RESEARCH PAPER

Case Report: Management of Acromion Nonunion in a 71-Year-Old Male Treated with MESH Plate Fixation

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Abstract
Acromion nonunion is an uncommon complication following shoulder surgery that can lead to persistent pain and functional impairment. This case report describes a 71-year-old male who developed a nonunion of the acromion following initial surgical intervention and was successfully treated with MESH plate fixation in a subsequent surgery. The case highlights the challenges in diagnosing and managing acromion nonunion and the innovative use of MESH plates for stabilization.
Keywords: Acromion nonunion, MESH plate fixation, Shoulder surgery, Orthopedic case report.
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Introduction

The acromion is a bony projection of the scapula that forms the highest point of the shoulder. Nonunion of the acromion is rare and often results from failed healing after surgery or trauma (Bigliani & Levine, 1997; McGahan & Rab, 1980). This condition can cause significant discomfort and limit shoulder function, necessitating surgical intervention. This report details the presentation, diagnosis, and management of a 71-year-old patient with acromion nonunion treated with a MESH plate.

Case Presentation

Patient Information

A 71-year-old male presented with persistent right shoulder pain and limited range of motion one year after undergoing surgery for a right fractured acromion and clavicle. The patient reported difficulty performing overhead activities and experienced pain during shoulder movements.

Clinical Findings

On examination, the patient exhibited tenderness over the acromion and restricted abduction and forward flexion of the shoulder. There was no evidence of infection or erythema around the surgical site.

Diagnostic Assessment

Imaging Studies: X-rays revealed a clear nonunion of the acromion with visible fracture lines and slight displacement with clavicle and acromion implant in situ. A CT scan of 1st surgery confirmed the fracture of acromion and provided detailed visualization of the fracture morphology following which the patient was operated for clavicle and acromion.

Laboratory Tests: Normal inflammatory markers and no signs of systemic infection.

Diagnosis

The diagnosis of acromion nonunion was established based on clinical evaluation and imaging findings.

Treatment

Given the patient's symptoms and imaging findings, surgical intervention was deemed necessary. The decision was made to use a MESH plate for fixation due to its versatility and ability to contour to the acromion's anatomical shape

Surgical Procedure

Anesthesia and Positioning:

The patient was placed under general anesthesia and positioned in a beach-chair position.

Incision and Exposure:

A posterior approach to the shoulder was used. The previous scar was utilized to minimize additional scarring. Previous implant for acromion was removed.

The nonunion site was exposed, and fibrous tissue was debrided to freshen the fracture edges.

MESH Plate Fixation:

A MESH plate was contoured to fit the acromial anatomy and secured with screws to provide stable fixation

Intraoperative fluoroscopy confirmed satisfactory alignment and stability of the fixation.

Closure:

The deltoid muscle was reattached, and the wound was closed in layers using absorbable sutures.

Postoperative Care

The patient was placed in a shoulder immobilizer postoperatively.

Pain was managed with analgesics, and a gradual rehabilitation program was commenced after six weeks focusing on range of motion and strengthening exercises.

Follow-up and Outcomes

At three months post-surgery, the patient reported significant improvement in pain and shoulder function.

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Follow-up X-rays showed good healing of the nonunion with no signs of hardware failure. At six months, the patient had returned to daily activities with improved range of motion and strength.

Discussion

Acromion nonunion is a rare but significant complication that can arise following surgical interventions or trauma to the shoulder. The acromion plays a critical role in shoulder biomechanics, serving as a site for muscle attachment and contributing to the stability of the shoulder girdle (Goss, 1995). Nonunion of this structure can lead to chronic pain, dysfunction, and significant impairment in daily activities, particularly those involving overhead movements.

Etiology and Challenges

The etiology of acromion nonunion often involves inadequate initial fixation, insufficient immobilization, or biological factors that impair healing, such as poor vascular supply to the acromion (Burkhart & Morgan, 2004). Diagnosing acromion nonunion can be challenging due to its non-specific symptoms, which overlap with other shoulder pathologies such as rotator cuff tears or adhesive capsulitis.

Surgical Considerations

The choice of surgical intervention is crucial for successful management of acromion nonunion. Traditional fixation methods, such as tension band wiring or standard plating, may not provide adequate stability due to the complex anatomy and biomechanics of the acromion. The use of MESH plates, as demonstrated in this case, offers several advantages: Versatility and Contouring: MESH plates can be easily contoured to the anatomical shape of the acromion, allowing for better adaptation and fixation. This flexibility is particularly beneficial in accommodating the irregular surfaces and angles of the acromion (Kuhn & Blasier, 1994). Enhanced Stability: The multi-hole design of MESH plates allows for multiple points of fixation, distributing forces evenly and reducing the risk of stress concentrations that could lead to hardware failure. Biocompatibility and Healing: Modern MESH plates are designed to be biocompatible, minimizing the risk of adverse tissue reactions and promoting osseointegration (Miller & Thompson, 2010).

Rehabilitation and Recovery

Postoperative rehabilitation is a critical component of the treatment plan, as it aids in restoring function and strength while ensuring proper healing of the nonunion site. The rehabilitation protocol typically involves:

Initial Immobilization: To protect the repair site and allow for initial healing.

Gradual Range of Motion Exercises: Initiated after adequate healing is observed, usually around six weeks post-surgery, to restore flexibility without compromising structural integrity.

Strengthening Exercises: Focused on the deltoid and rotator cuff muscles to enhance shoulder stability and function.

Long-term Prognosis and Future Directions

The long-term prognosis for patients undergoing MESH plate fixation for acromion nonunion is generally favorable, with most patients achieving significant pain relief and functional improvement. However, ongoing research is necessary to further refine surgical techniques and improve outcomes. Future directions may include the development of custom 3D-printed plates tailored to individual patient anatomy, as well as the integration of biologic agents to enhance bone healing and integration (Kuhn & Blasier, 1994; Romero & Schai, 2001). In conclusion, the management of acromion nonunion requires a comprehensive approach that considers the unique anatomical and biomechanical challenges of the shoulder. The innovative use of MESH plates represents a promising option for achieving stable fixation and successful outcomes in these complex cases.

Conclusion

Acromion nonunion can significantly affect shoulder function and quality of life. This case demonstrates that MESH plate fixation is a viable and effective option for treating nonunion of the acromion, providing stability and promoting healing. Further research is needed to establish long-term outcomes and refine surgical techniques for this rare condition.

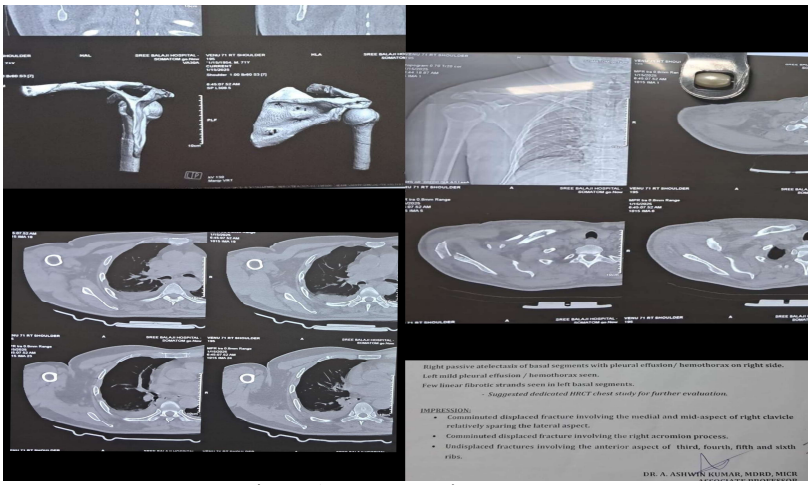

Figure 1 : Pre-operative CT scan

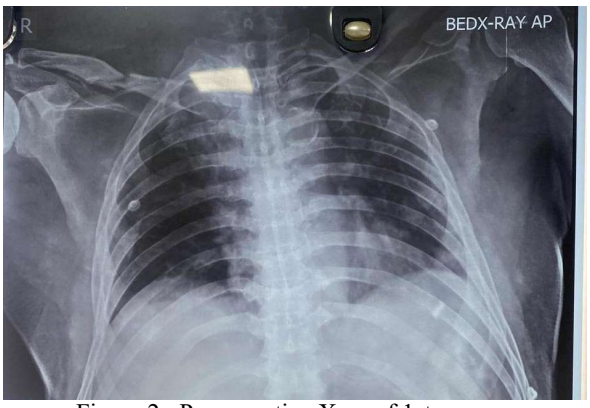

Figure 2 : Pre operative Xray of 1st surgery

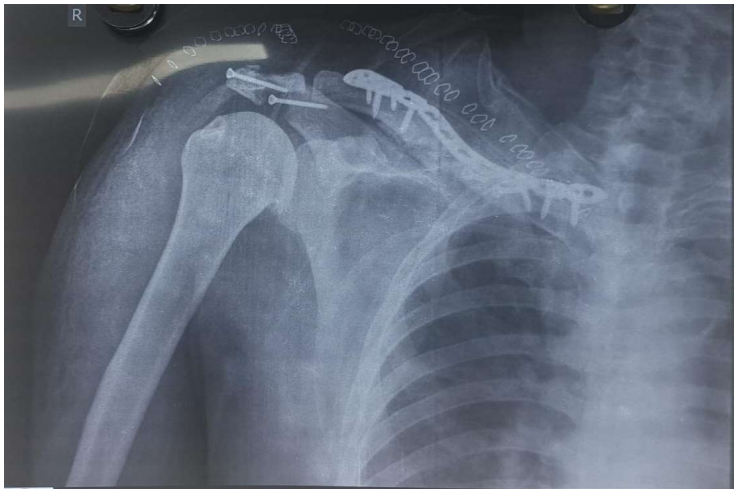

Figure 3: Post op xray after 1st surgery

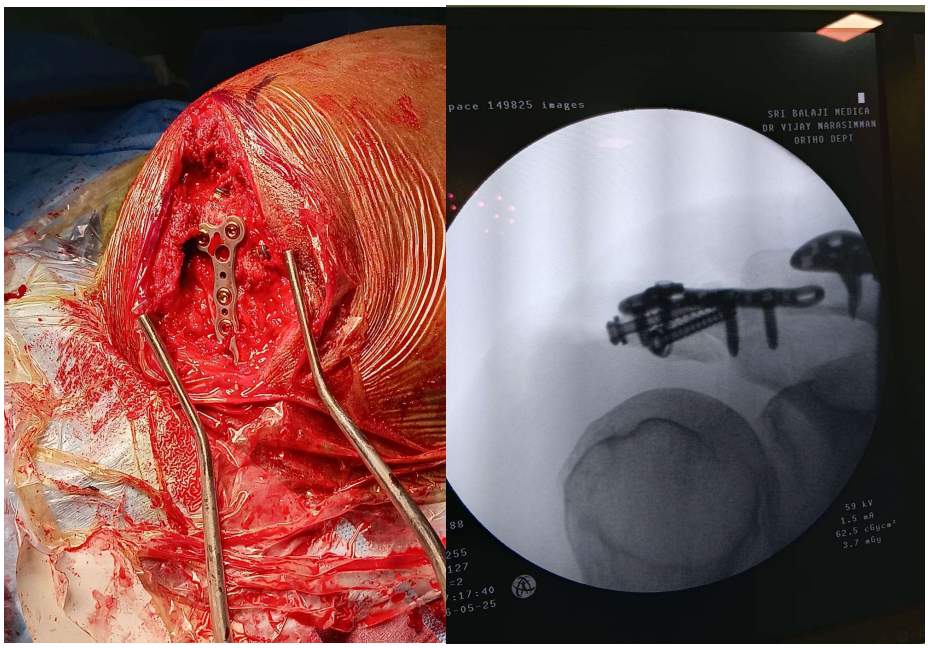

Figure 4: Intra Operative images of non union of acromion and MESH plate placed

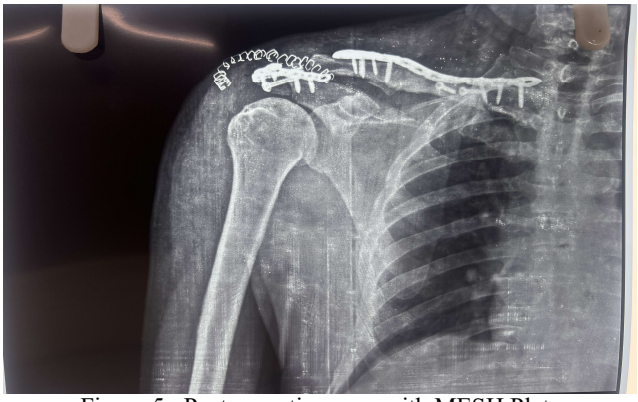

Figure 5 : Post operative xray with MESH Plate

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