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ORIGINAL RESEARCH

Functional outcome of operative management in acromioclavicular joint disruption – descriptive study

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ABSTRACT

Background: Injuries to the acromioclavicular (AC) joint are a common diagnosis following acute shoulder trauma, especially prevalent in athletes. The present study was conducted to analyze the functional outcome of Post-surgical acromioclavicular joint disruption using CONSTANT MURLEY Scoring (CMS) system and post operative pain using Visual Analog Scoring (VAS) system. **Methods:** 13 patients suffering from acromioclavicular joint disruption of both genderswas on regular follow up and sufficient data was collected. CONSTANT score and PAIN score were used for assessment of Functional outcome at 1month, 3 months and 6 months. **Results:** Among the study participants who had received tight rope technique, 33.3% were of age 31 to 40 years and more than 50 years, respectively. Among those who had received suture anchor, 50% were of age 21 to 30 years followed by 33.3% of age 41 to 50 years. Among the participant who had received, tension band wiring is of age 41 to 50 years. All the groups were similar with regard to distribution of age with P value of more than 0.05. The mean CMS among the participants at 1 st month was 78.08 ± 5.37. In the3 rd month, the mean was 84.85 ± 3.23 and in the 6 th month, the mean was 89.236 ± The mean constant score increased significantly during the follow up periodamong the participants. The mean CMS increased in magnitude within each technique during the follow up period.The mean VAS among the participants at 1st month was 3.92 ± 0.64. In the 3rd month, the mean was 2.54 ± 0.51 and in the 6th month, the mean was 1.15 ± 0.37. The mean VAS decreased significantly during the follow up period among the participants. **Conclusion:** The common surgical techniques performed for acromioclavicular joint injuries in the present study were tight rope and suture anchors. Both the procedures had shown a good functional outcome with regard to the Constant Murley Score.

Keywords: acromioclavicular, shoulder, Trauma

INTRODUCTION

Injuries to the acromioclavicular (AC) joint are a common diagnosis following acute shoulder trauma, especially prevalent in athletes.[1] These injuries represent 40%to 50% of shoulder injuries in many contact sports, with about 9% of shoulder girdle injuries affecting the AC joint. Such injuries are primarily minor sprains and occur five times more often in men than women, with the highest frequency observed in individuals aged 20 to 30.[2] Treatment for AC joint dislocations varies based on their grade and severity.[3,4] Common injury mechanisms include falling on an outstretched arm or direct trauma to the shoulder's apex with the arm adducted. Patients often experience pain with disability at the shoulder joint.[5]

Injury to the AC joint causes the acromion to move inferiorly while the clavicle remains in its anatomical position, leading to disruption of the AC and CCligaments.[6] This injury mechanism was first described by Cadenat. The injury typically progresses in a sequence: initially affecting the AC ligaments, followed by the CC ligaments, and eventually impacting the deltoid and trapezius muscles or their attachments. Numerous surgical methods have been investigated, such as endobutton fixation, Weaver-Dunn procedure, Mozacco, hook plate, k-wire, and Bosworth screw.[7] The present study was conducted to analyze the functional outcome of Post-surgical acromioclavicular joint disruption using CONSTANT MURLEY Scoring (CMS) system and post operative pain using Visual Analog Scoring (VAS) system.

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MATERIALS & METHODS

A descriptive study was done at Mahatma Gandhi Medical college and Research institute, Pondicherry after Ethics committee approval upto June 2024, which included 13 patients suffering from acromioclavicular joint disruption of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Patient was on regular follow up and sufficient data was collected. CONSTANT score and PAIN score were used for assessment of Functional outcome at 1month, 3 months and 6 months. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of age with the type of injury

Age group(inyears)	Type3		Type5	
	N=4	%	N=9	%
21-30	1	25	3	33.3
31-40	2	50	1	11.1
41-50	0	0	4	44.4
>50	1	25	1	11.1

Among those with type 3 injury, 50% belonged to age group 31 to 40 years followed by 25% in the age group, 21 to 30 years and more than 50 years, respectively. Among those with type 5 injury, 44.4% were of age 41 to 50 years followed by 33.3% of age 21 to 30 years. Both the groups were similar with regard to age.The difference was non- significant (P> 0.05).

Table II Distribution of age with regard to the technique used

Age group(in years)	Tight rope		Suture anchor		Tension band wiring	
	N=6	%	N=6	%	N=1	%
21-30	1	16.7	3	50	0	0
31-40	2	33.3	1	16.7	0	0
41-50	1	16.7	2	33.3	1	100
>50	2	33.3	0	0	0	0

Among the study participants who had received tight rope technique, 33.3% were of age 31 to 40 years and more than 50 years, respectively. Among those who had received suture anchor, 50% were of age 21 to 30 years followed by 33.3% of age 41 to 50 years. Among the participant who had received, tension band wiring is of age 41 to 50 years. All the groups were similar with regard to distribution of age with P value of more than 0.05.

Table III Change in CMS among the study participants

Timeline	Mean ±SD	Fvalue	Pvalue
1st month	78.08±5.37	61.43	0.001
3rdmonth	84.85±3.23		
6th month	89.23±3.01		

The mean CMS among the participants at 1 st month was 78.08 ± 5.37. In the3 rd month, the mean was 84.85 ± 3.23 and in the 6 th month, the mean was 89.236 ± The mean constant score increased significantly during the follow up periodamong the participants.

Table IV Change in mean CMS with regard to age over the follow up period

Technique	1st month		3rdmonth		6th month	
	Mean	SD	Mean	SD	Mean	SD
Tight rope	78.33	3.88	85	3.95	89.33	4.13
Suture Anchor	80	3.95	85.17	2.78	89.33	2.06
Tension band wiring	65	-	82	-	88	-

The mean CMS increased in magnitude within each technique during the follow up period.

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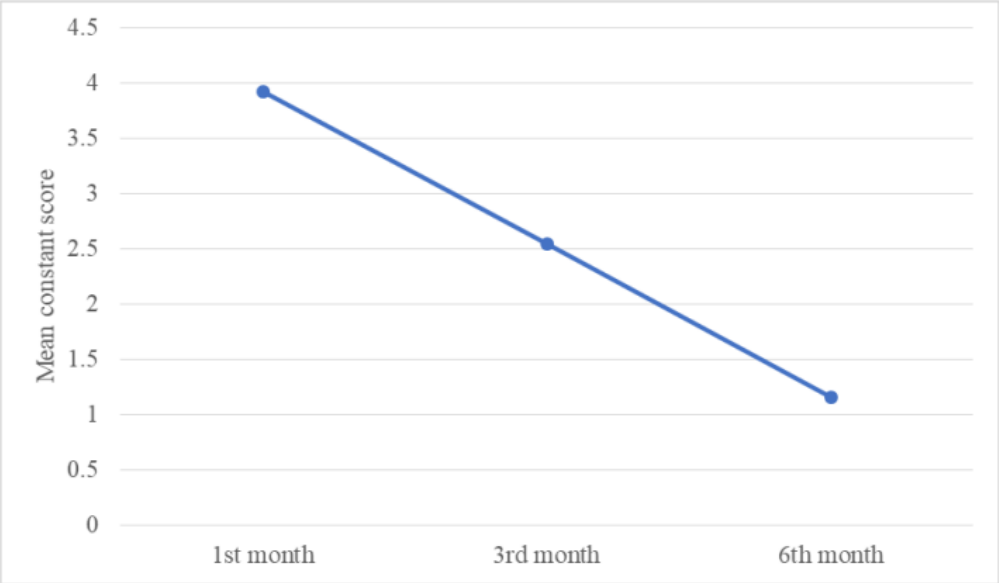
Graph I Change in VAS among the study participants



The mean VAS among the participants at 1st month was 3.92 ± 0.64. In the 3rd month, the mean was 2.54 ± 0.51 and in the 6th month, the mean was 1.15 ± 0.37. The mean VAS decreased significantly during the follow up period among the participants.

DISCUSSION

Injuries to the acromioclavicular (AC) joint are common, especially in the young and active population.[8] A 5-fold male predominance is seen in acromioclavicular (AC) joint injuries, with half the cases within the age group of 20-30 years. Acromioclavicular (AC) joint injuries contribute to around 9% of shoulder girdle injuries.[9]The present study was conducted to analyze the functional outcome of Post-surgical acromioclavicular joint disruption using CONSTANT MURLEY Scoring (CMS) system and post operative pain using Visual Analog Scoring (VAS) system.

We found that among those with type 3 injury, 50% belonged to age group 31 to 40 years followed by 25% in the age group, 21 to 30 years and more than 50 years, respectively. Among those with type 5 injury, 44.4% were of age 41 to 50 years followed by 33.3% of age 21 to 30 years. Both the groups were similar with regard to age. 10. Avinash Get al[10]evaluated the double-button fixation system in the management of Rockwood type III, IV, V and VI acute acromioclavicular joint dislocations. The mean age of patients was 40.6 years. Males comprised 97.7% and females were 3.3%, showing a male preponderance. The involvement of the right side (60%) was higher than the left (40%). The mode of injury in 11 patients was RTA (36.7%), and 19 patients sustained injuries due to falls (63.3%). The majority (73.3%) belongs to Rockwood type 5. Significant differences were observed between pre-operative and post-operative DASH scores and constant shoulder scores.

We observed that among the study participants who had received tight rope technique, 33.3% were of age 31 to 40 years and more than 50 years, respectively. Among those who had received suture anchor, 50% were of age 21 to 30 years followed by 33.3% of age 41 to 50 years. Among the participant who had received, tension band wiring is of age 41 to 50 years. Beris et al[11] in their study eight patients were operated on for grade III AC joint dislocation and 4 for grade IV. The mean age of the patients at the time of surgery was 27.5 years. The mean follow-up was 18.25 months (range: 12-30 months). At the most recent follow-up, the mean Constant score was 94.8 (range: 84-100) showing a significant increase compared with the mean pre-operative value of 34.4 (range: 25-52) ($p<0.001$). The mean DASH score was significantly decreased from 19.6 (range: 14-28) preoperatively to 0.25 (range: 0-3) at the last follow-up ($p<0.001$). The mean VAS score showed a significant decrease from 5.75 (range: 4-7) to 0.2 (range: 0-2) ($p<0.001$). The mean CC distance on the operated shoulder was found to have no significant difference from the CC distance on the contralateral normal side (10.5 vs. 10mm) ($p>0.05$). There was no evidence of AC joint osteoarthrosis, CC calcification or osteolysis of the distal clavicle or the coracoid process.

We found that the mean CMS among the participants at 1 st month was 78.08 ± 5.37. In the 3 rd month, the mean was 84.85 ± 3.23 and in the 6 th month, the mean was 89.236 ± The mean constant score increased significantly during the follow up period among the participants. The mean CMS increased in magnitude within each technique during the follow up period. The mean VAS among the participants at 1st month was 3.92 ± 0.64. In the 3rd month, the mean was 2.54 ± 0.51 and in the 6th month, the mean was 1.15 ± 0.37. The mean VAS decreased significantly during the follow up period among the participants.

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Lee et al12 examined the anatomy and measured the in situ force in ligaments at the acromioclavicular joint using a universal force-moment sensor. The in situ force in the coracoacromial, conoid, trapezoid, superior acromioclavicular capsular, and inferior acromioclavicular capsular ligaments of 10 fresh-frozen cadaveric shoulders was determined for a load of 70 N applied to the clavicle in anteroposterior and superoinferior directions. The lengths of the conoid and trapezoid ligaments were found to be 15.1 +/- 4.1 and 11.5 +/- 2.2 mm, respectively; the widths of the conoid and trapezoid ligaments were 10.7 +/- 1.5 and 11.0 +/- 2.8 mm, respectively. The in situ force of the trapezoid (42.9 +/- 15.4 N) was significantly greater than that for the other ligaments during posterior displacement. Otherwise, no statistically significant differences could be found between any of the in situ forces in each ligament during all other motions examined. During anterior displacement, the inferior acromioclavicular capsular ligament appeared to be the major restraint. The trapezoid ligament was the primary restraint during posterior displacement and provided 55.8% +/- 20.0% of the resisting force.
The shortcoming of the study is small sample size.

CONCLUSION

Authors found that the common surgical techniques performed for acromioclavicular joint injuries in the present study were tight rope and suture anchors.Both the procedures had shown a good functional outcome with regard to the Constant Murley Score.The pain analysed using Visual Analog Score had decreased significantly following tight rope and suture anchor procedure. The prognosis was found to be similar irrespective of the age, sex, type of injury and the side of injury.

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