RECURRENT ANTERIOR DISLOCATIONS OF THE SHOULDER JOINT TREATED BY THE BRISTOW-LATARJET PROCEDURE HISTORICAL REVIEW, OPERATIVE TECHNIQUE AND RESULTS

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Thirty patients who underwent a Bristow-Latarjet procedure for unilateral recurrent anterior dislocation of the shoulder joint were studied in retrospect. Using both subjective and objective criteria, a detailed scoring system was devised to assess the efficacy of the repair.

Keywords : shoulder ; anterior dislocation ; stabilisation.
Mots-clés : épaule ; luxation antérieure ; stabilisation.

INTRODUCTION

Transfer of the coracoid process to the anterior aspect of the glenoid was devised and described independently in three different centers, resulting in a variety of eponyms.

The technique as developed in the thirties by Sir Rowley Bristow, was first described in 1958 by Arthur Helfet, one of Bristow's disciples.

In the original technique, a small distal fragment of the coracoid process with its tendon attachments (short head of the biceps and coracobrachialis) was transferred distally through the subscapularis muscle to the anterior surface of the scapular neck. Fixation was achieved by means of the same sutures as those used for closure of the subscapularis muscle.

Helfet modified the technique in that he used a much larger fragment of the coracoid process, which was secured to the scapular neck with a screw. In addition, he also detached the subscapularis tendon from the humeral head and split the tendon in two parts for better exposure. Finally, he performed a suture of the subscapularis muscle to promote shoulder stability.

In 1954, a similar technique was reported in the French literature. Latarjet treated four cases of recurrent anterior shoulder dislocation by transferring the coracoid process to the anterior rim of the scapular neck, where it was secured by means of a screw.

In 1965 Trillat introduced his technique, consisting in an incomplete osteotomy of the coracoid process, which was tilted in a distal and lateral direction and screwed onto the scapular neck (9).

The shoulders operated on in our department were reassessed by one of the authors after a mean follow-up of 3 years to appreciate the long-term results obtained with this procedure. Special attention was paid to the mobility and the stability of the operated shoulder joint.

MATERIALS AND METHODS

Thirty patients who underwent a unilateral Bristow procedure were reviewed. All cases were traumatic in origin, spotaneous dislocations being always excluded.

Two-thirds of the dislocations were the result of sports injuries (table I). Eight patients were operated on in the Pellenberg University Hospital ; the remaining 22 patients were treated in the St. Elisabeth Clinic in Lier.

There were 8 women (6 left-handed, 2 right-handed) and 22 men (12 left-handed, 10 right-handed). As to

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Table I. — Mechanism of the first dislocation (N = 30 patients)

	Nb		%
	♀	♂	
Trauma :			
sports	4	16	66.6
auto accident	3	2	16.7
domestic	1	4	16.7

dominance, there was no predilection. Mean age at the first dislocation was 23 years (range 15-62 years). The decision to operate was based on a history of proven traumatic anterior shoulder dislocation, followed by repeated redislocations or subluxations.

The time interval between the first dislocation and surgery ranged from 3 months to 17 years (mean-4 years). Two patients had already undergone a failed Putti-Platt capsulorhaphy.

The follow-up ranged from 6 months to 8.5 years (mean-3 years). All patients were reexamined by one of the authors.

OPERATIVE TECHNIQUE

The patient was positioned in dorsal recumbency, with a pillow under the affected shoulder. The arm was draped free. Starting from the coracoid process, a 6 cm-incision was made, which was developed down through the deltopectoral groove. The pectoralis muscle with the cephalic vein was reflected medially. With the arm in external rotation, the coracoid process with its attached muscles was clearly visualized in the proximal part of the wound. A 3.2-mm hole was drilled in the coracoid process along its longitudinal axis and the distal portion was osteotomized over 1.5 to 2 cm, perpendicular to this axis. The loose bony fragment, the tendon of the short head of the biceps and the coracobrachialis tendon were dissected free in a distal direction for better exposure of the subscapularis muscle. With the shoulder in internal rotation, the anterior rim of the glenoid was palpated to determine the transfer site on the scapular neck (i.e. between the mid-portion and lower one-third), and a small incision was made in the subscapularis muscle along its fibers. A hole was drilled in the scapular neck, where the transplant was secured with a malleolar screw (fig. 1). The wound was closed in layers. Drainage was not routinely installed.

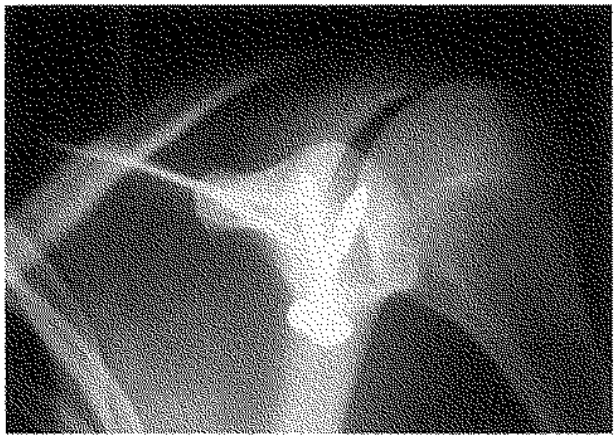

Fig. 1. — Fixation of the transplant on the scapular neck by means of a screw. Usually only one screw is used. Note the correct localization of the transplant.

After repair, an adduction bandage was worn for 3 weeks by 22 patients, for 4 weeks by 6 patients and for 6 weeks by 2 patients. Following this, the arm was kept in a sling and graduated exercises were initiated.

RESULTS

Intra- and postoperative complications

Incomplete paralysis of the ulnar nerve was observed once following surgery, probably owing to the position of the elbow. Initially, the deficit was fairly pronounced, with markedly decreased strength of the ball of little finger and the intrinsic hand muscles, but the patient made a full recovery in the ensuing months.

One patient developed a deep infection for which he received vigorous intravenous antibiotic treatment. The infection eventually cleared with no further complications. Two patients developed a superficial wound infection, that was resolved with short-term oral antibiotics.

Another patient experienced discomfort resulting from the material used for fixation of the

coracoid process. Despite evidence of bony fusion, the screw loosened and was subsequently removed, which resulted in resolution of the complaints. An intraoperative fracture of the coracoid process or a surgical hematoma, although frequently reported in the literature, were not observed.

Finally, marked stiffness of the operated shoulder was seen in some cases, which improved only slowly over a long period of rehabilitation (table II). In none of the patients with prolonged stiffness of the shoulder joint could a shoulder-hand syndrome be diagnosed.

There were no distinct peripheral neurogenic or vascular implications, no swelling of the hand or arm, and no excessive pain reactions.

Subjective evaluation

Ninety-three percent of the patients were satisfied with the outcome of the Bristow-Latarjet procedure (table III). They would have the same intervention performed for a similar condition without delay. Two patients were dissatisfied because their shoulder had redislocated on several occasions after the repair.

Postoperative objective evaluation

— *Stability*

Postoperative redislocation occurred in 2 patients (6.6%). One patient underwent repeat surgery elsewhere. In the other patient the postoperative roentgenograms showed too medial a position of the coracoid process ; bony fusion of the fixation had failed to occur, and the screw was too long.

Two patients continued to have symptoms of instability and felt their shoulder to be almost dislocated in the weeks following the repair. This complaint disappeared in the course of rehabilitation, leaving them with a fully stable shoulder joint.

— *Mobility*

The operated shoulder lost an average of 15° of external rotation, as compared with the unaffected extremity (table IV). This loss after a Bristow-Latarjet procedure has also been reported by others (5, 6, 9). External rotation was normal or slightly limited in approximately 73% of the operated shoulders, and markedly decreased (> 30°) in 6.6%. Only a small number of patients experienced discomfort with daily activities, but a professional soccer player was unable to engage in overhand throwing.

Internal rotation was normal in 83% of the shoulders, and decreased (15-30°) to severely limited (> 30°) in 17% of the cases (table V). This loss of internal rotation did not interfere with the activities of daily living. Abduction and propulsion of the operated shoulder were normal in 93.4% of the cases, and slightly limited in the remaining 6.6%.

Table II. — Complications (N = 30 patients)

	Nb	%
Neural damage	1	3.3
Infection :		
early	2	6.6
late	1	3.3
Stiffness	5	16.5
Complication related to the implant	1	3.3
	10	33

Table III. — Subjective evaluation (N = 30 patients)

	N	%
Excellent	16	53.4
Good	12	40.0
Poor	2	6.6

Table IV. — External rotation (N = 30 patients)

	Nb	%
Normal	8	26.7
Slight limitation	14	46.6
Marked limitation	6	20.0
Severe limitation	2	6.7

Table V. — Internal rotation (N = 30 patients)

	Nb	%
Normal	20	66.6
Slight limitation	5	16.7
Marked limitation	4	13.4
Severe limitation	1	3.3

— *Postoperative muscle strength and atrophy*

Muscle strength was compared with that of the contralateral shoulder. The movements of propulsion, retropulsion and abduction against resistance were tested. Fifty-nine percent of the patients had symmetrical shoulder strength. Strength was markedly decreased in 16.5% and slightly limited in 24.5%. In two cases, atrophy of the shoulder muscles was noted (8.3%).

— *Surgical scarring*

Surgical scarring was acceptable in 60% of the cases. Scarring was considerable (5 to 12 mm) or keloidal (or both) in the remaining 40%.

— *Disability*

Work was resumed at 2 to 6 months postsurgery. Duration of work disability averaged 3.4 months.

— *Return to sports*

Time to return to sports activities averaged 5 months. Only 15 patients returned to their preinjury level of sports ; the others opted for a lower performance level or withdrew completely from sports activities mainly for fear of redisclocations and of losing their job after repeated episodes of disability on account of previous recurrent dislocations (table VI).

Table VI. — Sports activities (N = 30 patients)

	Nb	%
Preinjury	14	46.6
Lower level	10	33.3
No sports	6	20.0

Overall evaluation

Based on objective and subjective findings such as stability, pain, mobility, sports, capacity for work, muscle strength and trophicity, a classification and scoring system was devised following Rowe. The ratings were found to correspond fairly well with the standard classification. This system was further refined (table VII).

— *Excellent results* (7 patients, 23.4%) :

no crepitus, no pain, no muscle atrophy and normal strength. Return to preinjury level of sports and to previous occupation.

Score : 90 points or more.

Table VII. — Score

Stability	normal	occasionally unstable	subluxation	dislocation
	25	15	10	0
Pain	absent	mild	frequent	constant
	25	15	10	0
Mobility	normal	slightly decreased	markedly decreased	severely decreased
	20	15	10	0
Sports and occupation	normal	lower level	—	—
	15	10	0	
Strength	normal	slightly decreased	markedly decreased	
	10	5	0	
Trophicity	good	atrophic		
	5	0		
	100			

— *Good result* (21 patients, 70%) :

mild discomfort, mild crepitus, minimal atrophy, minimal loss of strength. Return to a lower level of sports.

Score : 75-89 points.

— *Fair result* (no patients) :

frequent pain, symptoms of subluxation, decreased capacity for work and low performance level of sports.

Score : 60-74 points.

— *Poor result* (2 patients, 6.6%) :

recurrent dislocations, severe pain and marked loss of mobility and strength.

Score : < 60 points.

In the assessment, special emphasis was given to stability and absence of pain. Limitation of mobility was considered as a third item.

DISCUSSION

The modified Bristow technique with small incision of the subscapularis muscle as performed by the authors, does not allow for inspection of the shoulder joint, nor can a Bankart or Hill-Sachs lesion be identified. This can be remedied by simple transverse sectioning of the subscapularis muscle which exposes the interior of the joint without compromising the course of the procedure.

Proper placement of the transplant is impossible to accomplish under direct vision. It must be done by carefully palpating the shoulder joint and scapular neck. Location of the transplant at less than 1 cm medial to the rim of the glenoid and in the lower half of the scapular neck is of paramount importance to the success of the operation (fig. 2). One of the redislocations in our series was in fact caused by improper orientation of the transplant (too high and too far medial to the scapular neck).

A small incision of the subscapularis muscle is advantageous in that surgical scarring of this muscle is minimized, which promotes postoperative shoulder mobility.

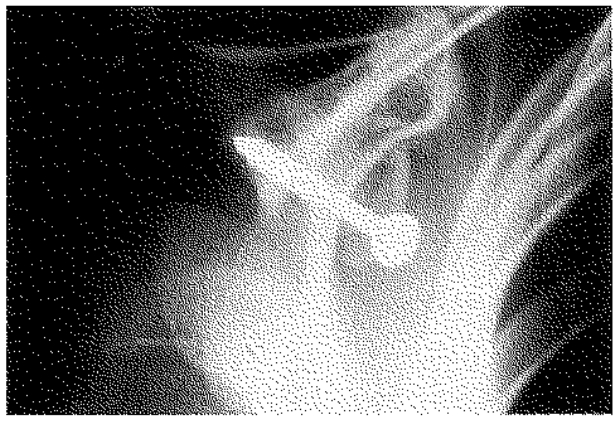

Fig. 2a

Fig. 2b

Fig. 2c

Fig. 2. — a. Fixation of the transplant on the scapular neck, without solid bony fusion.
b. A screw of the appropriate length was used.
c. Note the completely inappropriate localization of the transplant, with insufficient stabilization of the shoulder joint.

From a study conducted by Rowe *et al.* in February 1984 and dealing with recurrent anterior shoulder dislocations after a stabilizing procedure, it appeared that particularly the standard Bristow-Helfet repair with complete detachment of the subscapularis muscle was associated with severe scarring and partial fibrosis of this muscle, frequently leading to complete adhesion of the subscapularis muscle to the joint capsule of the shoulder (8).

The rigid screw fixation of the transplant to the anterior surface of the scapular neck ensures early mobilization of the shoulder joint, which is an important factor in regaining full shoulder motion. The immobilization in an adduction sling (or passive immobilization) imposed on our patients ranged from 3 to 6 weeks.

The subsequent period of active immobilization, in which the patient limited his activity for fear of redislocation, varied individually, depending on the patient's motivation. To study the correlation between the length of immobilization and shoulder mobility, the complete duration of both the active and passive immobilization must be considered. We indeed reviewed patients who had regained full shoulder motion 2 months after removal of the adduction bandage, irrespective of the length of the immobilization period or the institution of an exercise program. Conversely, some apprehensive patients developed marked stiffness of the shoulder joint after minimal passive immobilization, from which they recovered slowly and often incompletely after months of intensive physiotherapy (60 to 70 sessions).

Consequently, the longer the immobilization period, the greater the risk of prolonged and even permanent stiffness.

Therefore, we agree with Latarjet that the immobilization period should not exceed 2 to 3 days and should be followed by the wearing of a sling for 2 weeks, during which the patient is instructed in performing pendulum exercises.

With proper placement of the transplant and the use of a screw of the appropriate length, the risk of premature loosening of the transplant during the exercise program is minimal. In a study of 112 shoulders, Hovelius could not find a correlation between the length of immobilization and wound healing or bony fusion of the transplant. It is essential that a graduated exercise program be initiated, with pendulum exercises for the first 2 weeks, followed by abduction-elevation exercises from the 2nd to the 6th week postsurgery.

From the 6th postoperative week elevation above 90° or exercises against resistance are allowed.

With the Bristow-Latarjet procedure our success rate corresponds with the results reported in literature, i.e. an average of 80 to 90% of good to excellent results (2, 3, 5, 6, 9).

The major concern remains the postoperative limitation of external rotation, which is responsible for the fact that all athletic individuals with involvement of the dominant shoulder were not capable of returning to high performance levels of overhead sports activity after the procedure (5).

In comparison with the other stabilizing procedures, the low morbidity and minimal functional handicap are the points in favor of the Bristow repair (1).

However, this technique should not be used for "spontaneous" shoulder dislocations because of the poor results reported in approximately 80% of the cases (7).

CONCLUSION

The Bristow-Latarjet-Helfet-Trillat procedure is technically not very demanding. A good to excellent result is achieved in 93.3% of the cases.

The following factors are essential to the success of the operation :

1. proper indication, such as recurrent anterior shoulder dislocation of traumatic origin
2. proper placement of the transplant and the use of a screw of the appropriate length.

Only a small number of patients experience a disabling limitation of strength and mobility. In the majority of patients however, fatigue of the operated shoulder joint is the sole complaint.

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SAMENVATTING

D. MATTON, F. VAN LOOY en S. GEENS. De Bristow-Latarjet-ingreep bij de behandeling van recidiverende anterieure schouderluxaties.

Dertig patiënten die een Bristow-Latarjet-ingreep ondergingen wegens unilaterale recidiverende anterieure schouderluxatie, werden aan een retrospectieve studie onderworpen. Aan de hand van zowel subjectieve als objectieve criteria werd een uitgebreid scoresysteem ontworpen ter evaluatie van de doelmatigheid van deze ingreep. De Bristow Latarjet-operatie is een relatief eenvoudige ingreep, die in deze studie aanleiding gaf tot 93,2% goede en zeer goede resultaten. Om te komen tot een dergelijke hoge score zijn een goede indicatiestelling, een perfekte operatietechniek en een correct gevolgd postoperatief oefenschema van primordiaal belang.

RÉSUMÉ

D. MATTON, F. VAN LOOY et S. GEENS. La technique de Bristow-Latarjet dans le traitement des luxations antérieures récidivantes de l'épaule.

Les auteurs ont revu 30 malades après intervention de Bristow-Latarjet pour luxation récidivante de l'épaule. L'évaluation tant objective que subjective des malades a permis une quotation précise quant à l'appréciation des résultats. L'intervention de Bristow-Latarjet est relativement simple du point de vue technique. On obtient 93,3% de bons et très bons résultats. Ces résultats impliquent une évaluation préopératoire précise ainsi qu'une parfaite maîtrise de la technique avec suivi postopératoire et rééducation adéquats.