A LONG-TERM STUDY OF MANAGEMENT OF 36 CASES OF RECURRENT ANTERIOR SHOULDER DISLOCATIONS IN OSMANIA GENERAL HOSPITAL, HYDERABAD BY MODIFIED BOYTCHEV PROCEDURE DURING MAY 1995 TO MAY 2015 - A PROSPECTIVE STUDY

V. S. Ravindranath¹, M. Sri Rangarao², K. Nagamuneendrudu³, Kishore⁴, V. L. Sravanthi⁵

¹Professor-In-Charge, Department of Orthopaedics, Osmania General Hospital/Osmania Medical College, Hyderabad, Telangana.

²Assistant Professor, Department of Orthopaedics, Osmania General Hospital/Osmania Medical College, Hyderabad, Telangana.

³Associate Professor, Department of Orthopaedics, Osmania General Hospital/Osmania Medical College, Hyderabad, Telangana.

⁴Senior Resident, Department of Orthopaedics, Osmania General Hospital/Osmania Medical College, Hyderabad, Telangana.

⁵Junior Resident, Department of Orthopaedics, Osmania General Hospital/Osmania Medical College, Hyderabad, Telangana.

ABSTRACT

BACKGROUND

The purpose of this study is to evaluate results of the Modified Boytchev procedure for recurrent anterior dislocation of the shoulder in 36 patients in Osmania General Hospital (OGH) under Osmania Medical College (OMC), Hyderabad, Telangana, during May 1995 to May 2015.

MATERIALS AND METHODS

36 patients were followed in the Teaching Hospital, OGH, at regular intervals. Pain and Functional assessments were done. The mean number of redislocations was 1. Outcome was evaluated using the Burkhead and Rockwood criteria.¹

RESULTS

The mean follow-up period was 20 yrs. Outcome was excellent in 35 patients. One patient had recurrent dislocation.

CONCLUSION

The Modified Boytchev procedure is a simple and an easily reproducible surgical treatment for Recurrent Anterior Shoulder dislocation with proper exclusion criteria. It is also very cost effective procedure.

KEYWORDS

Coracoid Osteotomy; Anterior Shoulder Dislocation, Modified Boytchev.

HOW TO CITE THIS ARTICLE: Ravindranath VS, Rangarao MS, Nagamuneendrudu K, et al. A long-term study of management of 36 cases of recurrent anterior shoulder dislocations in Osmania General Hospital, Hyderabad by modified Boytchev procedure during May 1995 to May 2015 - a prospective study. J. Evolution Med. Dent. Sci. 2017;6(12):939-943, DOI: 10.14260/jemds/2017/201

BACKGROUND

The shoulder joint is less constrained joint due to large spherical head and small glenoid, the stability of the joint depends mostly on the capsule and the glenohumeral ligaments and the rotator cuff, biceps tendon and the force couple caused by the deltoid and the rotator cuff, unlike hip joint which is also multiaxial joint and very stable inherently; the shoulder is prone for dislocation and is at high risk of recurrent anterior dislocation, more so in athletes with overhead activity and anybody uses the shoulder for over the head activities. Surgical treatments for recurrent anterior dislocation of the shoulder include passive interventions using capsuloligamentous or bone block to create barriers and active interventions using muscle action. Major disadvantages of these treatments are long immobilisation and loss of external rotation of shoulder. The Modified Boytchev procedure² can overcome these disadvantages by re-routing the coracoid process with its attached conjoint tendon of the short head

of the biceps and coracobrachialis with the pectoralis minor muscle deep to the subscapularis muscle and re-attachment to its anatomic location. It was then Modified³ by rerouting the conjoint tendons of the short head of biceps and coracobrachialis only.

MATERIALS AND METHODS

The study was done at a teaching hospital, Osmania General Hospital, Hyderabad during May 1995 to May 2015; 36 patients were followed at regular intervals for 20 years after being assessed by clinical examination, MRI studies of the joint and for pain and functional scores using Burkhead and Rockwood criteria.¹ All patients had Bankart's lesion.

Figure 1: Bankart's Lesion

Financial or Other, Competing Interest: None.

Submission 12-07-2016, Peer Review 18-08-2016,

Acceptance 23-08-2016, Published 09-02-2017.

Corresponding Author:

Dr. V. S. Ravindranath,
Plot No: 50, Srinivasa Colony (West),
S. R. Nagar,

Hyderabad- 500038, Telangana.

E-mail: vsravindranath@rediffmail.com

DOI: 10.14260/jemds/2017/201

Inclusion Criteria

1. Young and active patient.
2. Recurrent dislocation.
3. Post-traumatic dislocation.
4. Strong subscapularis muscle,⁴ i.e. a thick anterior axillary fold and assessed by abdominal press test.

Exclusion Criteria

1. Old sedentary patients.
2. Rotator cuff tears.
3. Old 4 or 3 part fracture proximal humerus.
4. Habitual dislocation.
5. Epileptic patient.

Surgical Procedure

Patients were placed in a supine position under General anaesthesia and a sand bag was placed under the medial border of the scapula (Fig. 2). C-arm to be positioned from the same side from cephalic direction (Fig. 3). The standard deltopectoral approach was used (Fig. 4). The anterior margin of the Deltoid was exposed, while the Pectoralis Major was retracted medially to expose the horizontal part of the coracoid process that was the tendinous origin of the short head of the biceps and coracobrachialis. The tip of coracoid process was identified. An anteroposterior pre drill hole was made in the coracoid process along its long axis. The tip of the coracoid process along with the origin of short head of biceps and coracobrachialis was osteotomised and moved distally (Fig. 5). With the shoulder in internal rotation, a plane was developed between the joint capsule of shoulder and the subscapularis muscle starting just proximal to the lower border of the subscapularis without injuring the leash blood vessels at the lower border of subscapularis muscle (Fig. 6). Care was taken not to damage the anterior circumflex humeral vessels. The detached tip of the coracoid process along with the attached muscles was passed through the plane and fixed to the predrilled proximal counterpart of the coracoid process using a 3.5 mm AO cancellous screw (about 25 mm in length), while the arm was maintained in internal rotation (Fig. 7 and 8). After haemostasis, the wound was closed in layers.

Figure 2: Position of the Patient on the OT Table

Figure 3: Marking of Bony Land Marks

Figure 4: Deltopectoral Approach

Figure 5: Osteotomy of the Tip of the Coracoid Process

Figure 6: Tunnel Developed between Subscapularis and the Capsule of the Shoulder Joint

Figure 7: Re-Routing of the Tip of the Coracoid Process behind the Subscapularis Muscle

Figure 8: Fixing of the Tip of the Coracoid Process to the Body of the Coracoid with a Lag Screw

Post-Operative Management

The arm was immobilised by the side of chest with the shoulder in internal rotation. The position of the screw was assessed using post-op radiographs (Fig. 9). At two weeks, pendulum shoulder exercises were started after removal of the sutures. At three weeks, active-assisted shoulder mobilisation was started aiming to achieve full shoulder movements at 8 weeks (Fig. 10 and 11).

The patients were evaluated every 12 weeks during the first year. Outcome was evaluated using the Burkhead and Rockwood criteria; a score of 90 to 100 was considered excellent, 70 to 89 good, 40 to 69 fair and ≤ 39 poor.¹

Figure 9: Post-Op Radiograph

Figure 10: Bilateral Repair Done

Figure 11: Post-Op Abduction on Both Sides

RESULTS

All the patients are male in the study.

The mean follow-up period was 20 years. Outcome was excellent in 35 patients, one had poor outcome. One patient had recurrence of the anterior dislocation. No patient had evidence of loosening, migration of screw in the coracoid process or evidence of glenohumeral arthritis.

Outcome Score* Function	
No limitation in work, slight limitation in throwing baseball, serving forcefully in tennis or swimming, crawl, stroke can throw football normally	35
Moderate limitation in overhead work, throwing baseball and football, swimming, crawl, stroke or serving tennis	20
Marked limitation in throwing in all sports, unable to work with arm overhead	0
Pain	
None	10
Moderate	5
Severe	0
Stability	
Negative apprehension test, no subluxation	30
Negative apprehension test, but discomfort with arm in position of abduction and external rotation	15
Positive apprehensive test and sense of subluxation	0
Range of Motion	
Full	10
25% loss of motion in any plane	5
> 25% loss of motion in any plane	0

Table 1

Author	Year	No. of Shoulders	Recurrence	Followup	Comment
Conforty ⁵	1980	17	Nil	Mean 6 years	Excellent
Ha Eri GB ⁴	1986	26	Nil	Mini 2 years	Excellent
Yozo S etal ³	1999	63	3.1%	Mean 50 months	Excellent
Chattarjee ND et al	2002	46	One subluxation	Mean 88 months	Excellent
Zamora-Navas P et al ⁶	2001	27	20%	Mean 13.3 years	Attractive, but might be avoided
Li SP et al	2007	15	Nil	Mean 4 years 5 months	Simple and effective
Han TY et al	2008	18	One subluxation	10 months to 4.5 yrs.	Simple and effective
Garg et al	2011	48	Nil	58 months	Simple and effective
Our Study Ravindranath et al	From May 1995 to May 2015	36	1	20 years	Excellent and reproducible procedure

Table 2

DISCUSSION

Treatment for recurrent anterior dislocation of shoulder should provide an active corrective force that pushes the humeral head into the glenoid fossa. Surgical treatments for recurrent anterior dislocation of the shoulder include passive interventions using capsule ligamentous repair like Open or Arthroscopic Bankart repair or bone block to create barriers and active interventions using muscle action like Bristow's operation,⁶ where the tip of coracoid along with the conjoint tendons is fixed to the anterior glenoid rim through the subscapularis, but has many disadvantages as shortening of the subscapularis muscle, internal rotation contracture, limited external rotation, non-union of the coracoid process to the neck of the scapula and injury of the musculocutaneous nerve. Magnuson and Stack operation, transferred subscapularis muscle laterally to the greater tuberosity to overcome its weakness, but has significant decrease of the amount of external rotation.

The Putti-Platt procedure⁷ produces limitation of the external rotation and abduction of the shoulder joint. The failure rate was reported to be 20% Arthroscopic repair⁸ of unidirectional shoulder instability and inferior compared to traditional open repair. The risk of increased rates of recurrent instability currently appears to outweigh the potential benefits of arthroscopic repair. The technique of Modified Boytchev^{9,10} has many advantages as it is safe, easily reproducible, cost effective and provides immediate strong dynamic stability to the shoulder joint. This will hold the humeral head posterior when the arm is abducted and externally rotated as in overhead activity.

The Advantages of Modified Boytchev^{3,5,3,11,12,13,14} Procedure are

The re-routed muscle bellies to lie more directly in contact with the joint capsule and humeral head, so that their active contraction exerts a strong control on the anterior exertion of the humeral head, thereby balancing the deforming forces of dislocation.

The modified Boytchev procedure increases the pressure between the humeral head and subscapularis tendon, and thus increases proprioceptive stimuli in the subscapularis tendon, which accelerates the protective reflex needed to prevent shoulder dislocation.

The increased muscle bulk of the subscapularis, coracobrachialis and the short head of biceps augments the bracing effect over the antero-inferior aspect of the glenohumeral joint.

The literature suggests the recurrence rates after the Bankart's procedure 6%, Putti-Platt procedure 20%, Magnuson-Stack procedure 7% and Bristow procedure 13% with restriction of external rotation and glenohumeral arthritis in long-term follow-up; 8 - 10 years the Boytchev procedure achieves comparable results with lower recurrence rate, minimal restriction of external rotation and no glenohumeral arthritis.

Literature on Boytchev procedure and our study indicates that Modified Boytchev procedure is more beneficial. Studies show excellent results. Operative procedure was originally described in Bulgarian language and that made it inaccessible in most of the countries. The First Scandinavian-Japanese Shoulder Congress held in 1989 and thereafter successive meetings made this procedure known to the Asian countries. Since 1990 till date, most studies from this part of the world have given excellent results and valid scientific study has led

us to recommend Modified Boytchev is an efficacious operative procedure for treatment of recurrent anterior dislocation of shoulder. The dynamic contribution of the conjoint tendon after the Boytchev procedure in a cadaveric study has been reported.

CONCLUSION

The Modified Boytchev procedure is a simple and an easily reproducible surgical treatment for Recurrent Anterior Shoulder dislocation with proper exclusion criteria. It is also very cost effective procedure.

REFERENCES

- [1] Burkhead WZ, Rockwood CA. Treatment of instability of the shoulder with an exercise program. *J Bone Joint Surg Am* 1992;74(6):890-6.
- [2] Ha'Eri GB. Boytchev procedure for treatment of anterior shoulder instability. *Clin Orthop Relat Res* 1986;206:196-201.
- [3] Garg AK, Ayan S, Keshari V, et al. Modified Boytchev procedure for treatment of recurrent anterior dislocation of shoulder. *Indian J Orthop* 2011;45(4):336-40.
- [4] DePalma AF, Cooke AJ, Prabhakar M. The role of subscapularis in recurrent anterior dislocations of the shoulder. *Clin Orthop Relat Res* 1967;54:35-49.
- [5] Shibata Y, Honjo N, Shinoda T, et al. Pressure between the humeral head and the subscapularis tendon after the modified boytchev procedure. *J Shoulder Elbow Surg* 2004;13(2):170-3.
- [6] Hovelius L, Akermark C, Albrektsson B, et al. Bristow-Laterjet procedure for recurrent anterior dislocation of the shoulder. A 2-5 year follow-up study on the results of 112 cases. *Acta Orthop Scand* 1983;54(2):284-90.
- [7] Fredriksson AS, Tegner Y. Results of the putti-platt operation for recurrent anterior dislocation of the shoulder. *Int Orthop* 1991;15(3):185-8.
- [8] Linters TR, Franta AK, Wolf FM, et al. Arthroscopic compared with open repairs for recurrent anterior shoulder instability. A systematic review and meta-analysis of the literature. *J Bone Joint Surg Am* 2007;89(2):244-54.
- [9] Conforty B. The results of the Boytchev procedure for treatment of recurrent dislocation of the shoulder. *Int Orthop* 1980;4(2):127-32.
- [10] Jiang LS, Cui YM, Zhou ZD, et al. Stabilizing effect of the transferred conjoint tendon on shoulder stability. *Knee Surg Sports Traumatol Arthrosc* 2007;15(6):800-5.
- [11] Reddy GV, Prasad JS. Ha'eri-Chari's operative procedure for treatment of recurrent dislocation of shoulder. *Indian J Orthop* 1997;31(1):53-7.
- [12] Chatterjee ND, Nath C, Pal AK, et al. Modified Boytchev procedure for the treatment of recurrent anterior dislocation of the shoulder. *Int Orthop* 2002;26(1):7-9.
- [13] Navas ZP, Verdera BA, Garcia PJ, et al. Long-term results of the boytchev procedure for the treatment of recurrent dislocation of the shoulder. *Acta Orthop Belg* 2001;67(3):233-5.
- [14] Dalsgaard HL, Gothgen CB, Hoogmartens MJ. The boytchev procedure for recurrent anterior dislocation of the shoulder. A controversial technique. *Acta Orthop Belg* 2000;66(3):248-50.