Arthroscopic Marginal Resection of a Lipoma of the Supraspinatus Muscle in the Subacromial Space

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Abstract: Subacromial impingement syndrome is a common cause of shoulder pain in young adults and seniors at present. The etiology of this syndrome is associated with several shoulder disorders, most related to aging, overhead activities, and overuse. The subacromial space is well circumscribed and limited in size, and soft-tissue growing lesions, such as tumors, can endanger the normal function of the shoulder girdle. We present a case of shoulder impingement syndrome caused by an intramuscular lipoma of the supraspinatus muscle in the subacromial space in a 50-year-old male bank manager. Radiographs, magnetic resonance imaging, and a computed tomography scan showed a well-circumscribed soft-tissue tumor at the supraspinatus-musculotendinous junction. It was arthroscopically inspected and dissected and complete marginal excision was performed through a conventional augmented anterolateral portal, avoiding the need to open the trapezius fascia or perform an acromial osteotomy. Microscopic study showed a benign lipoma, and the shoulder function of the patient was fully recovered after a rehabilitation period of 4 months. This less invasive technique shows similar results to conventional open surgery.

Subacromial impingement syndrome is a well-known pathologic condition, first described by Neer,[1] that is related to overhead activities, overuse, and aging. This entity has been studied by Bigliani and Levine,[2] who classified it into 2 different groups: primary rotator cuff degeneration (intrinsic) and secondary rotator cuff degeneration (extrinsic). Most cases will subside without surgical intervention, but a few cases require subacromial decompression. An arthroscopic approach to this problem has been developed with good clinical results.[3] Growing lesions, such as tumors, which may mimic the signs and symptoms of common supraspinatus tendinitis, can also endanger the subacromial space. Some of these tumors are lipomas.[4] Complete surgical marginal excision is the treatment of choice for deep lipomas.[5] For the uncommon case of a supraspinatus muscle lipoma, the operative approach can be over the trapezius fascia[6] or transdeltoid muscle.[7] We describe complete marginal excision of a small lipoma in the supraspinatus muscle in the subacromial space by means of an arthroscopic approach.

Case Description

A 50-year-old male bank manager presented with a slow onset of pain and dysfunction of the right shoulder. Findings of sensory and vascular examination of the shoulder were unremarkable. Cervical spine examination findings were normal. Shoulder-specific tests (Neer test and Jobe test) showed positive findings, and a diagnosis of shoulder impingement was made. Radiographs were obtained and showed normal radiologic findings. The patient was treated with analgesic drugs and physiotherapy, with no improvement over a period of 3 months. Magnetic resonance imaging (MRI) was performed, and we found a rounded soft-tissue mass that was well circumscribed and was located inside the supraspinatus muscle in the subacromial space near the musculotendinous junction. The lesion's bright appearance on T1-weighted images and gray appearance on T2-weighted images were consistent with fatty tissue (Fig 1).

The lesion measured approximately 32 × 25 × 12 mm, and no other pathologic findings were observed at the rotator cuff. We performed a computed tomography (CT) scan, showing the same homogeneous lesion in the subacromial space (Fig 2). The radiologist

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The authors report that they have no conflicts of interest in the authorship and publication of this article.

Received January 12, 2015; accepted March 16, 2015.

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2212-6287/1535

http://dx.doi.org/10.1016/j.eats.2015.03.016

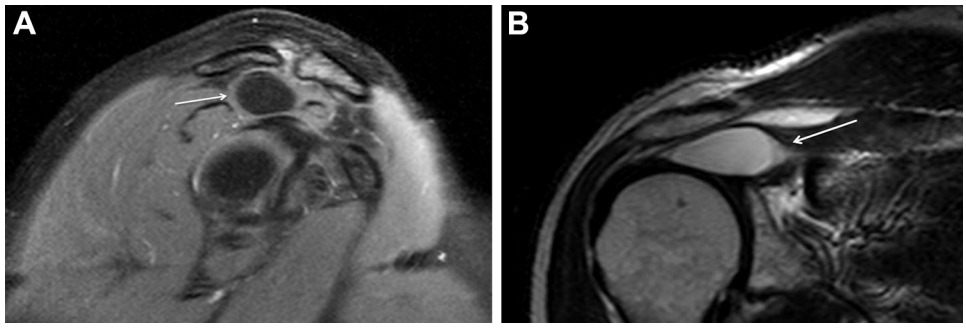

Fig 1. (A) Sagittal and (B) coronal magnetic resonance imaging (MRI) scans of the right shoulder showing a homogeneous mass inside the muscle belly of the supraspinatus just below the acromial process (arrows). (A) The sagittal T2-weighted MRI signal shows a low–signal intensity mass similar to subcutaneous fat, whereas (B) the coronal T1-weighted MRI signal shows high signal intensity of the fatty mass.

suggested a soft lipoma as the most probable cause of this mass.

Technique

At our institution, the patient is placed routinely in the beach-chair position after general anesthesia combined with an interscalene block. We performed primarily a conventional arthroscopic diagnostic inspection of the right glenohumeral joint, particularly the subacromial bursal space, in our usual manner, with slight arm traction of 2 kg.

Four portals were established for this procedure: The first portal, a posterior portal 1 cm below the posterolateral corner of the acromion, served primarily as a viewing portal and secondarily as an instrumentation portal. The second portal, lateral to the posterior one-third of the acromial border, served as a viewing portal for the rest of the procedure. The third portal, an anterolateral portal that was lateral to the anterior one-third of the acromial border, was used for instrumentation, and the fourth portal served as the excision channel (Fig 3), just lateral to the border of the acromion.

After bursal resection with a motorized shaver and coagulation of bleeding vessels, we found a protuberant muscle belly of the supraspinatus at the musculotendinous junction. At that point, we changed our viewing portal from posterior to lateral to obtain a better view of the muscle belly (Fig 4). On blunt dissection of the fibers (as in an open procedure) using a grasper, a Wissinger rod, and a radiofrequency ablation probe (ArthroCare, Sunnyvale, CA) (Fig 5), the fatty lesion bulged easily from within the muscle, was well encapsulated, and was excised with a Kocher clamp through a conventional shoulder anterolateral portal (Fig 6) augmented by 2 cm, with no need for acromial osteotomy or incision of the trapezius fascia (Video 1).

The intact mass was submitted for pathologic analysis, and microscopic study showed a benign lipoma. The patient was discharged on the first postoperative day and started a shoulder rehabilitation protocol that lasted 4 months, until full recovery was achieved. The advantages, disadvantages, and risks of our technique are listed in Table 1.

Discussion

There are few reports in the literature about painful intramuscular lipomas involving the supraspinatus muscle.[4,6] Although lipomas represent one of the most common soft-tissue tumors,[8,9] predominantly in the subcutaneous tissues, they can be found uncommonly inside the muscular tissues, converting them into a cause of shoulder impingement syndrome. According to

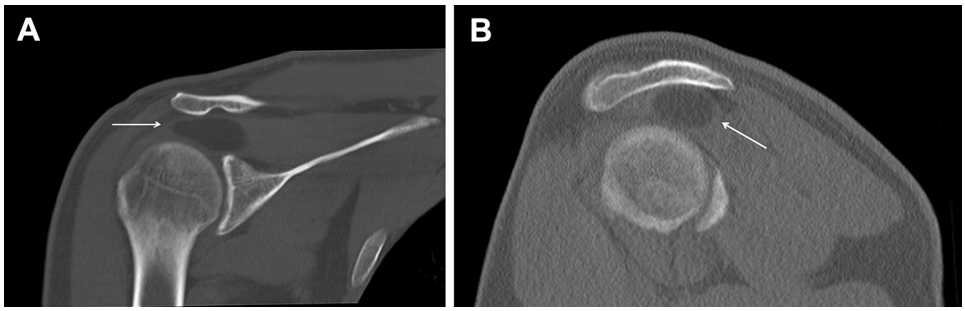

Fig 2. (A) Coronal and (B) sagittal computed tomography scans of the right shoulder showing a well-defined hypodense mass of the supraspinatus muscle belly under the acromion (arrows). The attenuation pattern within the tumor is equal to the adipose tissue.

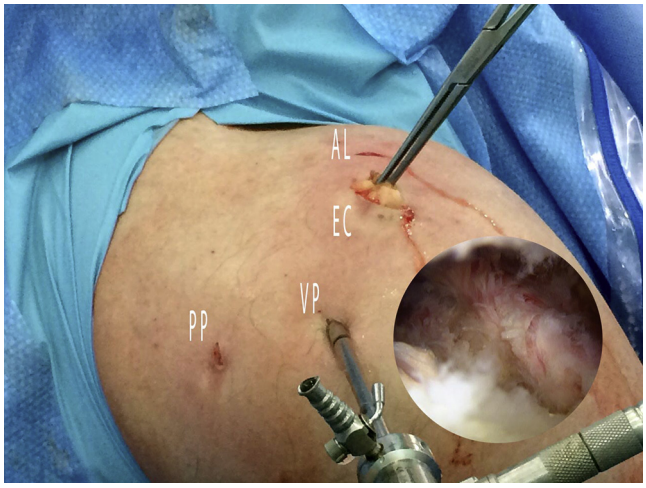

Fig 3. Photograph taken at the end of the procedure showing the 4 portals established for the procedure, as well as an arthroscopic image taken at the same time (inset). The first portal, a posterior portal (PP) 1 cm below the posterolateral corner of the acromion, serves primarily as a viewing portal and secondarily as an instrumentation portal. The second portal, lateral to the posterior one-third of the acromial border, serves as a viewing portal (VP) for the rest of the procedure. The third portal, an anterolateral portal (AL) lateral to the anterior one-third of the acromial border, is used for instrumentation. The fourth portal serves as the excision channel (EC), just lateral to the lateral border of the acromion, for removal of the tumor.

Bigliani and Levine,[2] an intramuscular lipoma is considered an intrinsic process of primary etiology for shoulder pain that has to be excluded from other causes of similar symptoms such as calcified tendinitis,

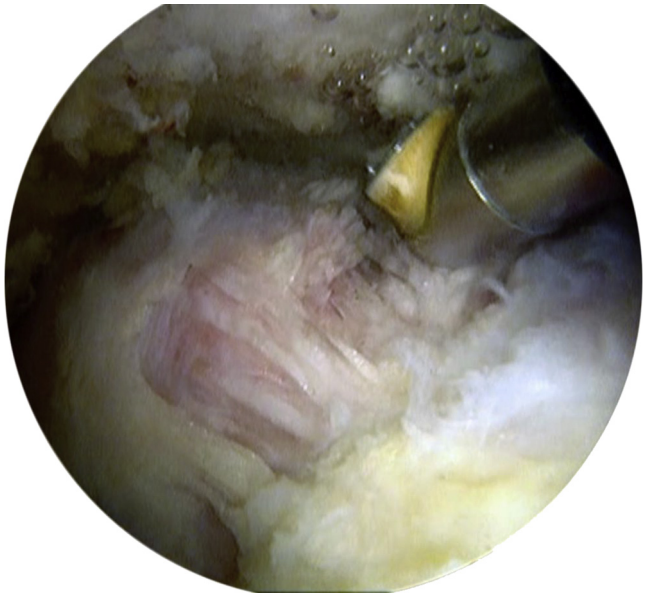

Fig 4. An arthroscopic image from the posterolateral portal showing the bulging aspect of the supraspinatus muscle after bursal resection, with palpation with a radiofrequency probe.

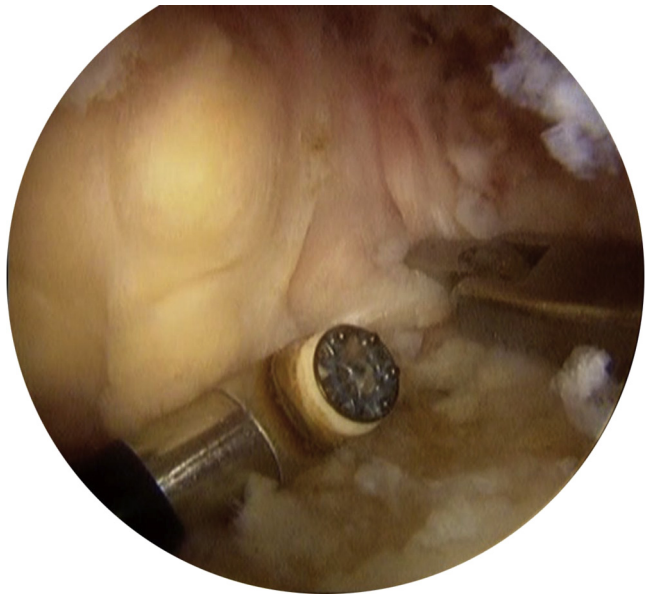

Fig 5. A Wissinger rod, a grasper for arthroscopy, and a radiofrequency ablator probe are used to bring the yellowish lipoma into view by longitudinally transecting the muscle fibers of the supraspinatus. The surgeon uses both hands during this thorough step, and the assistant holds the camera through the viewing portal.

glenohumeral instability, suprascapular nerve neuropathy, degenerative joint disease, biceps tendinitis, or frozen shoulder. When lipomas are located in the rotator cuff muscles, these alternatives must be considered.

These kinds of lesions have a slow onset of symptoms that usually mimic subacromial impingement syndrome due to overhead activities and overuse of the shoulder girdle, which may cause errors in diagnosis and treatment. Only MRI or CT scans can show these alterations of the anatomy of the shoulder and thus

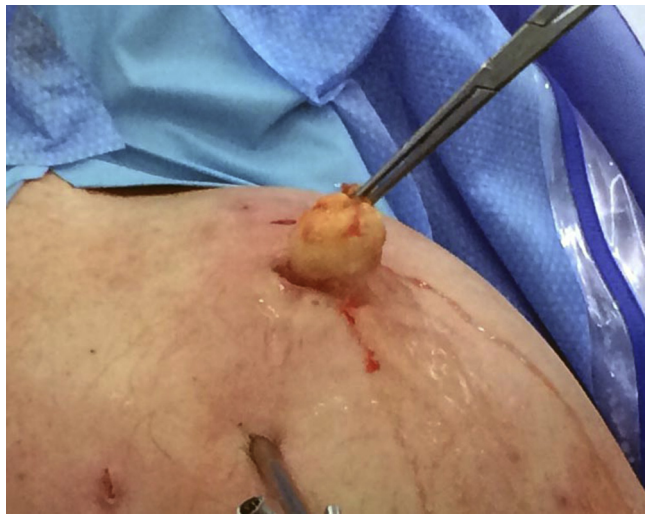

Fig 6. A yellowish fatty lesion is excised with a Kocher clamp through a previous anterolateral portal augmented by 2 cm.

Table 1. Advantages, Disadvantages, and Risks

Advantages
Less invasive approach to subacromial space than open surgery
Relatively simple arthroscopic technique, using standard equipment (Wissinger rod, grasper, radiofrequency ablation probe, Kocher clamp), with no requirement for special equipment
Avoidance of acromial osteotomy or deltoid detachment
Ability to address concomitant rotator cuff injuries
Disadvantages and risks
Requirement for advanced arthroscopic skills to avoid excessive swelling of shoulder (avoiding excessive time consumption is crucial)
Suprascapular nerve at risk during tumor dissection
Possibility of excessive resection or damage to supraspinatus muscle and tendon

provide the necessary information to make a preoperative plan.

Previous reports on intramuscular lipomas have suggested open excision as the treatment of choice for these lesions. However, intramuscular supraspinatus lipomas can be difficult to access through an open wound, especially those that are located at the musculotendinous junction, under the acromion. The need to open the posterior deltoid insertion or the trapezius fascia and perform an acromial osteotomy to gain access to this location can be avoided with our approach. Although we must keep in mind the risk of tearing the supraspinatus tendon when manipulating it or injuring the suprascapular nerve at the glenoid rim when dissecting the proximal portion of the tumor near the scapular spine, we believe that this technique of marginal excision can be accomplished with accuracy for lipomas measuring 4 cm in diameter or less. For larger lesions, the classic open operative approach may stand as the treatment of choice.

The origin of intramuscular lipomas and their exact location remain unclear, but their benign nature makes it easier to perform one's treatment of choice, that is, open or arthroscopic marginal excision.[7-10] Making the correct diagnosis is the true challenge when treating these tumors. MRI or CT scans are the best diagnostic tools for these cases, and we suggest that they should be obtained in all cases during preoperative planning before shoulder surgery.

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