

Surgical Treatment of Concomitant Scapular Spine Pseudoarthrosis and Rotator Cuff Impingement: A Case Report

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Abstract

Background: Nonunion and pseudoarthrosis formation following scapular spine fracture is a rare condition and is limited only to case reports. Some authors reported its association with rotator cuff impingement. Standard treatment is not defined well as the condition is rare.

Case Report: Our patient was a 61-year-old man with painful nonunion in addition to cuff impingement. Surgical treatment by open reduction, internal fixation with reconstruction plate and tension band wiring, along with bone grafting led to fracture union, as well as complete resolution of the rotator cuff tendinopathy.

Conclusion: Surgical fixation seems to be the best choice in treating scapular spine pseudoarthrosis. The first attempt should be the best, so we took an aggressive approach by the use of plating, tension band wiring, and bone grafting altogether.

Keywords: Pseudoarthrosis; Scapula; Rotator Cuff

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Background

Fractures of the scapular spine are rare conditions that account for less than 5% of all scapular fractures (1). Because of the high union rate of the scapular spine fractures with conservative treatment, reports on non-union and its management strategies are scarce and limited to case reports (2).

This paper is a report of a missed scapular spine fracture that resulted in painful non-union, its management, and an inclusive review of the literature. The patient was informed his data would be submitted for publication, and informed consent was obtained.

Case Report

Our patient was a 61-year old man with left shoulder pain from 18 months ago after direct trauma to the shoulder due to a simple fall during mountain climbing. In the first visit by an orthopedic surgeon immediately after the trauma, the patient was advised to use analgesics, and the physician reassured him that there was no serious problem. With regular use of pain killers and relative limb rest, the pain had diminished relatively but never resolved completely. Two months after the trauma, the pain continued and also a limitation in shoulder range of motion (ROM) became apparent. At this point, he was referred to a shoulder surgeon and after taking a magnetic resonance imaging (MRI), with a probable diagnosis of rotator cuff tendinopathy, he was treated by long term physical therapy, non-steroidal anti-inflammatory drugs (NSAIDs), and an intraarticular steroid injection, but he experienced no improvement.

At the first visit to our shoulder surgery clinic, 18

months after the initial trauma, he had local tenderness on the posterior aspect of the shoulder, on the scapular spine with some degrees of motion and swelling on the painful site. Besides, some clinical findings were in favor of subacromial impingement and supraspinatus tendon injury, including positive Jobs and Hawkins tests. The shoulder active ROM was painful and limited to 100 degrees of forward flexion and 120 degrees of abduction. Internal and external rotation both were in normal limits but painful. Other physical examinations were normal.

The MRI obtained revealed partial-thickness articular side tear (PASTA) in the supraspinatus tendon. However, as it did not fully match the clinical examination, we ran a plain X-ray and following that, a spiral 3-dimensionally (3D) reconstructed computed tomography (CT) scan, which revealed a sclerotic non-union and pseudoarthrosis formation in the scapular spine, just medial to the acromion. We reviewed the MRI images again and at this time we found the fracture line and edema at the non-union site (Figure 1).

As the rotator cuff tear was partial thickness and the chief complaint was the pain in the posterior aspect of shoulder, we decided to first approach the scapular non-union and treat the rotator cuff tear non-operatively at this stage. The scapular non-union was treated by open reduction, internal fixation, as well as bone grafting.

Under general anesthesia and in a lateral decubitus position, through a direct approach, a 10-cm skin incision was performed 0.5 cm above and parallel to the scapular spine and centered over the fracture site. After incising the fascia and retracting the infraspinatus muscle belly, the non-union site was exposed and the fibrous tissue removed. The two ends of the bone were freshened and anatomical reduction was achieved.



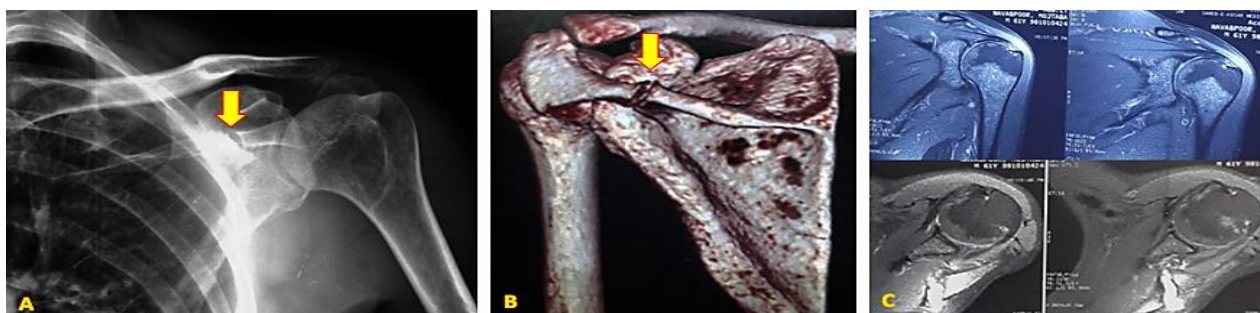


Figure 1: A: Plain X-ray, B: 3-dimensional computed tomography (3D-CT) scan, C: magnetic resonance imaging (MRI) (Yellow arrow indicates fracture site and the red arrow indicates rotator cuff tear)

Autologous cancellous bone graft from the iliac crest was placed in between and around the two bone ends and secure fixation and compression across the non-union site was achieved by using a combination of plating (3.5 mm reconstruction plate) and tension band wiring (Figures 2 and 3).

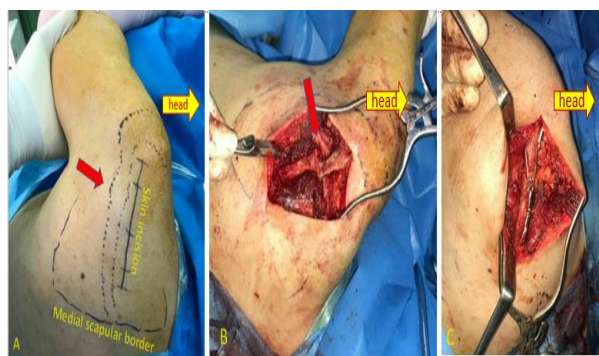


Figure 2: A: Skin incision in relation to anatomic landmarks, B and C: Nonunion site before and after open reduction and fixation

There was no postoperative complication and rehabilitation began after 2 weeks of limb rest in an arm sling. After 3 months of follow-up, he had no pain, and the ROM was 80% regained.

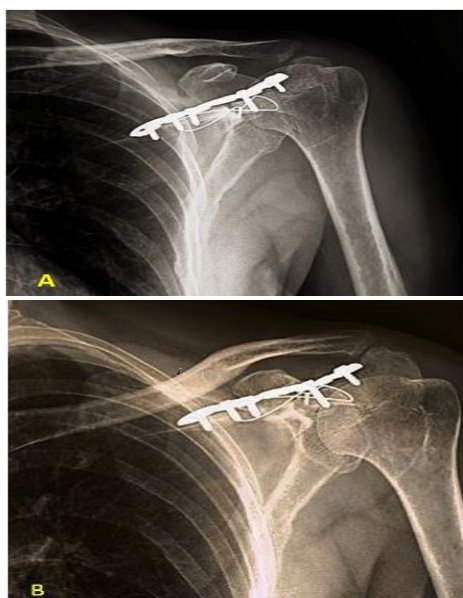


Figure 3: Early post operative antero-posterior and lateral X-ray demonstrating anatomic reuction of scapular spine

At 6 months of follow-up, there were no clinical signs of shoulder impingement anymore, and the shoulder ROM was complete and pain-free. The radiographic study demonstrated union and callus formation at the nonunion site (Figure 4). The patient was fully satisfied with the results of treatment.



Figure 4: Follow-up X-ray demonstrating callus formation at nonunion site

Discussion

Scapular fractures account for about 1% of all fractures and the scapular spine subtype includes 5% of them, so it is a rare condition (3). These fractures usually occur in the context of a high energy trauma and just like the majority of other scapular fractures, most cases are treated non-operatively (4). In the case of chronic shoulder pain after trauma with normal rotator cuff examination, this diagnosis should be suspected. Moreover, as the complex anatomy of the scapula and the overlap with the chest wall structures make the diagnosis on plain X-rays difficult (5), one should consider the use of 3D CT scan for accurate diagnosis (6).

Because the bone is encompassed within the periscapular muscles, fractures are usually minimal or without displacement and non-operative treatment is usually successful (7).

However, it seems that in fractures of the lateral side of the scapular spine, like those in the spinoacromial junction, as the muscular support decreases, the risk of non-union and consequently, the need for surgical intervention increases, especially if the fracture is not diagnosed at the first visit (8).

In our patient, in addition to the fracture non-union, signs of subacromial impingement and supraspinatus partial tear and tendinopathy were present. We could not

make sure if the supraspinatus partial tear was present before the trauma as an asymptomatic pathology, and it became symptomatic because of the altered biomechanics due to scapular spine nonunion; or if it happens acutely during shoulder trauma or afterward as a result of subacromial impingement. But the shoulder was completely asymptomatic before the trauma episode. Anyhow, full resolution of the impingement symptoms was achieved after the successful treatment of the non-union.

Some authors have described rotator cuff tendinopathy and impingement syndromes in association with this fracture non-union or pseudoarthrosis, and encountered it as an offender factor due to changes in the scapulothoracic mechanics (8, 9).

These reports also emphasized that with appropriate treatment of the non-union, the symptoms related to rotator cuff and subacromial pathologies can be eliminated (10, 11).

Since the reports of scapular spine pseudoarthrosis are limited to the case reports, there is no definite gold standard for the type of fixation. Bohm reported a good outcome for the treatment of this condition in a case report, with single lag screw insertion without nonunion exposure or resection of fibrous tissue (9). Nevertheless, some surgeons reported good results, with non-union site exposure and debridement, in addition to fixation with compression plates or tension band wiring (2, 8, 11). The first surgery attempt should be the last best, so we considered it as rational to choose an aggressive treatment approach by the use of plating, tension band wiring, and bone grafting altogether.

Conclusion

Scapular spine fracture is a rare condition, and due to the poor muscular attachments, nonunion rate is higher than other scapular fractures. It can also lead to rotator cuff impingement. Surgical treatment with rigid fixation and bone grafting seems to be the best choice in treating scapular spine pseudoarthrosis. Nonunion correction can cause improvement of shoulder biomechanics and resolution of concomitant impingement.

Conflict of Interest

The authors declare no conflict of interest in this study.

Acknowledgments

None.

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