

# Complicated Acromioclavicular Joint Cyst With Massive Rotator Cuff Tear

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## Abstract

An acromioclavicular (AC) joint cyst is an unusual presentation of full-thickness rotator cuff tears in patients with degenerative changes of the AC joint. It is important to understand the relationship between AC joint cysts and rotator cuff tears because there is a high recurrence rate if the cyst is treated without addressing the rotator cuff tear. Furthermore, recurrence or draining sinus caused by failure to treat the cyst may lead to infection. To our knowledge, there have been no reports of infected AC joint cyst as a serious complication. We present 2 cases involving an infected AC joint cyst with a massive rotator cuff tear caused by simple cyst excision. When patients have an AC joint cyst, physicians should consider the following points: (1) There is the possibility of an underlying rotator cuff tear, (2) Surgical treatment is indicated for a symptomatic cyst, (3) Aspiration and simple cyst excision are not recommended, because of the potential for postoperative complications such as recurrence, a draining sinus, and infection, and (4) Lateral clavicle resection should be performed if there is an irreparable rotator cuff tear.

An acromioclavicular (AC) joint cyst is an unusual presentation of full-thickness rotator cuff tears in patients with degenerative changes of the AC joint.<sup>1,2</sup> It is important to understand the relationship between AC joint cysts and rotator cuff tears because there is a high recurrence rate if the cyst is treated without addressing the rotator cuff tear.<sup>2-4</sup> Thorough diagnosis of the underlying pathology is essential to prevent complications after treatment.<sup>5</sup>

Treatment options that have been discussed in the literature include watchful waiting, aspiration, cyst excision with or without rotator cuff repair, lateral clavicle resection, and hemiarthroplasty.<sup>1,3,4,6-8</sup> A total of 49 cases of AC joint cyst have been reported in English literature<sup>9</sup>, with most reports emphasizing that AC joint cysts are usually combined with a rotator cuff tear and may recur after treatment. Furthermore, recurrence or a draining sinus caused by failure to treat the

cyst may lead to infection, which can develop into pyogenic arthritis or osteomyelitis. To our knowledge, there have been no reports of infected AC joint cyst as a serious complication. We present 2 cases involving an infected AC joint cyst with a massive rotator cuff tear caused by simple cyst excision.

The patients provided written informed consent for print and electronic publication of this case report.

## Case Series

### Case 1

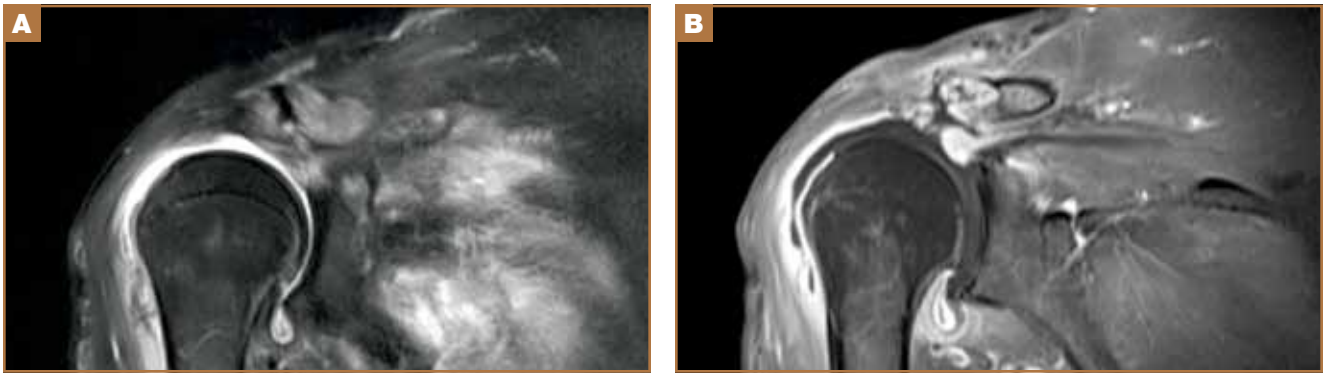
A 71-year-old right-handed man was referred to our hospital with pain and open wound on his right AC joint. He reported right shoulder pain for 2 years, and a soft mass in the right AC joint 4 months before we assessed him. Initial plain radiographs obtained at a local clinic showed degenerative changes of the AC joint with proximal migration of the humeral head (Figure 1). He had undergone simple excision of the mass 4 times within a 3-month period at a local clinic because of recurrence.

On physical examination, we found a 2-cm open wound with purulent discharge at the site of a scar above the AC joint. Laboratory tests showed a white blood cell count of 8310 cells/ $\mu$ L, an erythrocyte sedimentation rate of 95 mm/h, and C-reactive protein level of 8.17 mg/L (normal range, 0-0.5 mg/L). Active range of motion of his right shoulder was as follows:

**Figure 1.** Preoperative plain radiograph from case 1, shows degenerative changes of the acromioclavicular (AC) joint with proximal migration of the humeral head. A shadow from the soft tissue mass is apparent above AC joint (white arrow).



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**Figure 2.** Magnetic resonance images from case 1. (A) A T2-weighted oblique coronal image shows a large collection of fluid in the glenohumeral (GH) joint and subacromial space, with a high signal intensity in the peri-shoulder muscles. (B) Rim enhancement and communication between the GH joint and the acromioclavicular joint are apparent on an enhanced oblique coronal image.

10° of forward flexion, 0° of external rotation with the arm at the side, and buttock level of internal rotation.

Magnetic resonance imaging (MRI) demonstrated a massive rotator cuff tear, including a severely retracted supraspinatus tendon and pyogenic arthritis, with rim enhancement apparent on an enhanced oblique coronal image. There was also communication between the glenohumeral (GH) joint and the AC joint. The adjacent bony structures showed no signs of osteomyelitis (**Figures 2A, 2B**).

After arthroscopic irrigation and debridement of the GH joint

Intraoperative cultures of the cystic fluid and wound showed bacterial infection by methicillin-resistant *Staphylococcus epidermidis*. Although signs of infection... were aggravated after surgery, the wound was completely healed 4 weeks postoperatively.

and subacromial space, open wound debridement and lateral clavicle resection was performed. Intraoperative wound culture detected bacterial infection by methicillin-resistant *Staphylococcus aureus*. After 15 mg/kg twice daily of vancomycin was administered intravenously for 4 weeks, the infected wound healed completely and uneventfully. Seventeen months postoperatively, the cyst had not recurred, but the clinical outcome was poor, with the patient's American Shoulder and Elbow Surgeons score being 58 points out of a possible 100 points.

### Case 2

A 77-year-old right-handed man was referred to our hospital because he had a painful recurrent mass in his right AC joint.

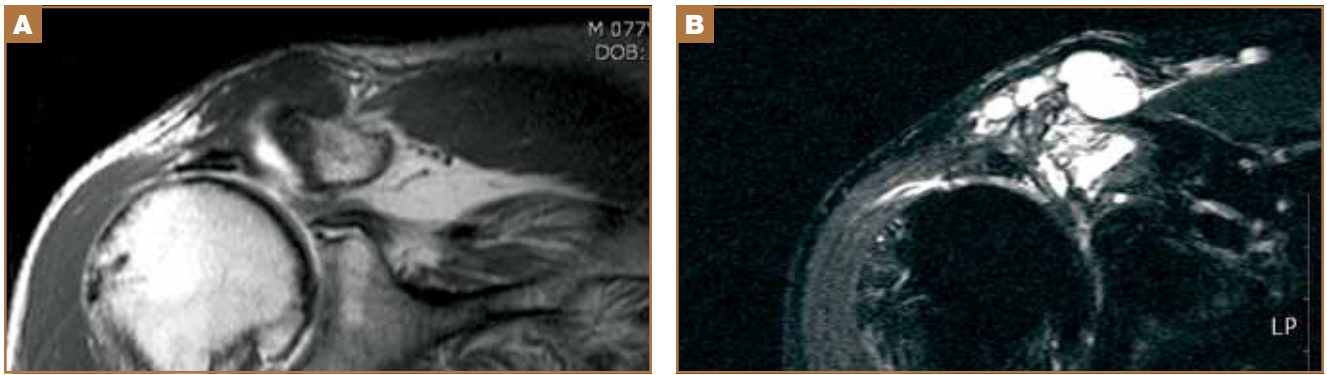
He reported intermittent pain in his right shoulder for 3 years. Five months before he was referred to us, a soft mass developed in his right AC joint. He underwent simple excision of the mass at a local clinic 3 weeks before referral to our hospital, but the painful mass recurred, and a draining sinus was created through the previous incision site.

On physical examination, we found a 3 × 3 cm soft mass and a 4-cm scar above the AC joint. When the mass was compressed slightly, serous fluid was observed through a draining sinus. Although there was mild redness around the scar, laboratory findings were within the normal range. There was marked wasting of the supraspinatus and infraspinatus muscles. Active range of motion of the right shoulder was as follows: 90° of flexion, 30° of external rotation at the side, and fourth lumbar level of internal rotation.

Plain radiographs revealed arthritic changes of the AC joint and GH joint, with proximal migration of humeral head. MRI demonstrated a massive rotator cuff tear and multilobulated cysts above the AC joint. An oblique coronal image showed clear communication between the AC joint and the GH joint. The adjacent bony structures showed no signs of osteomyelitis (**Figures 3A, 3B**).

During surgery, a skin incision was made across the existing scar and extended to the deltopectoral interval. After complete cyst excision, lateral clavicle resection was performed because the massive rotator cuff tear was irreparable. Debridement and irrigation of the GH joint and subacromial space were performed because infection could not be ruled out. Intraoperative cultures of the cystic fluid and wound showed bacterial infection by methicillin-resistant *Staphylococcus epidermidis*. Although signs of infection, including redness and heat around the AC joint area, were aggravated after surgery, the wound was completely healed 4 weeks postoperatively; the patient was administered 15 mg/kg twice daily of intravenous vancomycin for the first 2 weeks after surgery and oral antibiotics for the next 2 weeks.

Eight years after surgery, the patient had no cyst recurrence, reported no weakness, and had a good clinical outcome, with an American Shoulder and Elbow Surgeons score of 83 points.



**Figure 3.** Magnetic resonance images from case 2 show a massive rotator cuff tear and multilobulated cysts above the acromioclavicular (AC) joint, with communication between the glenohumeral joint and the AC joint. The cysts have a low signal intensity on a  $T_1$ -weighted image (A) and a high signal intensity on a  $T_2$ -weighted image (B).

## Discussion

AC joint cysts are uncommon and seem to result from rotator cuff tears and degenerative arthritis of the AC joint.<sup>1</sup> Although the exact pathogenesis of such cysts is still controversial, 2 possible mechanisms have been suggested.<sup>3,9</sup> One is that they result from degenerative changes of the AC joint. These changes can cause spurs under the acromion and deterioration of the inferior capsule of the AC joint. Chronic friction between the rotator cuff and the spurs can cause a rotator cuff tear. Consequently, there is communication between the GH joint and AC joint, which can cause a cyst above the AC joint. Another mechanism is proximal migration of humeral head caused by a rotator cuff tear. The migration damages the inferior capsule of AC joint and then pushes synovial fluid into the AC joint, with the deteriorated capsule acting as a valve and sustaining the cyst.<sup>10</sup> We believe that the latter mechanism is the most likely because most cases reported by others and our cases involved massive rotator cuff tears with proximal migration of the humeral head and degenerative changes of the AC joint.

The geysers sign was originally described by Craig<sup>2</sup> in 1986 as leakage of dye from the GH joint into the AC joint via the subacromial space during shoulder arthrography in patients with an AC joint cyst.<sup>11</sup> More recently, the relationship of rotator cuff tears to cysts above the AC joint, including those showing the geysers sign, has been observed on MRI, which is today's preferred imaging modality.<sup>12,13</sup> Thus, MRI should be the tool of choice for exact diagnosis and treatment of AC joint cysts.

Treatment options for AC joint cysts with rotator cuff tears include watchful waiting, aspiration, cyst excision with or without rotator cuff repair, lateral clavicle resection, and hemiarthroplasty.<sup>1,3,4,6-8</sup> In reporting a case of spontaneous disappearance of an AC joint cyst, de Hartog and colleagues<sup>3</sup> suggested that a wait-and-see policy may be the best treatment for these cysts in the older or asymptomatic patient. The most common complication after treatment of AC joint cyst is recurrence of the mass.<sup>7</sup> Most reports note that there is a high recurrence rate after aspiration or simple cyst excision, with potential for a draining sinus, and therefore aspiration

and excision are not adequate treatment methods, considering the pathomechanism of these cysts.<sup>3-5</sup> If the rotator cuff tear is repairable, then rotator cuff repair and cyst excision with or without lateral clavicle resection are viable options.<sup>11</sup> If the rotator cuff tear is irreparable, however, lateral clavicle resection with cyst excision should be considered, to reduce the risk of recurrence by removing the pinch-valve effect.<sup>2,10,14</sup> Skedros and Knight<sup>15</sup> reported that an allograft patch can be used to seal the surfaces of the resected bone after AC joint resection in patients with irreparable rotator cuff tear. However, in most reported cases, as well as in our cases, there has not been cyst recurrence after lateral clavicle resection. In our view, sealing the inferior surface after AC joint resection with an allograft patch is not needed to prevent recurrence. Instead, we believe that the use of patches may encourage postoperative infection in recurrent cysts.

For an infected AC joint cyst, lateral clavicle resection is debatable because it can aggravate osteomyelitis. However, we opted for lateral clavicle resection with the use of intravenous antibiotics to prevent recurrence of the mass. There were no further complications in either case by the time of final follow-up examinations. In view of our findings and of those reported by others, lateral clavicle resection seems to be effective for preventing recurrence in patients with irreparable rotator cuff tear.

To the best of our knowledge, the 2 cases reported here are the first reported instances of AC joint cyst complicated by infection after surgical treatment. Most previous studies have reported only very short-term outcomes for patients with AC joint cysts, but in our second case, long-term results were available.

## Conclusion

When patients have an AC joint cyst, physicians should consider the following: (1) There is the possibility of an underlying rotator cuff tear, (2) Surgical treatment is indicated for a symptomatic cyst, (3) Aspiration and simple cyst excision are not recommended, because of the potential for postoperative complications such as recurrence, a draining sinus, and infec-



tion, and (4) Lateral clavicle resection should be performed if there is an irreparable rotator cuff tear.

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