N.D. Chatterjee · Chinmoy Nath · Ananda Kisor Pal
D.P. Baksi

Modified Boytchev procedure for the treatment of recurrent anterior dislocation of the shoulder

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Abstract From January 1990 to December 1998, 48 patients with 50 recurrent anterior dislocations of the shoulder were treated using a modified Boytchev procedure. The age of the patients varied from 18 to 35 years (average 24.7 years). The follow-up period was in average 88 (26–132) months. Six patients were lost in follow-up. Forty-two shoulders showed excellent results. There was one traction injury of the musculocutaneous nerve and one patient with immediate recurrence of the dislocation. Superficial wound infection occurred in five cases, all of which were controlled by antibiotics.

Résumé De janvier 1990 à décembre 1998 48 patients avec 50 luxations antérieures récidivantes d'épaule ont été traités en utilisant la procédure de Boytchev modifiée. L'âge de patients a varié de 18 à 35 ans (moyenne 24.7 ans). Le suivi était en moyenne de 88 (26 à 132) mois. Six patients ont été perdus de vue. Quarante-deux épaules ont montré des résultats excellents. Il y avait une blessure par traction du nerf musculocutaneous et une luxation récidivante précoce. Une infection superficielle s'est produite 5 fois, toujours contrôlée par les antibiotiques.

Introduction

More than 150 operative techniques are described for the surgical treatment of recurrent anterior dislocation of the

shoulder. Boytchev's technique [1] comprises rerouting of the coracoid process with its attached conjoint tendons (short head of biceps and coracobrachialis) along with the pectoralis minor muscle deep to the subscapularis and reattachment to its anatomical location. Conforty used the conjoint tendons of the short head of biceps and coracobrachialis only, omitting the pectoralis minor muscle. Satisfactory results were reported in 1980 [2] and later by Ha'Eri [4], but none reported their long-term follow-up. The object of this study was to evaluate the modified Boytchev procedure and report the midterm results.

Materials and methods

Forty-eight patients with 50 recurrent anterior dislocations of the shoulder were treated from January 1990 to December 1998 by the modified Boytchev procedure. The age of the patients varied from 18 to 35 years (average 24.7 years). Among them, 46 were men and two were women. Thirty-four patients were affected on the right side, 12 on the left, and two had bilateral affections. The minimum number of dislocations were four and the maximum 500 (average 49) during a period from 12 to 72 months.

Fig. 1 **a** Diagram showing isolation of the osteotomized horizontal part of the coracoid process with the attached short head of biceps, brachii, and coracobrachialis. Insertion of a screw through the isolated coracoid process is shown. **b** Diagram showing the passage of the isolated coracoid process with the conjoint tendon deep to the subscapularis and its refixation into the original site with a screw

N.D. Chatterjee (✉)
Department of Orthopaedics, Burdwan Medical College,
219/1, M.B. Road, Birati, Kolkata-700 051 (W.B.), India
e-mail: chinmoynath@hotmail.com
Tel.: +91-33-5395875

C. Nath
R.G. Kar Medical College and Hospital, Calcutta, India

A.K. Pal
N.R.S. Medical College and Hospital, Calcutta, India

D.P. Baksi
Department of Orthopaedics, Medical College Hospitals, Calcutta,
India

Table 1 Case details. (*M* male, *F* female, *Rt* right, *Lt* left, *VS* very satisfied, *NS* not satisfied, *E* excellent, *P* poor)

Case no.	Age/sex	Total dislocations	Complications	Follow-up period (in months)	Redislocation	Patient satisfaction	Gradation of results
1	33/M	10	—	132	—	VS	E
2	22/M	6	—	130	—	VS	E
3	28/M	40	—	Lost to follow-up	—	—	—
4	21/M	25	—	127	—	VS	E
5	19/M	5	—	126	—	VS	E
6	35/F	6	Superficial wound infection	Lost to follow-up	—	—	—
7	18/F	12	—	122	—	VS	E
8	25/M	50	—	120	—	VS	E
9	18/M	10	Superficial wound infection	118	—	VS	E
10	31/M	100	—	115	—	VS	E
11	28/M	10	—	115	—	VS	E
12	26/M	16	—	112	—	VS	E
13	22/M	15	—	110	—	VS	E
14	25/M	200	Injury musculocutaneous nerve	110	—	NS	E
15	22/M (bilat)	25 each	—	Rt 108, Lt 102	—	VS	E (both)
16	19/M	4	—	107	—	VS	E
17	30/M	100	—	105	—	VS	E
18	26/M	75	—	Lost to follow-up	—	—	—
19	27/M	150	—	100	—	VS	E
20	20/M	5	—	98	—	VS	E
21	30/M	75	—	Lost to follow-up	—	—	—
22	29/M	70	—	96	—	VS	E
23	22/M	10	—	92	—	VS	E
24	21/F	8	Superficial wound infection	92	—	VS	E
25	19/M	20	—	90	—	VS	E
26	35/M	250	—	Lost to follow-up	—	—	—
27	18/M	8	—	90	—	VS	E
28	22/M	12	—	89	—	VS	E
29	24/M	6	Superficial wound infection	87	—	VS	E
30	28/M (bilat)	Rt 70, Lt 20	—	Rt 85, Lt 76	—	VS	E (both)
31	23/M	8	—	85	—	VS	E
32	20/M	15	—	84	—	VS	E
33	31/M	500	3 episodes of convulsion	82	4	NS	P
34	28/M	100	—	80	—	VS	E
35	28/M	25	—	70	—	VS	E
36	19/M	8	—	Lost to follow-up	—	—	—
37	24/M	15	—	68	—	VS	E
38	28/M	80	—	67	—	VS	E
39	22/M	15	—	65	—	VS	E
40	21/M	5	Superficial wound infection	62	—	VS	E
41	23/M	20	—	60	—	VS	E
42	22/M	24	—	58	—	VS	E
43	23/M	6	—	56	—	VS	E
44	24/M	25	—	50	—	VS	E
45	29/M	70	—	46	—	VS	E
46	33/M	80	—	41	—	VS	E
47	25/M	15	—	30	—	VS	E
48	18/M	10	—	26	—	VS	E

All patients gave a history of injury around the shoulder. Two patients were epileptic and one had generalized joint laxity. None had paralysis around the shoulder. Forty-four shoulders had full preoperative motion. In five cases abduction was restricted; external rotation was restricted in one. Apprehension test for anterior dislocation was positive in all cases. Three humeral heads revealed a Hill–Sachs lesion.

Surgical technique

Under general anesthesia the patient was placed in supine position with a sand bag being placed behind the shoulder. After antiseptic preparation an incision of about 11.4 cm in length was made over the deltopectoral groove beginning from the level of the clavicle at the junction of lateral one-third and medial two-thirds across the tip of the coracoid process, extending distally. The deep fascia was

divided along the line of skin incision. The anterior margin of deltoid muscle was exposed and sectioned transversely near its origin, while the pectoralis major was retracted medially to expose the horizontal part of the coracoid process, with the tendinous origin of the short head of biceps and the coracobrachialis muscle. An anteroposterior drill hole is made from anterior end of horizontal part of the coracoid process along its axis. The anterior 2 cm of the coracoid process, along with the tendinous origin of the short head of biceps and the coracobrachialis, was osteotomized and mobilized distally, taking care to protect the musculocutaneous nerve (Fig. 1a). A tunnel between the shoulder capsule and the subscapularis muscle was created by splitting the fibers of the subscapularis muscle just proximal to its lower border, taking care not to damage the anterior circumflex humeral vessels.

The isolated coracoid process, along with the conjoint tendons, are now passed through and fixed to the predrilled proximal counterpart of the coracoid process with a 2.5 cm long 3.5 mm AO screw (Fig. 1b) while the arm is maintained in full internal rotation.

After hemostasis the wound is closed in layers around a suction drain. A well-padded dressing is applied. The arm is immobilized by the side of the chest with the shoulder in complete internal rotation. After removal of the stitches pendulum shoulder exercises are advocated followed by vigorous active shoulder exercises after the third postoperative week.

Results

The follow-up period varied from 26 to 132 months (average 88 months). Six patients were lost to follow-up. Forty-two patients were evaluated following a grading system proposed by Rowe [9]. Forty-two shoulders showed excellent results; two showed poor results, one due to a traction injury of the musculocutaneous nerve and another due to a recurrent dislocation in a patient with epilepsy (Table 1). Superficial wound infection occurred in five cases. All the movements of the shoulder were retained satisfactorily in the majority cases, except for a minor restriction of external rotation in three cases.

Discussion

Forty-four recurrent anterior dislocations of the shoulder were treated by the modified Boytchev procedure, which is simple and has several advantages compared to other procedures. The technique is biomechanically sound since the rerouted conjoint tendons comprising of the short head of biceps and coracobrachialis pull the subscapularis forward during elevation of the shoulder. This increases its lever arm and thereby augments the internal

rotational moment arm. The rerouted muscles prevent superior displacement of the subscapularis while the arm is abducted more than 90°. The increased muscle bulk composed of the subscapularis, coracobrachialis, and the short head of biceps augments the bracing effect over the anteroinferior aspect of the glenohumeral joint thus preventing anterior dislocation. Moreover, the tension of rerouted muscles is increased due to their passage through a longer course, deep to the subscapularis, thereby counteracting the deforming forces essential for dislocation.

Other commonly practiced surgical procedures, like the Putti-Platt technique, have a 20% recurrence rate [3, 5] and marked restriction of external rotation [3]. The Magnuson-Stack technique has a 2% recurrence rate [7] and restriction of the external rotation in all cases [8]. The Bristow procedure has a 13% recurrence rate and an average of 20° loss of external rotation [6], along with associated complications of the implant used. In our series using a modified Boytchev procedure we had only one recurrence and a 10–15° restriction of external rotation in only three cases. However, this procedure is not applicable in uncontrolled epileptics and in patients having a weak subscapularis muscle.

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