attributed to subacromial impingement syndrome and/or compression of the suprascapular nerve associated with the lipoma. We therefore added subacromial decompression and suprascapular nerve decompression in addition to excision of the lipoma, and these surgical interventions successfully provided the patient with pain relief without any complication. As the lipoma was located in the supraspinatus fossa where the suprascapular nerve runs, we released the suprascapular nerve by cutting the superior transverse scapular ligament before removing the lipoma.^{1,4,10} Suprascapular neuropathy is reported to occur with traction during massive

rotator cuff tears,⁵ and forcible tumor resection could thus have damaged the suprascapular nerve. Since arthroscopic subacromial decompression and suprascapular nerve release were added in this case, the effect of the tumorectomy itself was still unclear. However, we believe that arthroscopic removal of this tumor is a safe, minimally invasive, and viable option for the treatment of symptomatic tumors around rotator cuff muscles.

Tumor size in this case was expected to be $14 \times 18 \times 30$ mm. Since tumors <50 mm in diameter are likely to be benign, as previously stated,³ we performed arthroscopic marginal resection without biopsy.¹⁵ The tumor proved to be a benign lipoma on pathological examination. Although careful follow-up is warranted, this case suggests that deep tumors under the rotator cuff muscles can be safely resected using arthroscopy.

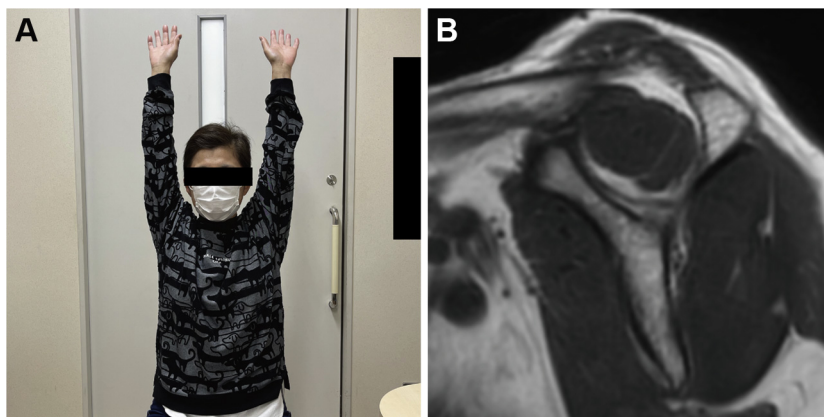


Figure 3 (A) Active ROM of the left shoulder at 2 years after surgery has improved to 170° of forward flexion. (B) Postoperative oblique sagittal T2-weighted fat suppression MRI shows no recurrence 2 years after surgery.

Conclusion

We report a case of lipoma under the supraspinatus muscle, which was located in the supraspinatus fossa where the suprascapular nerve runs. The tumor could be safely resected in combination with suprascapular nerve release. Arthroscopic resection is thought to be a viable and minimally invasive treatment option for symptomatic lipoma under the supraspinatus muscle.

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Patient consent: Obtained.

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