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Knot impingement after arthroscopic rotator cuff repair mimicking infection : A case report

Knot impingement after rotator cuff repair

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Abstract

BACKGROUND

Knot impingement as a complication after arthroscopic rotator cuff repair (ARCR) has been suggested as a cause for persistent pain with limited motion. We experienced a case involving knot impingement after ARCR that complained of acute onset of pain with limited motion and was confused with infection.

CASE SUMMARY

A 55-year-old female visited our emergency room complaining of severe pain with limited motion of the right shoulder. Passive range of motion could not be checked due to severe pain. Four months ago, the patient had undergone ARCR using a suture-bridge technique for a small supraspinatus tear of the right shoulder at a local clinic. Plain radiographs of the right shoulder showed an erosive change of the acromion undersurface, and magnetic resonance imaging showed moderate amount of bursal fluid and synovial thickening with enhancement. Results of the aspirated fluid analysis showed a WBC count of 3960 with 90% neutrophils. In the view of arthroscopy, healing of the repaired supraspinatus tendon and loose suture threads and knots with severe subacromial bursitis were observed. All suture materials were removed with debridement of inflammatory tissues of the glenohumeral joint and subacromial space. Her symptoms subsided immediately after the surgical procedure.

CONCLUSION

Despite the rare incidence of knot impingement, physicians should consider the possibility of knot impingement after ARCR.

Key Words: Rotator cuff; Knot impingement; Shoulder; Infection; Arthroscopy; Case report

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Core Tip: Arthroscopic rotator cuff repair (ARCR) is a widely performed procedure with satisfactory outcomes. Knot impingement as a rare complication after ARCR has been suggested to cause persistent pain with limited motion. Due to its rarity, clinical features in patients with knot impingement after ARCR are still limited. We suggest that knot impingement after ARCR should be considered as a cause of acute shoulder pain.

INTRODUCTION

Determining the cause of acute joint pain without a history of trauma can be challenging for the orthopedic clinician[1]. A septic condition should be considered when making a diagnosis because the involved joint can be destroyed rapidly. However, making a differential diagnosis of infection from other problems inducing acute joint pain is not always easy. Acute onset of shoulder pain is a relatively common symptom in the clinical setting. The most common causes of acute shoulder pain include calcific tendinitis, subacromial bursitis, septic arthritis. [1]

Arthroscopic rotator cuff repair (ARCR) is a widely performed procedure that results in satisfactory outcomes[2-5]. Knot impingement as a complication after ARCR has been suggested as a cause for persistent pain with limited motion[6,7]. To date, only 13 cases involving knot impingement after ARCR have been reported and in most cases complained of insidious onset of pain during shoulder motion[6-8]. Previous studies have focused on the pathogenesis of bone erosion on the acromial undersurface caused by suture knots[6-8]. Due to its rarity, information on the clinical features in patients with knot impingement after ARCR is still limited.

We experienced a case involving knot impingement after ARCR that complained of acute onset of pain with limited motion and was confused with infection. This report

describes our experience with an extremely rare case mimicking infection, which was managed successfully by arthroscopic removal of the knot.

CASE PRESENTATION

Chief complaints

A 55-year-old female visited our emergency room complaining of severe pain with limited motion of the right shoulder.

History of present illness

The pain had developed 2 days ago and was dull and continuous in nature regardless of shoulder motion.

History of past illness

Four months ago, the patient had undergone ARCR using a suture-bridge technique for a small supraspinatus tear of the right shoulder at a local clinic.

Personal and family history

There was no history of personal or family history.

Physical examination

Tenderness on the involved shoulder was observed and body temperature was 37.4°C. Her active range of motion was 45° of forward flexion, 30° of abduction, 25° of external rotation at the side, and buttock level of internal rotation at the back. Passive range of motion could not be checked due to severe pain.

Laboratory examinations

Results of laboratory tests showed a white blood cell count of 7920/μL (normal ranges, 4000-10000/μL) with 66.9% of neutrophils. C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) were elevated at 8.4 mg/dL (normal ranges, 0.0-0.5 mg/dL)

and 50 mm/hr (normal ranges, 0-25 mm/hr), respectively. On a suspicion of a septic condition, aspiration was performed through the subacromial space and 2 cc of yellowish fluid with mucoid nature was obtained. Results of the fluid analysis showed a WBC count of 3960 with 90% neutrophils.

Imaging examinations

Plain radiographs of the right shoulder showed an erosive change of the acromion undersurface on 30° caudal tilting view (Figure 1). Enhanced magnetic resonance imaging (MRI) showed a moderate amount of bursal fluid and synovial thickening with enhancement (Figure 2). And an irregular erosive change of the acromion undersurface was also noted.

FINAL DIAGNOSIS

Although these findings did not indicate a definite diagnosis of infection, the patient was scheduled to undergo emergency arthroscopic surgery because the possibility of infection could not be ruled out completely based on the clinical symptoms.

TREATMENT

In the view of arthroscopy, healing of the repaired supraspinatus tendon and loose suture threads and knots with severe subacromial bursitis were observed. Suture knots were impinged at the acromion undersurface, which resulted in subacromial bone erosion (Figure 3). All suture materials were removed with debridement of inflammatory tissues of the glenohumeral joint and subacromial space.

OUTCOME AND FOLLOW-UP

No growth of organisms was observed in the final culture from the aspirated bursal fluid. Her symptoms subsided immediately after this procedure. The range of motion was completely restored without pain at rest or activity at 1-year follow-up after surgery.

DISCUSSION

Knot impingement has recently been described as a complication after ARCR leading to pain during motion, and removal of the suture knots through further surgery may be necessary[6,7]. To date, only 13 cases involving knot impingement after ARCR have been reported[6-8]. In 2010, Hotta and Yamashita[6] first reported that acromial erosion was observed in 9 of 434 (2.1%) patients who had undergone ARCR. They found that the knot position was associated with the portion of osteolysis on the acromion undersurface and their symptoms disappeared after removal of the knots[6]. They concluded that this complication might have been caused by knot impingement resulting from the knots of the suture thread[6]. Park *et al*[8] also reported that acromial erosion was observed in 3 of 221 (1.4%) patients with ARCR. Uchida *et al*[7] recently reported 2 cases involving symptomatic knot impingement resulting in subacromial bone erosion.

The position of the knot, exposure of cancellous bone after acromioplasty, and stronger suture materials have been suggested as causes of knot impingement after ARCR[6-8]. Hotta and Yamashita[6] reported that knots were observed on the top of the greater tuberosity in all cases with knot impingement and suggested that the use of a knotless or suture-bridge repair technique may be helpful in the prevention of symptomatic knot impingement during ARCR. However, Park *et al*[8] reported no difference in acromial erosion in high-profile knots made using a single row technique compared with a double row suture-bridge technique. Exposure of weak cancellous bone after acromioplasty may result in acromial erosion due to knot impingement[6,8]. Strong braided nonabsorbable suture materials such as FiberWire (Arthrex, Naples, FL, USA) have recently replaced anchor suture limbs to make stronger knots without suture breakage during ARCR[8]. However, these characteristics may contribute to knot impingement after ARCR. In our case, acromioplasty and ARCR were performed using suture anchors with strong braided nonabsorbable suture threads. Even though we

used a suture-bridge technique in the performance of ARCR, knot impingement associated with loose suture threads and knots was confirmed.

Due to its rarity, clinical features in patients with knot impingement are poorly understood. Although it is not described in detail in previous studies, symptoms in most reported cases developed insidiously and were aggravated during shoulder motion such as overhead working and sports activities[6-8]. In the current study, the clinical features were different compared to previously reported cases. The patient visited the emergency room because of acute onset of severe pain and limited motion. The clinical features with elevated ESR and CRP on laboratory tests and fluid collection and synovial thickening with enhancement on MRI raised concerns of an infectious condition. Therefore, we decided to perform emergency arthroscopic surgery for diagnostic and therapeutic intention. Before arthroscopic surgery, erosive change of the acromial undersurface was observed on plain radiographs. However, symptomatic knot impingement was not detected because the clinical features were more like an infection. We recognized that knot impingement with suture threads might have caused the patient's pain through arthroscopic findings. Further studies, including large numbers of patients are needed to clarify the pathogenesis and clinical features of knot impingement after ARCR.

A review of the literature found that some of the shoulder problems such as calcific tendinitis, subacromial bursitis, chronic lymphocytic leukemia, small lymphocytic lymphoma, and deep vein thrombosis can mimic infection by presenting acute onset of severe pain[1,9,10]. Despite the rare incidence, physicians should consider the possibility of knot impingement in patients with acute pain and limited motion of the shoulder with a history of ARCR.

CONCLUSION

To the best of our knowledge, this is the first report of knot impingement after ARCR mimicking infection managed successfully by arthroscopic removal of the knot. We

suggest that knot impingement after ARCR should be considered as a cause of acute shoulder pain.

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