Management of Recurrent Anterior shoulder dislocation by Ha'Eri Chari procedure

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Abstract: Recurrent anterior shoulder dislocation can be treated by various procedures with varying results. Most procedures have the disadvantages of immobilizing the shoulder for several weeks limitation of external rotation caused by the nature of repair. In HaEri Chari procedure, the conjoint tendon of coracobrachialis short head of biceps with detached tip of the coracoid process are rerouted posterior to subscapularis reattached to coracoid process. It provides a dynamic sling. This allows early mobilization of joint with minimal loss of external rotation. In this study, a total of 7 patients with recurrent anterior shoulder dislocation underwent HaEri Chari procedure. The results are analysed with Rowe's scoring system. 6 had excellent results 1 had fair result. No recurrence in any cases. In conclusion, this is a simple and safe procedure for management of recurrent shoulder dislocation. It can be done even in small peripheral centres.

Keyword: KEY WORDS - Recurrent Anterior shoulder dislocation - Ha'Eri Chari procedure - modified Boytchev procedure

INTRODUCTION

Recurrent anterior dislocation is not uncommon and more than 150 procedures have been described for treatment [1]. Though the etiology of recurrent anterior dislocation is dubious till date, three lesions are thought to be responsible for recurrence: Bankart lesion, Hill Sachs lesion and posttraumatic laxity of subscapularis [2]. Most of the procedures are associated with high recurrence rate. The surgical procedures are based mainly on active (rotator cuff and Biceps) and passive (capsuloligamentous) mechanisms. Boytchev (1951), a Bulgarian orthopaedic surgeon [3] described a procedure involving rerouting of detached tip of coracoid process with its conjointed tendon (short head of Biceps and coracobrachialis) along with pectoralis minor muscle deep to subscapularis and reattaching to its anatomical location. Ha'Eri Chari’s procedure is a simple modification of Boytchev’s method of treating recurrent dislocation. Chari conceived the present method to treat recurrent dislocation of shoulder in India in 1980, a few months after Conforty (1980) presented a paper modifying Boytchev’s procedure by rerouting the conjointed tendon of short head of Biceps and Coracobrachialis only in SICOT ‘80 conference held in Tokyo [4]. Ha’Eri of U.S.A in 1981 started treating his patients with the same procedure. His procedure was published in APCON ‘86 in Hyderabad. Hence the modified Boytchev’s procedure named as Ha’Eri Chari’s procedure.

MATERIALS & METHODS:

A total of 7 male patients with average age of 26.5 years were treated in our institute with an average follow up of 1 year (9 months to 2 years). Average pre-operative recurrence rate is 5 times & duration around 2 years. History of RTA and accidental fall are the common causes. None of the patients are epileptic. One patient shows Hill Sachs’ lesion in MRI involving less than 20% of the humeral head. Patient who had less than three dislocation, bilateral dislocation, multidirectional instability, neuromuscular disorders, epilepsy were excluded from the study.

OPERATIVE TECHNIQUE:

Under general anaesthesia, patient in supine position, 10 to 12 cm skin incision was made over the deltopectoral groove starting proximally between the clavicle and coracoid process and extending distally. Deep fascia was divided and the dissection was carried deep in the deltopectoral groove, taking care of cephalic vein. Pectoralis major was retracted medially and deltoid laterally to expose the coracoid process with attached conjointed tendons of coracobrachialis and short head of biceps brachii muscle. From anterior end of horizontal part of coracoid process, a drill hole was made along its axis. Osteotomy was done at about 1.5 cm proximal to the tip of coracoid process. The free part of coracoid along with attached conjointed tendons was mobilized distally, taking extreme care to avoid injury to musculocutaneous nerve. Just proximal to lower border of subscapularis, its fibers were split carefully (taking care of anterior circumflex humeral vessels) and a tunnel was created between subscapularis and shoulder capsule. The osteotomised tip of coracoid process with attached conjointed tendons was passed through this tunnel and fixed to the predrilled proximal part of coracoid process with a 4mm cancellous screw.
while the assistant held the arm in flexion internal rotation at shoulder and flexion at elbow. Haemostasis was achieved, suction drain placed, and the wound was closed in layers. The modified Boytchev procedure is biomechanically sound that acts by two possible mechanisms:
1. Dynamic muscular sling effect
2. Improved shoulder joint proprioception

The subscapularis is pulled forward by the rerouted conjoined tendon during elevation of the shoulder thereby causing an increase in the lever arm and enhancing the internal rotational moment arm. When the arm is in the vulnerable position of abduction and external rotation, the rerouted muscles prevent the superior displacement of the subscapularis and dislocation. The anterior dislocation of the humeral head is prevented by the increased muscle bulk composed of the subscapularis, coracobrachialis and the short head of the biceps which enhances the bracing effect over the anteroinferior aspect of the glenohumeral joint. Since the rerouted muscles have to pass through a longer course, deep to the subscapularis, the tension within them increases which counteracts the physiological dislocation action of the subscapularis which is responsible for anterior dislocation of the shoulder. Biomechanical study of Halder et al. [11] provides valid scientific reason for prevention of recurrence after modified Boytchev procedure. Study by Shibata et al. [10] revealed that the efficacy of modified Boytchev procedure was not only due to the muscular sling effect but improved shoulder proprioception also played an important role in prevention of shoulder dislocation. Conjoined tendon transfer led to an increase in the pressure between the humeral head and the subscapularis tendon, which leads to stimulation of mechanoreceptors which in turn improves shoulder joint proprioception. This improvement in proprioception led to improvement of reflex which was responsible for protection against shoulder dislocation. Other authors claimed that shoulder instability was associated with an enlarged intraarticular glenohumeral joint volume [14,15]. Surgical success of capsular shift in anteroinferior instability has supported this hypothesis by demonstrating the reduction in shoulder joint volume as a result of inferior capsular shift.

Review of scarce literature on Boytchev procedure and our study indicates that modified Boytchev procedure is no more controversial. Most of studies show good result in terms of recurrence and restriction of movement. Since 1990 till date, most studies from this part of the world have given good results and valid scientific study has led us to recommend modified Boytchev as an efficacious operative procedure for treatment of recurrent anterior dislocation of shoulder. On review of literature [12], many studies show that low Rowe Score following an open procedure was not due to high recurrence but was due to diminished range of motion or function, whereas a low Rowe Score following an arthroscopic procedure is due to high recurrence. The incidence of recurrence reported after the Bankart [20], Putti-Platt, and Bristow laterjet procedure ranged from 2 to 10%, 0 to 12.5%, and 2-10% respectively, with restriction of external rotation (average 10°) and glenohumeral osteoarthrosis in long term followup study.

CONCLUSION:
Hence this procedure fulfills most of the criteria of an ideal procedure [13] for recurrent anterior dislocation of shoulder and allows us to conclude that this procedure is an effective procedure, technically simple, and does not require expert skills or any sophisticated instruments and can be performed by all orthopaedic surgeons where basic operative facility is present.

POST OP PROTOCOL
Arm was immobilised in shoulder arm immobiliser maintaining flexion, adduction and internal rotation. Passive pendulum exercises started from the 2nd post operative day. Abduction after 2 weeks. The immobiliser was removed on the 3rd week and active and resisted shoulder exercises were started. The regime was continued until full shoulder function and strength were regained. At the end of 3rd month, patient allowed to return to full work potential.

Literature review suggested that special attention should be paid to strengthen the conjoined muscles by exercises inorder to achieve good range of motion [9].

RESULTS:
Results were analysed with Rowe’s scoring system [9] in which,

- Active mobility (1-6)
- Passive mobility (1-6)
- Pain (1-9)

4. Stability against forces tending to dislocate the shoulder (1-3).

Total score of 21 to 24 were rated as excellent, 17 to 20 as good, 13 to 16 as fair and below 12 as poor. According to the above scoring system, 6 patients showed excellent results and 1 patient showed fair result. By the end of 3 months, osteotomy site united in all of our patients. None of the patients had wound complications, loss of external rotation, redislocation or screw pullout or migration. One patient had loss of abduction of 30 degree.

DISCUSSION:
The glenohumeral articulation has the capacity for the greatest range of motion of any diarthrodial joint in the human body, and the stability of the shoulder depends on the static effects of its capsuloligamentous structures and dynamic effects of the surrounding muscles. There are four possible mechanisms for dynamic stabilization by muscles:
1. Passive tension from the bulk effect of the muscle itself
2. Contraction causing relative compression of the articular surfaces
3. Joint motion that secondarily tightens the passive ligament constraints the barrier effect of the contracted muscle [21]
REFERENCES:


