

Case Report

Biplanar fixation of acromio-clavicular joint dislocation associated with coracoid process fracture: Case report

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ABSTRACT

Introduction: Acromioclavicular (AC) joint injury associated with coracoid process (CP) fracture is a rare injury and only case reports had been published in the literature. Although AC joint injury is not uncommon, there is controversy as regard the best stabilization method whether to use wires, hook plate, arthroscopic reconstruction or the recently described techniques of anatomic restoration of both the coracoclavicular (CC) and acromioclavicular (AC) ligaments to add stability in both the vertical as well as the horizontal plane for the AC joint. Isolated CP fracture rarely necessitates surgical intervention; but in association with AC joint injury; a controversy as regard best management, surgical approach, technique of stabilization and implant used is present due to paucity of literature.

Patient and method: A 36 years old manual worker who sustained a combined injury of AC joint (grade III) and CP comminuted base fracture had been treated surgically in our hospital using a biplanar fixation technique; blind 4 mm cannulated screw for the CP fracture and anatomic reconstruction of the AC ligament using FibreTape (Arthrex, Naples, FL); to add stability in both the vertical and horizontal plane. Follow up was done for one year.

Results: After completion of rehabilitation program, patient could return to work with no shoulder pain in ten weeks postoperatively. Till the last follow up there was no evidence of loss of reduction or shoulder pain with a Constant score of 86.

Conclusion: Our technique in combined AC joint and CP fracture, address both injuries to add biplanar AC joint stability allowing accelerated rehabilitation and avoids metal hardware complications.

Introduction

Acromioclavicular (AC) joint dislocation accounts for 9–12% of all shoulder injuries [1]. It occurs most commonly due to direct impact on the shoulder especially in sports activities and road traffic injuries [2]. The association of coracoid process (CP) fracture to such an injury is rare and only case reports had been published regarding this situation [3].

Recently, concerns as regards the stability of the AC joint in both the vertical and horizontal planes have been issued [4]. Many techniques had been described to address such stability in anatomic pattern restoring both the CC and AC ligaments [5,6]. Although fixation of isolated CP fracture is rarely indicated unless involving part of the glenoid, evident compression of the suprascapular nerve or brachial plexus or limiting shoulder internal rotation, its association with AC dislocation simulates the CC ligaments complete disruption [7].

This report presents the positive outcome of rigid stability in a case of AC joint dislocation associated with CP fracture in which a

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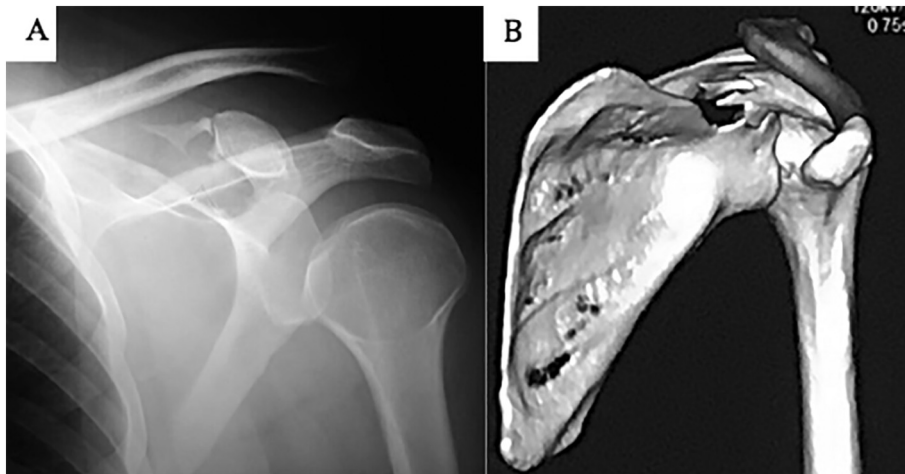


Fig. 1. A, B: (A) X-ray of left shoulder showing grade III AC dislocation, (B) 3DCT scan showing comminuted fracture of CP base.

fixation in both the horizontal and vertical planes was achieved allowing accelerated rehabilitation and rapid return to work.

Case report

On trauma call, a 36 years old male patient, manual worker, came to our hospital following a direct fall on his left shoulder from a 2 m height. A painful bony prominence on the left shoulder with the arm held by other side raised a clinical suspicion of AC joint dislocation that was confirmed with routine x-ray views of AC joint (type III Rockwood and Green classification). A similar CC distance in comparison to the other normal side suggested CP base fracture that was confirmed by CT scan, [Fig. 1].

Upon admission, planning of surgical intervention supposed different questions as regard position, approach, fixation technique and postoperative care. Review of available literature was done and only case reports found.

Operation decided on the next morning. After administration of 1.5 g of 3rd generation cephalosporin, the patient was placed in a beach-chair position on a translucent orthopedic table. Routine upper limb draping and sterilization allowing free arm positioning during surgery was done. Horizontal S-shaped skin incision centered over the AC joint was done. Deep dissection to expose the antero-superior distal clavicle end and the AC joint splitting the anterior deltoid muscle fibers continued till exposure of the upper CP surface.

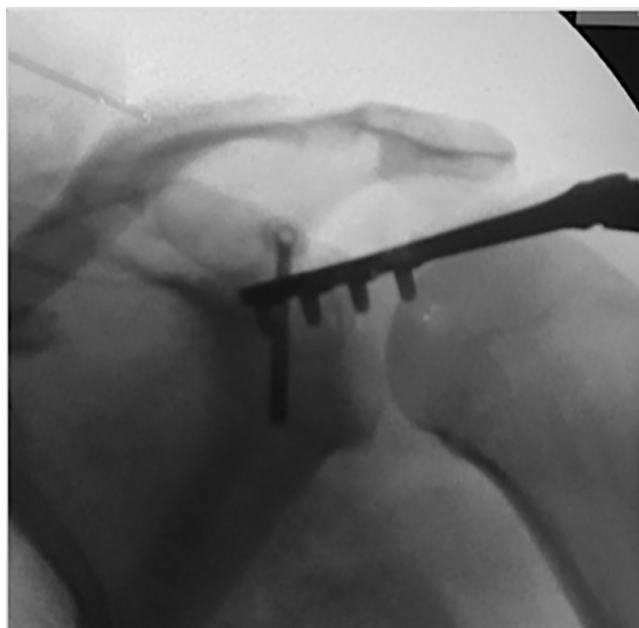


Fig. 2. Intraoperative fluoroscopy after indirect reduction of CP showing AC joint reduction.

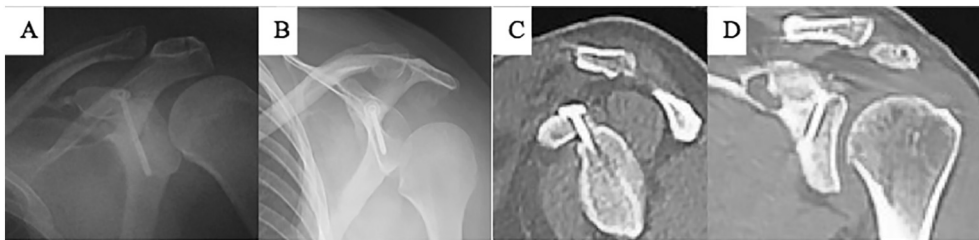


Fig. 3. A, B, C, D: (A) postoperative X ray at day two showing reduction of AC joint and bony tunnels for anatomic restoration of AC ligaments, (B) postoperative X ray at tenth week showing maintained position of AC joint although in (C) CT scan sagittal cut showing non anatomical reduction of CP, (D) CT scan coronal cuts showing partial union of CP comminuted base fracture at tenth week.

Under fluoroscopy guidance, indirect reduction of the coracoid fracture was achieved with fixation to the scapula using a 4 mm cannulated screw. With the tightening of the screw, reduction of the AC joint could be achieved [Fig. 2]. But while testing stability in the horizontal plane, a large degree of instability was evidenced. [Supplementary Video 1].

To add stability in the horizontal plane, anatomic reconstruction of the AC ligament using FibreTape® (Arthrex, Naples, FL) was done in the form of double figure of eight sutures (near suture and far suture to AC joint by one and two cm transosseous tunnels) with one knot anterior to AC and the other superior to it.

Closure in layers was completed and the patient continued antibiotics for 48 h. Analgesics prescribed to facilitate rehabilitation program. Pouch arm sling was used in the first three weeks for comfortable arm positioning. Follow up with X rays on day two, three weeks, six weeks and ten weeks postoperative together with CT scan were done to assess union [Fig. 3].

Accelerated rehabilitation program was started with pendulum exercises, passive range of motion and strengthening exercises in the first three weeks. Followed by active assisted muscle strengthening exercises, scapular stabilization and full active range of motion at six weeks. The patient returned to work at tenth week after full recovery of active range of motion, with no pain and a Constant score of 86 with excellent function compared to the normal side. Follow up X-rays showed no displacement in both planes



Fig. 4. A, B, C, D, E: (A) Ten weeks postoperative muscle strength with restored deltoid contour and range of motion, (B) external rotation (C) internal rotation, (D) forward flexion, (E) abduction.

[Fig. 4] [Supplementary Video 2].

Patient had been followed up every three months for one year postoperatively. There was no evidence of loss of reduction or shoulder pain till last follow up.

Discussion

Coracoid fracture is a rare injury that if occurred alone no special treatment is needed, as anatomical reduction does not affect either activity or healing [7]. But when combined with AC joint injury, disturbance of the superior shoulder suspensory complex is evident at two levels. Different techniques including both conservative and surgical treatment; guided mainly by the degree of AC injury; are described [3].

trans-Articular wires had been described by many authors to manage combined AC dislocation and CP fracture [3], This technique carries the risk of hardware migration, breakage and need for removal [8], A more stable fixation using hook plate for AC stability alone [3] or in combination with CP fixation using cannulated screws also was described [9], but again this technique had high complication rates including shoulder pain and discomfort that is only relieved after plate removal [8].

Anatomical reconstruction of AC joint is nowadays popular [6,9] to address the horizontal stability of the joint by restoring the AC ligaments [4]. In the presence of CP fracture, the vertical limb of such technique is impossible. So combining anatomical reconstruction of AC ligaments with blind cannulated screw fixation of CP fracture to have stable fixation allowing accelerated rehabilitation of the shoulder could be a solution of such a problem.

Although non-anatomical incomplete union of CP was evidenced, the patient returned to work and regained deltoid strength in ten weeks with no pain. This is similar to one of the two cases reported in the work by Kose et al. [3].

In conclusion, combined acromioclavicular injury with coracoid process fracture is a rare injury. The described technique can address both injuries to add biplanar acromioclavicular joint stability allowing accelerated rehabilitation and avoids metal hardware complications. Long-term follow up is needed to evaluate the development of arthritic changes in the AC joint.

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Conflict of interest

None.

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