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ORIGINAL ARTICLE

Operational Result after Modified Weaver Dunn (W.D) Procedure in Chronic Acromio-Clavicular (A.C) Joint Disruption

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ABSTRACT

Background: In orthopedic trauma acromioclavicular joint disruptions are among the most commonly faced injuries that could be due to sports or road traffic accidents. These are injuries in which treatment is always controversial especially in type III of Rockwood type. These injuries accounts for 12% of the total shoulder injuries with young male patients have predominance.
Aim: To assess the operational result after acromioclavicular joint fixation with Modified Weaver Dunn procedure using tight roping technique with two endobuttons.
Place and duration of study: Department of Orthopedic Surgery, Govt. Shahdrah Teaching Hospital Lahore and Lahore General Hospital Lahore for one year from 01st July 2019 to 30th June 2020.
Methodology: This is a descriptive case series study of 10 patients in the combined settings of Department of Orthopedic Surgery Govt. Shahdrah Teaching Hospital Lahore and Lahore General Hospital Lahore. All the cases were operated by a single surgeon using Modified WD procedure with endo-buttons and tight roping technique and operational result was assessed by using Oxford shoulder scoring system (OSS), this system was used in pre-operative and post-operative settings and results were compared. SPSS version 23 & paired t test was used for the analysis of results of all the patients in both pre and post-operative settings.
Results: The patient's average age was 34±2. Road traffic accidents and sports injuries to the shoulders were mechanism of injuries. In 70% of cases dominant side was involved. The significant p value is found in the pre and post-operative oxford shoulder score.
Conclusion: There is a consequential improvement in OSS in all the patients. However small number of follow ups and lesser patients were the reasons of our limited study that need to be looked upon in near future.
Keywords: Weaver Dunn (WD), Acromioclavicular (AC), Coraco-Clavicular ligaments (CC), Oxford shoulder score (OSS)

INTRODUCTION

In orthopedic trauma AC joint disruptions are among the most commonly faced injuries that could be due sports or road traffic accidents[1]. These are injuries in which treatment is always controversial especially in type III of Rockwood type. These injuries accounts for 12% of the total shoulder injuries with young male patients have predominance[2].

In 1963 Tossy et al classified these injuries in three types which was again modified by Rockwood and added three more categories.1 The spectrum of these injuries range from mild sprain to the ligaments to the rupture with dislocation and facial tears with button holing of the acromioclavicular joint coracoclavicular (CC) or acromioclavicular (AC).3 Later in 1990 some more categories were added by Rockwood and new classification is presented which is still used. Type III are the most controversial injuries regarding their managements some of the surgeons prefer to do surgeries but others want to keep it conservative. Classically which procedure can be performed in such injuries are Weaver Dunn procedure, Modified weaver Dunn Procedure and Cadent and Bosworth[4,5].

All these procedures have some varying results. The modified weaver Dunn procedure is still in practice with many of the modifications going on and nothing has not proven best. Some surgeons use the semitendinosus graft as stabilizer and others used the synthetic materials. In classical weaver Dunn procedure there is excision of lateral end of clavicle and transfer of coracoacromial ligament to the distal end of clavicle but this procedure lost its popularity due to recurrence and painful postoperative period. This procedure in long term follow up was having 30% failure rate and only 25% of the strength is gained by this ligament which is transferred in comparison to original CC ligament.6 Initial modification to the classic WD procedure was done by using the cerclage wire around the clavicle to coracoid process which even changed to some other synthetic materials like nylon tape or gortex etc.

When studied biomechanically these materials were also good in providing the mechanical strength better than the previous. Now-a-days people are using the endo buttons with loops or tight rope technique to stabilize these dislocation both by arthroscopic and open surgical techniques with promising results. We also used the same modification in Weaver Dunn procedure and in short come follow found the better results even in our compromised circumstances. Now the results with anatomical reconstruction technique using tendinous graft with the same modification also has better results than the synthetic materials but has more morbidity of the area from where these tendons are harvested. Some authors are also advocating now not to excise the lateral end of clavicle so that to keep the normal anatomy as much as you can but long term results are still waiting in the literature especially the arthritis of the lateral clavicular end.

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MATERIALS AND METHODS

Classical Weaver Dunn procedure was explained in 1972 and little modifications were added in 1986. To carry out this procedure, the patient was positioned in beach-chair manner under general anesthesia. Saber cut approach (straight incision running directly from AC to coracoid) was implemented to expose AC joint, lateral end of the clavicle and the coracoid process. After detachment of the delto-trapezial fascia subperiosteally, the coracoacromial ligament with small fleck of bone was separated from the undersurface of the acromion. The lateral end of the clavicle approximately 8-10mm (measured by a ruler) removed just lateral to the site of attachment of the trapezoid part of coracoclavicular ligament.

Scapulo-humeral complex by pushed upward gently by an assistant to ensure anatomical reduction of the acromioclavicular joint and a large point reduction forceps placed between the

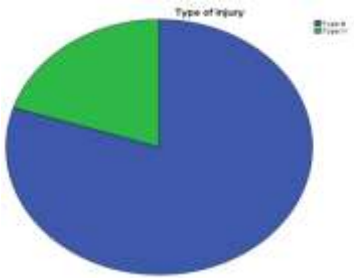
coracoid and clavicle. Great care should be taken to avoid musculocutaneous nerve injury by displacement of reduction forceps medial to the coracoid. One drill hole was made with cannulated drill bit of size 3.5mm over the K wire then the suture passer was passed to anchor the endobutton with suture of 5/0 ethibond. Another drill hole was made very carefully in the clavicle about 1–1.5cm medial to the lateral end of clavicle. The suture is passed through this hole and with the help of another endo button over it was tied as tight roping technique. To anchor the coracoacromial ligament drill hole was made on the dorsal surface of clavicle about 5mm medial to the resected end and medullary canal was prepared with 2mm drill bit. Bony end of coracoacromial ligament was inserted into the canal and fixed with vicryl # 1 suture placed through drill hole. The difference between preoperative and postoperative Oxford Shoulder Score was determined with paired t test.

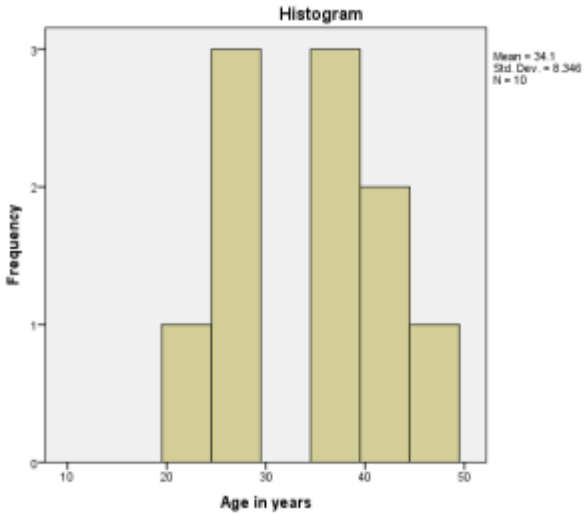
RESULTS

The patient's average age was 34±2. Road traffic accidents and sports injuries to the shoulders were mechanism of injuries. In 70% of cases dominant side was involved. The significant p value is found in the pre and post-operative oxford shoulder score. A P value of less than 0.05 was considered statistically significant.

Dominant hand

	n	%age
Right	7	70.0
Left	3	30.0
Total	10	100.0





Oxford shoulder score

Mean ± SD	Mean ± SD
26.00±2.21	46.40±3.97
P value <0.05	

DISCUSSION

The operative treatment of chronic symptomatic AC dislocations has two main tracks[7]. According to Mumford, in patients with partial injuries, Rockwood types I and II, resection arthroplasty of the lateral end of the clavicle has been performed[8]. In cases of Rockwood types III to V, complete AC joint disruption with the deficiency of the CC ligament complex, reconstruction of the CC ligament was performed to fix AC joint. For this, a traditional and routinely preferred surgical technique was the transfer of the CA ligament to the distal end of the clavicle from the previous acromial attachment and this technique was used in the treatment of acute injuries as well, including its numerous practical modifications[9]. In well liked, one modification there is coracoid based CA ligament transfer to the distal clavicle has its own drawbacks that is propensity of anterior displacement and recurrent deformity[10,11]. In our study we even modified the technique in terms of little excision of the lateral clavicular end and also with protection of our ligament transfer with two endo buttons the endo button on the clavicle was applied on the antero superior surface which also limit the anterior translation of the clavicle which needs to follow in future. The strength and constraint of CA ligament may be biomechanically inadequate to reconstruct CC ligament[12]. Therefore, augmentation procedures have been recommended by many surgeons to protect the transferred CA ligament. These tight roping-endobutton modifications in the WD procedure have attained better result for acute and chronic AC joint disruptions[13,14]. According to biomechanical studies CA ligament strength is only 30% and stiffness is only 10% as compared to intact ligament and the failures mainly occur at the suture attachment sites of transferred CA ligament[15,16].

In 2009, Tauber et al concluded that the anatomic characteristics of the CA ligament result in forward and moderately inferior subluxation of the lateral end of the clavicle when coracoacromial ligament transfer is performed[12]. The whole upper limb weight pulls downthe clavicular distal end with an accordingly non anatomic longer lever arm, whereas in the anatomic reconstruction coracoid is suspended to the clavicle which results in a shorter lever arm with less muscle exhaustion at the shoulder girdle[12]. This problem was already discussed and addressed in our study by modification not only in the material we used to protect our ligament transfer but also in terms of mechanical stability for anteroposterior translation of lateral end of clavicle.

CONCLUSION

There is a consequential improvement in OSS in all the patients. However small number of follow ups and lesser patients were the reasons of our limited study that need to be looked upon in near future.

Conflict of interest: Nil

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