



Neglected anterior shoulder dislocation : open remplissage of the Hill-Sachs lesion with the infraspinatus tendon

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Neglected anterior shoulder dislocation is a rare condition ; reduction usually requires an open procedure. There is usually a concurrent Hill-Sachs lesion, with the humeral head impaled over the anterior rim of the glenoid. Large, engaging Hill-Sachs lesions can contribute to continued shoulder instability, and therefore require a specific action. Reconstruction of the humeral head with an osteochondral allograft has been advocated, but allografts are not easily available in some countries, such as Egypt. For this reason, I switched to the open infraspinatus remplissage technique. I report the results with this technique, in four young adult patients who presented with a locked anterior shoulder dislocation, which had been left unreduced for 10 to 20 weeks. The infraspinatus tendon was pulled into the humeral defect with a four limbs suture anchor ; as a result, the lesion became extra-articular. A Putti-Platt procedure was added to obtain anterior stability, except in one patient with a concurrent glenoid defect which required a Latarjet procedure. The mean follow-up period was 32 months, without recurrence or other complications. The mean postoperative Constant score was 74, and the range of motion was satisfactory, with a functional range of external rotation.

Keywords : neglected anterior shoulder dislocation ; Hill-Sachs lesion ; humeral head defect ; open remplissage ; infraspinatus tendon.

INTRODUCTION

Neglected anterior dislocations of the shoulder are rare. They are frequently associated with

seizures or major trauma. According to Schulz *et al* (13), and Rowe and Zarins (12), neglected posterior dislocations are more frequent than neglected anterior dislocations, because anterior shoulder dislocations are more familiar to the orthopaedic surgeon, and their radiological diagnosis is easy. An articular surface defect is usually present, either as an isolated Hill-Sachs lesion or as a Hill-Sachs lesion associated with a glenoid defect. The term “engaging Hill-Sachs lesion” is used to describe a defect in the humeral head, large enough to lock its edge on the glenoid rim when the arm is externally rotated. The possible role of this humeral head defect as a cause of recurrent anterior dislocation depends on its size and depth (2,11), which are therefore important factors in the choice of surgical treatment. Minor defects do not require specific surgical treatment, as they are not considered to contribute to shoulder instability. For Hill-Sachs lesions involving more than 30% of the humeral head, a specific surgical action may be required : reconstruction has been recommended for lesions involving as much as 30 or 40% of the humeral

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Table I. — Demographic data

Case	Gender	Age (years)	Side	Duration	Cause	Attempts at closed reduction
1	male	26	right	14 weeks	epilepsy	1
2	female	37	right	20 weeks	epilepsy	1
3	male	24	right	15 weeks	fits of unknown cause	0
4	female	22	left	10 weeks	epilepsy	2

head, and hemiarthroplasty for defects involving more than 40% of the articular surface (6). Reconstruction can be performed with osteochondral allografts ; they have been used successfully in chronic posterior and anterior dislocations (7). However, allografts may not be available in certain countries, so other methods must be searched to reconstruct the humeral head defect. This study assesses the results of open reduction combined with infraspinatus remplissage of the Hill-Sachs lesion (tenodesis of the tendon against the defect with suture anchors) and a Putti-Platt procedure to achieve anterior stability, unless a large glenoid defect required a Latarjet procedure.

MATERIALS AND METHODS

Four patients with neglected anterior shoulder dislocation were seen between January 2004 and May 2006. The mean duration of the dislocation was 14.7 weeks ; other demographic data are summarized in table I. The shoulder joint was completely locked in all four patients. There was squaring of the shoulder and anterior bulging of the humeral head. Neurovascular complications were absent. A neurologist saw the patients for their epileptic condition. Plain radiographs (anteroposterior and axillary views) were made to recognise associated fractures or articular surface defects. A CT-scan allowed quantification of the skeletal lesions and planning of the treatment. MRI assessed the condition of the rotator cuff, especially lesions of the supraspinatus and subscapularis, and also the possible value of the subscapularis tendon for augmentation. Measurement of the conduction latency of the axillary nerve was obtained in all cases ; the findings were normal. Cases 1, 3 and 4 had an engaging Hill-Sachs lesion without an anterior glenoid defect ; they underwent an open remplissage procedure, combined with open reduction and a Putti-Platt procedure. Case 2 also had an important Hill-Sachs lesion, combined with an anterior glenoid defect ; for this reason, he

underwent a Latarjet procedure rather than a Putti-Platt procedure (fig 1 & 2).

The operation was performed under general anaesthesia, in the beach-chair position. A long deltopectoral incision was made because of the disturbed anatomy. The subscapularis tendon and the capsule were sectioned at two cm from the lesser tuberosity, between two stay sutures. The flaps were released from the underlying humeral head. Gradual external rotation of the dislocated head and section of the surrounding adhesions allowed reduction of the head and inspection of the Hill-Sachs lesion. Posterior capsulotomy was the next step, so that the capsule was almost circumferentially released. The glenoid was debrided. The Hill-Sachs lesion was roughened with a high speed burr. In case 2 the glenoid defect was similarly roughened. A suture anchor with four limbs was inserted into the center of the head defect. Subsequently, two limbs were passed through the infraspinatus tendon in a retrograde manner so that the knots could be tied inside the joint. The dislocation was reduced. The head defect was filled (remplissage) with the infraspinatus tendon, by tying the sutures from the anchor, so bringing the tendon down to the defect (fig 1 & 2). Finally, a Putti-Platt operation was performed in cases 1, 3 and 4 to achieve anterior stability. In case 2 a Bristow-Latarjet procedure was added to fill the glenoid defect (fig 1 & 2). This consisted of passing the osteotomized coracoid process through the subscapularis muscle and fixing it with a screw to the anterior rim of the glenoid. The wound was closed. A pouch arm sling was given for the next six weeks, restricting external rotation to neutral. After that, the patient started gentle external rotation and overhead exercises. The goal was to obtain at least 50% of the contralateral external rotation at 3 months postoperatively. The mean follow-up period was 32 months (range : 25 to 40 months).

RESULTS

There were neither wound infections, nor neurological complications, nor recurrences. The



Fig. 1. — Case 2. Postoperative plain radiograph, AP view, showing the anchor pulling the infraspinatus tendon into the humeral defect (remplissage), and the screw, fixing the horizontal part of the coracoid process against the anterior rim of the glenoid (Latarjet procedure).



Fig. 2. — Case 2. Postoperative CT-scan, axial view, after 36 months, showing the anchor pulling the infraspinatus tendon into the Hill-Sachs lesion, and the horizontal part of the coracoid process, fixed to the anterior rim of the glenoid with a screw.

postoperative range of movement was satisfactory (table II). The mean postoperative Constant score (4) was 74 (range : 69-80).

DISCUSSION

The treatment of neglected anterior shoulder dislocation, especially if complicated with a large articular defect, is a surgical challenge. The literature about this condition is scarce, due to the rarity of this injury. Various treatment options exist. They all focus on reduction of the neglected dislocation, repair of the articular defects, maintenance of shoulder stability, and rehabilitation (6).

A few general rules are helpful : 1. open reduction is always mandatory after four weeks ; 2. reconstruction of the articular contour of the humeral head is worthwhile, if performed within 6 months (9,14).

It is not generally accepted that defects of the humeral head play an important role in recurrence of shoulder dislocation (11). However, several authors (1,2) feel that patients with large humeral bone defects are at risk for failure after any single stabilisation procedure, without reconstruction. Burkhart and Danaceau (2) identified recurrent shoulder instability in all patients with an engaging Hill-Sachs lesion.

Humeral head reconstruction with an osteochondral allograft is widely used and its results are superior to those obtained with the remplissage technique (7,10). Gerber (6) reported 3 cases, treated with an allograft ; the final results were very satisfactory with an average of 145 degrees of elevation and 70 degrees of external rotation. Unfortunately, allografts are rarely available in Egypt, for several reasons.

Table II. — Results

Case	Follow-up	Flexion	Abduction	External rotation (in adduction)	Internal rotation (in adduction)	Constant score
1	33 months	130°	120°	30°	60°	80 points
2	40 months	140°	130°	20°	50°	69 points
3	25 months	130°	120°	30°	70°	74 points
4	30 months	140°	130°	30°	60°	72 points

Rotational osteotomy of the surgical neck has been reported as a successful procedure for recurrent anterior instability associated with large Hill-Sachs lesions, but there are no studies which support this technique in neglected locked anterior dislocation. Moreover, it would increase the risk of avascular necrosis of the head and it would hamper subsequent prosthetic reconstruction (6,9).

Connolly (3) was first, in 1972, to inset the infraspinatus tendon into the Hill-Sachs defect via an open procedure. He reported satisfactory results in 14 out of 15 patients, without significant complications nor limitations in rotation. By filling (remplissage) the Hill-Sachs lesion with the transferred infraspinatus tendon, one attempts to convert the defect to an extra-articular lesion, thus providing stability by limiting translation of the humeral head on the glenoid surface. This study confirmed the findings of Connolly. More recently, an arthroscopic variant of this technique has been developed (8).

When a glenoid defect is present, the Latarjet operation is more appropriate than the Bristow operation, as it provides more bone (the horizontal part of the coracoid, i.e. about 3 centimetres, instead of just the tip of the coracoid). Furthermore, it functions as a mechanical barrier against dislocation of the head.

REFERENCES

1. Boileau P, Villalba M, Héry JY *et al.* Risk factors for recurrence of shoulder instability after arthroscopic Bankart repair. *J Bone Joint Surg* 2006 ; 88-A : 1755-1763.
2. Burkhart SS, Danaceau SM. Articular arc length mismatch as a cause of failed Bankart repair. *Arthroscopy* 2000 ; 16 : 740-744.
3. Connolly JF. Humeral head defects associated with shoulder dislocations — their diagnostic and surgical significance. *AAOS Instr Course Lect* 1972 ; 21 : 42-54.
4. Constant CR, Murley AH. A clinical method of functional assessment of the shoulder. *Clin Orthop Relat Res* 1987 ; 214 : 160-164.
5. de Castro Veado MA. Chronic unreduced shoulder dislocation. *Rev Bras Ortop* 2004 ; 39 : 1-13.
6. Gerber C. Chronic, locked, anterior and posterior dislocations. In : Warner JP, Iannotti JP, Flatow EL (eds). *Complex and Revision Problems in Shoulder Surgery*. 2nd ed, Lippincott Williams & Wilkins, Philadelphia, 2005, pp 89-103.
7. Gerber C, Lambert SM. Allograft reconstruction of segmental defects of the humeral head for the treatment of chronic locked posterior dislocation of the shoulder. *J Bone Joint Surg* 1996 ; 78-A : 376-382.
8. Koo SS, Burkhart SS, Ochoa E. Arthroscopic double-pulley remplissage technique for engaging Hill-Sachs lesions in anterior shoulder instability repairs. *Arthroscopy* 2009 ; 25 : 1343-1348.
9. Loebenberg MI, Cuomo F. The treatment of chronic anterior and posterior dislocations of the glenohumeral joint and associated articular surface defects. *Orthop Clin North Am* 2000 ; 31 : 23-34.
10. Martinez AA, Calvo A, Domingo J *et al.* Allograft reconstruction of segmental defects of the humeral head associated with posterior dislocations of the shoulder. *Injury* 2008 ; 39 : 319-322.
11. Neer CS II. Dislocations. In : *Shoulder Reconstruction*. WB Saunders Company, Philadelphia, 1990, p 329.
12. Rowe CR, Zarins B, Cuijlo JV. Recurrent anterior dislocation of the shoulder after surgical repair. Apparent causes of failure and treatment. *J Bone Joint Surg* 1984 ; 66-A : 159-168.
13. Schulz TJ, Jacobs B, Patterson RL Jr. Unrecognized dislocations of the shoulder. *J Trauma* 1969 ; 9 : 1009-1023.
14. Yagishita K, Thomas BJ. Use of allograft for large Hill-Sachs lesion associated with anterior glenohumeral dislocation. A case report. *Injury* 2002 ; 33 : 791-794.