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Acromioclavicular Joint Dislocation: A Comparative Study of the Palmaris Longus Tendon Graft Reconstruction versus Clavicular Hook Plate Fixation

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Abstract: ***Aim of the Study: 1) To compare the Acromioclavicular joint dislocation treated by autograft tendon repair versus hook plate fixation. 2) Outcome in long term followup based on functional results. Materials and Methods: This is a prospective study carried out in department of orthopaedics P. M. C. H. Patna from May 2015-April 2018 on a subset of 10 patients. Observation: Out of 10 patients (Grade 3: 4; Grade 4: 4; Grade 5: 2) of Acromioclavicular joint dislocations, 5 patients were treated by palmaris longus autograft for the coracoclavicular ligament repair and 5 were treated by clavicular hook plate patients were followed up till 1 year postoperatively. Functional outcome in both the groups were same at the end of their follow up. One of the patient treated by clavicular hook plate had hardware prominence and another had clavicle instability in whom tendon autograft was used while rest has had no complications. Conclusion: In our study we have found out that there is no difference in the functional outcomes of the subset of the patients treated by tendon repair or hook plate for acromioclavicular joint dislocation.***

Keywords: Acromioclavicular Joint Dislocation; Palmaris Longus Tendon, Clavicular Hook Plate

1. Introduction

The acromioclavicular and coracoclavicular ligaments of the shoulder joints are prone to sports injuries. The mechanism of injury usually involves a direct trauma to the superior aspect of the acromion and includes inferior and anterior translation of acromion in relation to the distal aspect of the clavicle. Operative treatment has been advocated for certain type 3 Acromioclavicular joint separations and certainly in types 4 and 5 acromioclavicular joint injuries [(1).]

Previous studies have demonstratedthat the acromioclavicular ligaments control anterior posterior stability, while the coracoclavicular ligaments control superior inferior stability [(1, 2).]

Current operative techniques can be classified into 2 groups:-
1) Those that focus on primary healing of the coracoclavicular ligaments, by holding the clavicle and coracoid in a reduced position and 2) those that focus on reconstructing the coracoclavicular ligament using local tissue transfers or tendon grafts. The former utilises fixation of the Acromioclavicular joint using K-wires, tension banding and clavicular hook plates or fixing the coracoid to clavicle using screws, sutures. The latter transfers local tissue sources to the clavicle or uses tendon grafts. One common problem with these techniques remains the weak initial fixation of the ligament or tendon to the clavicle [(3, 4, 5).]

There is an increasing trend in using tendon grafts for reconstructing the coracoclavicular ligaments.

2. Materials and Methods

A prospective study conducted in the department of orthopaedics PMCH Patna from May 2015 to April 2018 on a subset of 10 patients in the age group (25-50 years). There were 6 male and 4female patients. There were 5 right shoulders and 5 left shoulders involvements. Out of the 10 cases, 4 cases were of Rockwood type 3 and 4 each while 2 cases belonged to Rockwood type 5.

Inclusion Criteria:
1) Unstable Acromioclavicular Joint.
2) Rockwood type 3, 4 and 5.
3) Absence of comminuted scapular fracture.
4) Age-25-50 years.

Exclusion Criteria:
1) Stable Acromioclavicular joint
2) Rockwood type 1 and 2
3) Gross communited scapular fracture or floating shoulder injuries.

4) Age-less than 20 years or more 50 years.

For Diagnosis:-
AP and Axillary X Ray views were used.
MRI were used in some cases.

3. Techniques

A. Pamaris Longus Tendon Graft
The graft was prepared after being harvested from the volar aspect of forearm via two 1 cm transverse mid-axial incisions spaced about 10 cm apart. Prior to testing, a tendon graft was then passed through the 3.2 mm holes, each drilled at the distal end of the clavicle and at the acromion, 1 cm away from acromioclavicular joint with the ends secured in a pulvertaft fashion, using no.2 ethibond sutures [6].

B. Clavicle Hook Plate Augmentation
The acromioclavicular joint was reduced under vision. The clavicle hook plates with 6 or 7 holes, are pre-contoured in left and right plates. They are available in commercially pure titanium and stainless steel. The hook of the plate with a 15 mm or 18 mm hook depth was first passed under the acromion, then on the superior aspect of the clavicle. Finally, 3.5 mm cortical screws were placed in the medial and anterior lateral screw holes [7, 8].

4. Result

Patients were graded into excellent, good, fair and poor based on their postoperative assessment of pain, motion and strength and activity.

Outcome	Pain	Motion & Strength	Activity
Excellent	No	Normal	No compromise
Good	Occasional	Normal	No compromise
Fair	During activity	Limited ($<20^0$)	Limited
Poor	Constant requiring medication	Limited ($<20^0$)	Limited

Figure 1: Rockwood Type-3 Dislocation

Figure 2: Fixed By Clavicle Hook Plate

Rehabilitation:
Sling was used for 6-8 weeks while beginning gentle range of motion in weeks 1 to 3. Isometric strengthening exercises can be started after 4 weeks while patient is in sling as well as after the sling is discontinued. Six weeks is the earliest time point that unsupported arm range of motion should be performed in order to allow biological healing. Full strengthening can begin approximately 12 weeks postoperatively; and patient can return to all activities at 4-6 months.

S. No.	Age (Yr) / Sex	Side	Days Old	Operation	Result
1	26 / Male	Right	02	Clavicle hook plate	Excellent
2	29 / Male	Right	02	Clavicle hook plate	Excellent
3	26 / Male	Left	06	Clavicle hook plate	Good
4	34 / Female	Left	14	Clavicle hook plate	Excellent
5	39 / Female	Right	17	Tendon Graft	Excellent
6	48 / Female	Right	22	Tendon Graft	Poor
7	30 / Male	Left	21	Tendon Graft	Good
8	48 / Male	Left	27	Tendon Graft	Fair
9	41 / Male	Left	12	Tendon Graft	Excellent
10	47 / Female	Right	09	Clavicle hook Plate	Poor
	Mean-36.8 Yrs.		13.2		

5. Discussion

Management of acromioclavicular joint injuries remain controversial and continues to evolve over the past decades. Modalities of treatment have been changed with increasing understanding of biomechanics of the joint and nature of problem. After failure of a lot of conservative measures used previously various operative methods have been proposed for the anatomical reduction of acromioclavicular joint which is essential in active and high demand patients like sportsmen.

The average age of patients in our study was 36.8 years (range 25-50 yrs.). Most beingof younger age group. They had equal incidence for the side involved. The average time interval of the reported injury was 13.2 days. (range 2 to 30 days). There was no significant difference in the final outcomes between old and new injuries.

Out of 5 patients treated by clavicular hook plate 3 had excellent outcomes, 1 had good and 1 had poor due to hardware prominence for which implant removal was done at 6 months and gradually full range of motion was obtained at the end of 1 year of follow up.

The patients treated by palmaris longus tendon had 2 excellent results; 1 good, fair and poor each. The patient with fair outcome was given analgesics, short wave diathermy therapy and was immobilised for 8 weeks and then gradually allowed range of motion exercises from 9^{th} week. The patient with poor outcome had clavicular instability due to poor tendon reconstruct. He is still in our follow up and we are planning for re-operating him.

6. Conclusion

There is still no clear consensus regarding the best treatment modalities for the type 3, 4 and 5 acromioclavicular joint dislocations. The modalities of treatment have their own advantages anddisadvantages. From this study we have concluded that both clavicular hook plate and palmaris longus tendon autograft have similar outcomes as far as painless and functional joint along with full range of motionattainment is concerned.

7. Disclaimer

There is no conflict of interest.

There is no financial involvement.

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