Acromioclavicular Joint Dislocation Clinical , Radiological and Therapeutic Study

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ABSTRACT:

BACKGROUND:

The ACJ is the most peripheral joint component of the upper extremity appendicular linkage . All significant mechanical forces applied directly to or through the upper extremity are ultimately transmitted across that linkage .

OBJECTIVE:

We try to see the outcome of both conservative and operative treatment on dislocated acromioclavicular joint {ACJ}

METHODS:

From September 2005 – June 2008, 14 patients with ACJ dislocation were seen at AL-Hay hospital wasset , the patient age, sex , occupation, injured side and manner of injury were recorded. The patients were chosen randomly to operative or conservative treatment according to type of injury and will of patients and studied in form of indication tactile approaches to treatment and results were described and discussed in some details.

RESULTS:

Conservatively treated patient regained movement significantly more quickly and fully returned to work earlier and had fewer unsatisfactory results than having early operation. however for severe dislocation with coracolavicullar displacement of 2cm and more, early surgery produced better results.

CONCLUSION:

Conservative management is best for most acute dislocation but younger patients with severe displacement may benefit from early reduction and stabilization.

KEYWORDS: acromioclavicular joint , dislocation .

INTRODUCTION:

The ACJ is the most peripheral joint component of the upper extremity appendicular linkage . All significant mechanical forces applied directly to or through the upper extremity are ultimately transmitted across that linkage.[1]

injuries to the ACJ are common in contact sport and manual laborers. Although most of injuries are treated without surgical repair[2] , the treatment of ACJ dislocation remain controversial in spite of some controlled randomized trials have shown that the result of conservative treatment are better than those of operation[3]. Operation has been advocated to restore anatomy of ACJ since it has been thought that this could not be achieved by conservative treatment, although conservative treatment allows patients to rehabilitate more rapidly, operation carries a significant risk of complications and internal fixation may required to be removed . [4,5]

We try to see the outcome of both conservative and operative treatment on dislocated ACJ

Anatomy of the ACJ

The acromioclavicular articulation, between the acromial end the clavicle and the medial margin of acromion of the scapula is of plane variety . both articular surfaces are covered with fibrocartilage; on the acromial and of the clavicle is a narrow, oval area, directed downward and laterally to overlap a corresponding area, on the medial border of the acromion the long axis of the joint is antero- posterior . it's ligaments are within the capsule , acromioclavicular{AC} and coracolavicular{CC} .

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The CC ligament connects the clavicle with the AC joint it forms the most efficient means of preventing the clavicle with the acromion. It consists of two parts, trapezoid and conoid , which are usually separated by fat, or frequently , bursa thus intervenes between the medial end of the horizontal part of the coracoid process and the lateral end of the groove for subclavian on the clavicle . These bony regions may be closely apposed and covered with cartilage to form CC joint [6]

Movements of the AC joint:

These are passive movements , muscles which move the scapula cause it to move on the clavicle so it is only hinge joint with elevation and depression movments[7]

Mechanism of injury and classification:

The most common victims of ACJ injury are contact sports and motor vehicle accidents, the most common precipitating event is a force application directly onto the lateral edge of the acromion. Locked by ribs, is then pushed upward. Direct fall on adducted shoulder may cause ACJ separation, the force of the fall dictates the degree of injury . rarely indirect injury also may cause ACJ separation as fall on outstretched hand .[8,9]

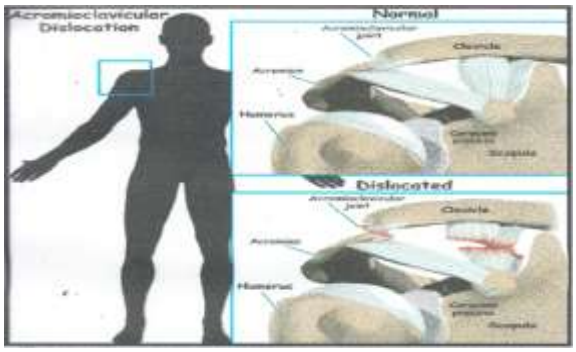

Figure 1: An indirect force applied up through the upper extremity (as a fall on outstretched hand) may superiorly displace the acromion form the clavicle, however the CC ligament is not stressed[10]

The most useful classification of ACJ separation is that of Rockwood who describes six main types of sprains although some surgeons still use the three grades classification of Allman's [11]

Rockwood classification of ACJ dislocation:

Type I: partial tear of the AC ligament without real change in position of distal clavicle in relation to the acromion

Type II: rupture of the AC ligament with a partial tear of the CC ligament . The distal end of the clavicle is displaced in relation to the acromion less than the full width of clavicle itself .

Type III: rupture of the AC ligament and CC ligament, with displacement of the distal clavicle more than it's full width.

Type IV: posterior displacement of the clavicle through the muscle aponeurosis of trapezius . deltoid and trapezius muscle are detached from the distal clavicle.

Type V: the distal clavicle is severely displaced upward toward the base of the neck, covered only by skin subcutaneous tissue , with complete rupture of the deltoid-trapezius musculature.

Type VI: inferior dislocation of the clavicle under either the acromion or the coracoid process, CC ligament and muscles are disrupted .

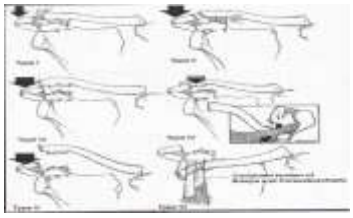

Figure 2: Schematic drawing of the classification of ligamentous injuries to the ACJ[11].

Figure 3:X-Ray appearance of grade III ACJ dislocation on the right shoulder[7]

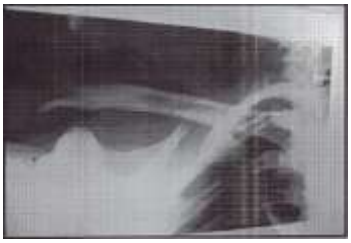

Figure 4: Grade IV ACJ dislocation,note the posterior displacement of the clavicle[7]

PATIENTS AND METHOD:

From September 2005 – June 2008, 14 patients with ACJ dislocation were seen at AL-Hay hospital wasset , the patient age, sex , occupation, injured side and manner of injury were recorded;in some patients weight bearing radiographs were taken in form of 5Kg suspended on each wrist and pulling back both shoulders. The patients were chosen randomly to operative or conservative treatment according to type of injury and will of patents, the study was prospective . Patients with associated fractures of the clavicle were excluded from the study .

Surgeries were performed under general anesthesia, through anterior shape incision the ACJ was inspected and its meniscus was removed. The joint was then reduced and held with either 2 K.wires across the joint or by coracoclavicular fixation using AO cancellous or malleolar screw and washer , with overdrilling of the clavicle to facilitate insertion of the screw and to allow some independent rotation, the AC ligament was repaired, and the CC ligaments were reconstructed using fascia lata graft. The origin of deltoid and insertion of trapezius were repaired. The limb was protected in borad arm sling for 4 weeks, during this period sutures were removed two week post-operatively, active exercises of fingers, wrist and elbow were started, with pendular exercises of the shoulder and then active shoulder movements.

K.wires were removed after 6 weeks, while some of CC screws were removed after 3-6 months and others were not removed. Shoulder rehabilitation and exercise were instituted in order to regain motion and strength.

Conservative management involved a two weeks period of rest in broad arm sling, with taping across the shoulder to relieve pain in some patients, followed by a program of rehabilitation. The sling continued for 6 weeks.

Follow up reviews were after 2, 6 and 12 weeks and then at 6 months.

Range of motion, power and pain were recorded on an objective scale "lmatani et al 1975". This functional scoring system demonstrates a result to "fair" if there is slight pain and weakness, but does not take in account the appearance of the shoulder.

Table I :The imatani evaluation system for AC dislocation[12].

Results	Excellent	91-100
	Good	81-90
	Fair	61-80
	Poor	<61

Distribution		Score
Pain "40 points"	none	40
	Slight, occasional	25
	Moderate, tolerable, limits activities	10
	Severe, disabling	5
Function "30 points"	Weakness (proportion to pre-injury)	20
	Use of shoulder	5
	Change of occupation	5
Movements " 30 points "	Flexion	10
	Adduction	10
	Adduction	١٠

RESULTS:

14 patients "10 males and 4 females " involved in this study. Their mean age was 38.5 years " ranging from 26 to 63 years ". Half of patients were manual workers and the remainder do sedentary jobs. Of the 14 dislocations, 8 (57%) were due to fall on the ground on the shoulder tip, 3 (21%) sustained during road traffic accidents and 3 (21%) due to fall of heavy objects on the shoulder. The grades of dislocations were 4 patients (28%) with grade II, 8 patients (64%) with grade III and one patient (8%) with grade V. in 9 cases the injuries were on the right side and 5 on the left side " one of them was the dominant side " with Rt:Lt ratio 2:1, this indicates the predilection of injuries for the dominant side. 8 patients had conservative treatment and 6 had surgical treatment.

Outcome:

Manual workers treated conservativle return to work after an average of 4 weeks and those treated surgically aftre 10 weeks. Conservatively treated clerical workers return to work in 2-3 weeks, those after operation in an average of 4 weeks. We evaluate the results of treatment in the two groups after 6 weeks and after 6 months. The initial clinial results are better in conservatively treated group, but after 6 six months there is no much difference between the two groups.

One patient in conservatively treated group, 29 years old male, had fair outcome because of residual pain and limitation of shoulder movements. The patient had to be operated upon and good outcome was obtained. One patient in the opreavely treated group, 38years old female housewife, had poor outcome because of pain and limitation of shoulder movements and she had a complication of lateral pin mogration, re-operation was done for pin removal. She started physiotherap and fair outcome was obtained after 6 months.

The 8 patients who were treated conservatively, 7 of them (88%) score excellent and good results. Higher scores were for those who were treated with sling and taping than those with sling alone.

The 6 patients who had been operated on, 5 of them (86%) had an average scoring from excellent to good at 6 months follow up.

Table 2:The results of both groups after 6 weeks and 6 months follow up.

	Conservative		Operative	
	6 weeks	6 months	6 weeks	6 months
Excellent	3	5	-	3
Good	4	2	3	2
Fair	1	1	2	1
Poor	-	-	1	-
Total	8	8	6	6

Anatomical reduction was rarely maintained, even when it was initially achieved, in patents who were treated non-operatively, although most of them had on increase in coracoclavivular distance after application of load to the wrist while loss of anatomical reduction was only in one patient in operatively treated group, this was due to lateral pin migration 2 weeks post-operatively.

In both groups reduction was confirmed and assessed radiologically in 3 months and 6 months follow up periods.

Calcifications around the ligaments were seen in one patient who was treated non-operatively, although the patient score was excellent.

Table 3:The results of both conservative and operative treatment on type III ACJ dislocation after 6 months follow up.

Results	Conservative	Operative
Excellent	-	1
Good	3	2
Fair	1	1
Poor	-	-
Total	4	4

Note that 3 out of 4 patients (75%) of both groups with type III ACJ dislocation had good and excellent results.

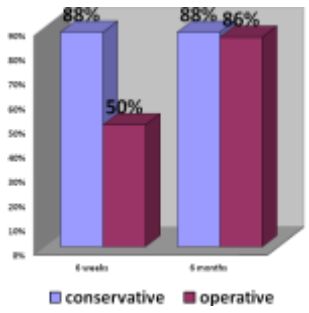

Figure 5: Excellent and good reslts of both conservative and operative treatment after 6 wks. And mon. follow up.

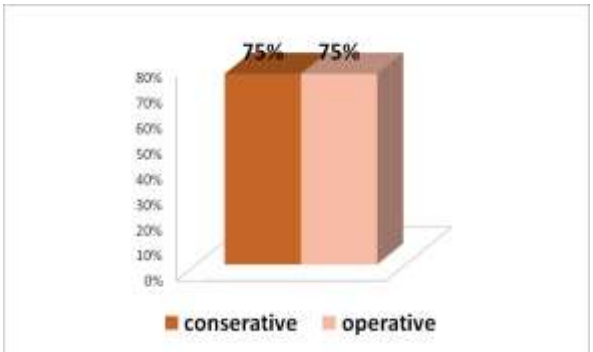

Figure 6: Results of both conservative and operative treatment of type III ACJ dislocation after 6 months follow up.

Complications:

- Superficial wound infection which settled down with dressing and antibiotics used in one case.
- One patient had lateral migration {outside migration} of a wire for which required second operation for its removal, the outcome was fair.
-One patient had calcification of CC ligaments, although it had on significant influence on functional results.
-One patient in conservatively managed group eventually required operation for painful subluxation of the joint and limited shoulder flexion and abduction, the outcome was good.
-No patient in both groups recorded "unhappy" because of cosmetic result of the shoulder.
-No patient recorded having secondary arthritis of the ACJ

DISCUSSION:

There is significant debate about the optimal treatment of ACJ injury. Treatment of type I and II injuries consists of ice, elevation, analgesics and immobilization in a sling followed by early range of motion. While type I injury may require 7-10 days of immobilization in a sling type II injury is often immobilized for up 3-6 weeks.[13,14]

The treatment of complete dislocations, however, is much more controversial. Some surgeons recommend operative reduction and repair of all acute, complete acromioclavicular dislocations.[15,16] Other authors advocate routine nonoperative treatment in all cases of complete dislocation[17]. Still other surgeons recommend operative repair in selected circumstances.[18]

The confusion surrounding the treatment of acromioclavicular injuries is not clarified by a review of the literature. Many articles have been written about acromioclavicular injuries. However, there are few, if any, prospective studies comparing the results of operative and nonoperatve treatment in two well-matched groups large enough to make statistically significant conclusions. In fact, a review of more than 300 articles pertaining to acromioclavicular injuries reveals that about half have contributed only a new surgical technique or a new twist to an old technique[19]. In addition, some authors include incomplete and complete dislocations together when reporting the results of a given form of treatment[20,21,22]. Furthermore, all complete acromioclavicular dislocations are not the same. Complete dislocations include types III, IV, V, and VI injuries which have significantly different pathologic findings and prognoses. The treatment of complete acromioclavicular injuries will continue to be controversial until results of different forms of treatment are compared prospectively in truly similar patient groups with comparable types of complete dislocations[23,24,25].

Cox "1991" performed an interesting study, he mailed surveys to two groups of orthopedic surgeons: one group of orthopedic surgeons participating in the care of athletes on a regular basis and the second group chairmen of orthopedic residency training programs in north America. In group I, 86.4% preferred nonoperative management of type III acromioclavicular dislocation; 56.7% of the surgeons in group I who chose nonoperative management preferred symptomatic treatment over attempts at manual reduction. In group II , 72.2% preferred nonopertive management of type

III injuries; 71.9% of the chairmen who preferred nonoperative management advocated symptomatic treatment rather than attempts at closed manipulation. According to Cox, the currentpreference for treatment of type III acromioclavicular injuries is nonoperative and involves sympathetic treatment and represents a shift toward nonopertive treatment[26].

Imatani et al "1975" suggested that closed treatment of ACJ injuries gave superior results than early operation. They suggested that ACJ dislocation involved rupture of the CC ligament and avulsion of anterior fibers of deltoid and inferior fibers of trapezius, so surgical approach to this region involved more muscle detachment and an extension of partial lessons. The advantages of the Conservative treatment are shorter period of rehabilitation; the freedom from hospitalization and in general, the satisfactory functional results. The disadvantages are that in severe dislocations there is no guarantee of freedom from pain and slightly more incidence of ACJ arthritis "although" reduction has not achieved some contact between the joint surfaces occurred as a result of elevating the arm" in that case a reconstructive procedure is needed.[18]

Thus, according to Larsen Christenson "1986" it seems that operation for AC dislocation is only justified in a few situations; in thin young patient with great prominence of the clavicle in patients whose work necessitates having the shoulder in 90 degree of flexion or abduction or both and in people who have to lift heavy weights at work. [27]

Our study results agree with that opinion in conservatively treated patients we have no poor results although 28% of cases are type II and other 64% are type III and we record 88% good and excellent results after 6 months.

For higher grades of dislocations who are manual workers we treat them surgically we have one early poor result because of lateral pin migration in spite of that the final outcome is 86% good and excellent results.

Calcifications is commonly seen in the CC ligament after operation but is often present after conservative treatment. In our study one patient has developed Calcifications in the CC ligament. Ligament calcification appears to have no bearing on the clinical outcome. Warren-Smith "1989" suggested that surgery was equally effective for both early and late cases and there was no indication to operate in acute stage. However delay in offering operation may leave the patient with a protracted period of discomfort and this may affect the patient function and even job[28,29,30].

All our surgical series except on has been operated upon early and all of them return to their normal occupations. This suggest that an early operation should be considered more in selected cases.

CONCLUSION:

1.Conservative treatment seems to be method of choice for patients with type I,II and some cases of type III.

2.Higher grades of dislocations best to be managed operatively because of severe deformity and persistence of pain.

3.Operative treatment mostly indicated for young patients with manual work also for sportsmen and athletes.

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