

SURGICAL MANAGEMENT OF ACROMIOCLAVICULAR JOINT DISLOCATION BY DOUBLE ENDO BUTTON AND FIBRE WIRE TECHNIQUE - A CASE SERIES AND FUNCTIONAL OUTCOME

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Abstract

Surgical intervention is necessary for adequate reduction and stabilization of complete acromioclavicular (AC) joint dislocations. This study assessed the functional outcomes of treating these injuries using the double endobutton and fibre wire techniques. Nine male patients (aged 24-45 years) with isolated, closed, and complete AC joint dislocations underwent surgical repair 8-60 days post-injury, with a mean surgery duration of 60-80 minutes. At the one-year follow-up, the mean Constant Shoulder Score was 90, with no limitations in shoulder joint movements, subluxation, or redislocation of the AC joint, and no complications were observed. The surgical technique involves the precise placement of a guidewire and cannulated drill through the clavicle and coracoid, followed by the insertion of endobutton-fibre wire constructs to maintain reduction. This study showed that the double endobutton and fibre wire technique is an effective surgical approach for treating complete AC joint dislocations, resulting in excellent functional outcomes and minimal complications.

INTRODUCTION

Acromioclavicular joint injuries are commonly seen in as many as 9% of all shoulder girdle injuries.^[1] Rockwood type I and II can be treated non-operatively, but complete dislocation of the AC joint requires operative treatment for adequate reduction and stabilization of the AC joint.^[2] Numerous static and dynamic techniques have been described for the management of AC joint dislocation, but no standard technique has been established to date.^[3]

This study aimed to describe and evaluate the post-operative functional results of complete AC joint dislocation treated with the double endobutton technique.

Case Series

This study was conducted in a tertiary care orthopaedic hospital between June 2019 and December 2022, among 9 patients. All patients were male and aged between 24 and 45 years old. Five patients were diagnosed with right-sided injuries and four patients with left-sided injuries. All the patients had complete AC joint dislocations and closed injuries. All of them were isolated AC joint dislocations. The surgical time interval was 8-60 days. All cases were treated with the double

endobutton and fibre wire technique. The duration of hospital stay was 6-8 days. Patients were followed up at 2, 4, 8, 12, and 24 weeks, and one year post-operative.

The operated shoulder was immobilized in a shoulder immobilizer for the initial 2 weeks, followed by pendulum exercise for the next 2 weeks. ROM exercises were started after four weeks, and strengthening exercises were allowed after eight weeks. Gradual normal activity was allowed after 12 weeks. Outcomes were assessed using AP radiographs, stress AP radiographs, and the Constant Shoulder Score (CSS). Functional outcomes were graded according to CSS as Excellent (90-100), Good (80-89), Fair (70-79) and poor (<70).

Surgical technique

The patient was under general anaesthesia and received antibiotic prophylaxis. The patient was in the supine position with the head end up and the C-arm approached from the opposite side to take the true AP view of the AC joint and end on view of the coracoid process base. A 2-inch incision was made over the AC joint and lateral end of the clavicle. The AC joint and lateral part of the clavicle were exposed. Another 1-inch incision was made over the

coracoid tip, the deltoid was split in line with its fibres, and the base of the coracoid was cleared from soft tissue with a fingertip. Two 1.8 mm drill holes were made in the anterior and posterior parts of the acromion and two 1.8 mm drill holes were made in the anterior and posterior parts of the lateral end of the clavicle.

No 2 Ethibond were passed through these corresponding drill holes, the AC joint is reduced manually and held in position with preliminary ties of the ethibond. A drill tip guidewire was drilled into the top of the clavicle 2–3 cm medial to the AC joint and midway between the anterior and posterior borders of the clavicle. The entry point is positioned such that it allows for the straight passage of the guidewire from the clavicle to the centre of the base of the coracoid. The guidewire is then aimed at 15–20 degrees anteriorly and towards the base of the coracoid. Care should be taken to advance the guidewire through each of the four cortices it will pass in the superior to inferior direction by feeling at each cortex and checking under the image intensifier. The guide wire should not be advanced deeper than the inferior cortex of the coracoid to prevent injury to the neurovascular structures.

Once the satisfactory position of the guidewire was determined, it was over-drilled with a 4 mm cannulated drill. Once the bone tunnel was created, endobutton and fibre wire constructs were prepared. The endobutton-fibre wire construct was placed under the coracoid with the help of a wire loop made with a dental wire passed through the bone tunnel. The two pairs of fibre wire tails were pulled up to lock the endobutton onto the underside of the coracoid base. The fibre wire tails exiting the top of the clavicle were passed through the second endobutton holes. It is extremely important while applying the final knots, the endobutton should be held flat on top of the clavicle, and the AC joint should be maintained in complete reduction. Tie the sutures on the top of the endobutton and Ethibond over the AC joint. The wound was washed and closed in layers.

RESULTS

All 9 patients were male aged between 24 and 45 years. Out of nine, five were right-sided injuries, which were the dominant side, and four were left-sided injuries, which were the non-dominant side. The cause of injury was a fall on the shoulder with RTA in 8 cases and a fall from a height in 1 case. The duration between injury and surgery was 8–60 days. The mean duration of surgery was 60–80 min. The duration of the hospital stay was 6–8 days. At the final follow-up at the year post-operative period, the mean CSS was 90, and no restriction of shoulder joint movements, subluxation, or redislocation of the AC joint was observed in any of the 9 patients. No other complications were noted.

Figures 1-3: Intra-operative images showing careful passage of the guide wire across the four cortices. The AC joint was maintained in the reduced position

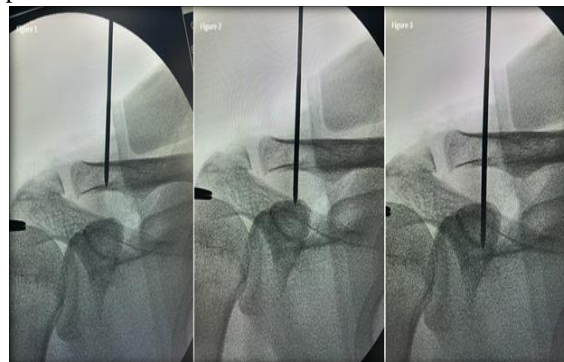


Figure 1-3: Intra-operative images showing careful passage of guide wire across the 4 cortices. Note the AC joint is maintained in the reduced position

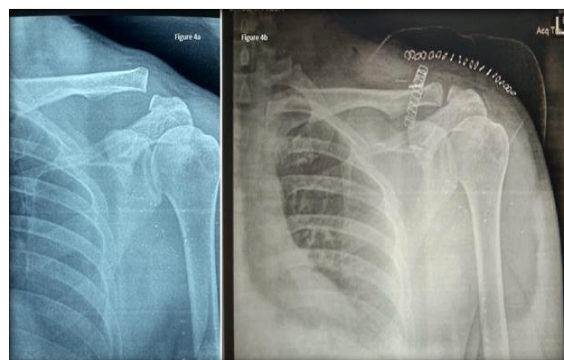


Figure 4 a: Preop x-ray showing left AC joint dislocation. Fig 4 b: Postop x-ray showing endobutton in situ with AC joint in reduced position

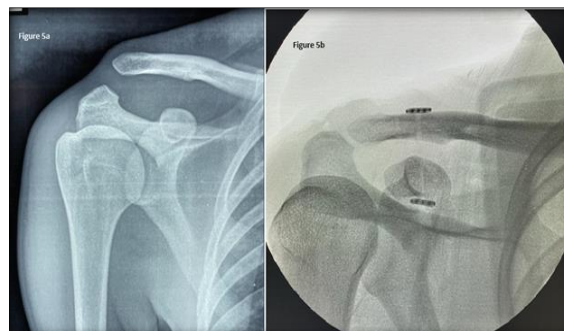


Figure 5 a: Preop x-ray showing AC joint dislocation. Fig 5 b: Intra-op images showing reduced AC joint with endobutton in situ

DISCUSSION

AC joint injuries constitute approximately 9% of all shoulder injuries.^[1] The treatment of complete AC joint dislocation remains controversial. Although many studies have demonstrated successful outcomes with nonoperative treatment, several studies have reported poor outcomes in over 40% of patients. Many of these patients undergo subsequent surgical treatment for the ongoing symptoms of both pain and weakness. Long-term follow-up has shown

residual symptoms in most patients treated non-operatively.^[4-6] This has led to a commonly accepted recommendation for surgical treatment in high-level athletes or high-demand manual labourers. However, even in patients with lower demand levels, a recent study has shown a poor outcome in 20% of non-athletes, and an additional 15% of patients reported significant symptoms of weakness.^[7]

Surgical treatment has shown much higher success rates in recent studies; however, many of these techniques are associated with significant implant-related complications. Various surgical methods have been used to treat AC joint dislocation. The common goals of various treatment options are pain relief, restoration of normal anatomy, and biomechanics of the AC joint. A primary principle in treatment is to maintain mechanical stability and joint congruity as accurately as possible for the development of rigid scar tissue healing.

Biochemical studies have led to the development of new techniques with the goal of more accurately recreating the native anatomy and identifying materials that can tolerate cyclic loading without deformation or failure. Fixations placed in anatomically correct positions may improve implant stability and response to cyclical loads.^[7,9] The endobutton is placed in an anatomically correct fashion to reproduce the course of the coracoclavicular ligament. The deforming forces of the arm weight are distributed along the surface of the two metal endobuttons and not entirely on the suture material itself. This technique restores the CC interval to normal and maintains it until native ligaments heal. It also provides optimum strength for the native ligaments to heal.^[7,10]

In our study, in the final follow-up at the year post-operative period, the mean CSS was 90 and there was no restriction of shoulder joint movements, subluxation, or redislocation of the AC joint in any of the 9 patients. Many complications are associated with the double-endobutton technique, such as suture failure, knot slippage, implant migration, foreign body reaction, loss of reduction, and AC joint arthrosis.^[11,12] In our study, we did not notice any of these complications.

CONCLUSION

The double-endobutton technique is a simple and cost-effective surgery that provides better cosmetic and functional outcomes. Future studies may look into longer-term outcomes and compare outcomes

between open and percutaneous arthroscopic endobutton fixation techniques.

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