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Original Research Article

Recurrent Shoulder Dislocation: Epidemiological and Therapeutic Aspects (About 30 Cases)

A. M. Niandou[1], Linda El Allani[2], T. S. Bah[1*], A. Marzouki[1], K. Lahrach[1], F. Boutayeb[1]

[1]Orthopedic Trauma Department at CHU Hassan II Fez, Morocco
[2]Polyvalente Réanimation Service at CHU Hassan II fez, Morocco

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Abstract: Shoulder dislocation reflects a complete loss of contact between the humeral head and the glenoid cavity. It is a frequent pathology and is the most common dislocation in the body. More frequent in young adults with a clear male predominance, which can lead to a socio-professional and sporting handicap. The diagnosis of glenohumeral instability is most often clinical. Standard radiography is sufficient for bone assessment. Arthroscanner and arthro-irm are currently the most effective techniques for confirming the diagnosis, assessing the extent and severity of the lesions, and searching for associated lesions. The treatment is surgical, the LATARJET operation remains the gold standard of treatment of instability of the shoulder. It allows the recovery of joint mobility as well as satisfactory joint stability.

Keywords: Shoulder dislocation, glenoid cavity, glenohumeral instability, diagnosis, LATARJET operation.

INTRODUCTION

The weak congruence of articular surfaces, solidity depending only on the joint capsule and coaptor muscles contrasting with the great mobility of the shoulder, constitute elements of weakness of the scapulohumeral joint. This exposes the joint to dislocation during violent trauma [1, 2].

Ranked first among dislocations of the body, dislocation of the shoulder is a common condition and results in complete loss of contact between the humeral head and the glenoid cavity [3, 4]. One of the main complications is recurrence.

Recurrent dislocation is defined by iterative episodes of dislocation, which is more and more frequent after the initial episode, even often with increasingly minimal trauma [5, 6].

Several anatomo-clinical forms are described; Anterior-internal instability is the most common form of recurrent shoulder dislocations [7]. It is a common pathology in young adults with a clear male predominance, it leads to a socio-professional and sporting handicap.

The diagnosis of glenohumeral instability is clinical. Standard radiological workup [8] is sufficient for bone assessment. CT arthrography and a joint MRI make it possible to confirm the diagnosis, to assess the extent and severity of the associated lesions.

The treatment of shoulder instabilities is resolutely surgical. It allows the recovery of joint mobility and provides satisfactory joint stability [9].

The surgical technique used in our study is the Latarget procedure [10].

The aim of this work is to study the epidemiological and anatomo-clinical aspects of shoulder instabilities, to evaluate the contribution of radiological imaging in the confirmation of recurrent dislocation of the shoulder, as well as the technical results of Latarget's procedure. in the treatment of recurrent anterior-internal dislocation of the shoulder.

MATERIALS AND METHOD

This is a retrospective study of 36 cases of recurrent dislocations of the shoulder treated surgically using Latarget's procedure by glenoid stopper, data was collected at the orthopedic and traumatology department A of the CHU Hassan II of Fez during a period of 14 years from January 2004 to August 2018.

Included in our study were patients with recurrent anterior-internal shoulder dislocation, i.e. presenting more than two episodes of shoulder

***Corresponding Author:** T. S. Bah
Orthopedic Trauma Department at CHU Hassan II Fez, Morocco

dislocation, and who received treatment surgical by preglenoid abutment using Latarjet's procedure.

Through this study, we have dealt with a set of parameters relating to the analysis of the results of surgical treatment by preglenoid coracoid abutment.

The first step consisted of collecting various data relating to the study of the characteristics of the patients and of the recurrent dislocation itself.

The second step focused on specific classifications for the evaluation of the results of Latarget's intervention according to the clinical scale of Rowe's rating and paraclinical evaluation using the Samilson classification for glenohumeral osteoarthritis.

Information was collected from medical records. As a result, an operating technical sheet was drawn up based on the data from taking patients histories, the clinical examination of patients before and after the operation and the checks during follow-up consultations.

RESULTS

In our series, the mean age at the time of surgery was 29.11 years with extremes ranging from 18 to 69 years. Recurrent shoulder dislocation was common in the 20-30 age group representing over 60% of cases. Of the 36 cases, we had 31 males (86%) and 5 females (14%), i.e., a sex ratio of 6.2 in favor of the male sex. There is a predominance of right-side dislocations with 23 cases, or 64%, and that of the left side in 13 cases, or 36%. No case of bilateral dislocations was found. The dominant side was involved in 72% of patients. None of our patients had a personal or family history of hyper laxity or recurrent dislocation of the shoulder. Four patients were known to have epilepsy, 3 patients presented with an initial dislocation during an epileptic seizure and the other during an intense exertion of force 40% of our series were sedentary, 20% hard workers and the remaining 40% were manual workers. 23 patients representing 64% of cases were athletic of different levels of which 14 patients (60%) leisure sport, 7 patients (30%) competitive athletes, 2 patients (10%) were high level athletes while the remaining 13 patients did not play any sport. In the majority of cases the initial episode of the dislocation was secondary to trauma; a fall, or a sports accident in 32 cases, i.e., 89% and in 4 cases linked to a movement or heavy object carrying. The lesional mechanism of the initial dislocation was direct in 24 patients: a fall landing on the shoulder stump, 8 patients reported an indirect mechanism, fall on the palm of the hand and lifting of an object, on the other hand 4 patients did not remember more of the mechanism. The reduction of the first dislocation was performed in the hospital under general anesthesia in 28 cases, i.e., 78%, for the remaining 8 patients, in 3 cases the reduction was made by the patients themselves, i.e., 8% and for 5 cases 14% by the patient's entourage. In our series, 78% of cases benefited from a Dujarier type elbow bandage immobilization for three weeks. 22% had no immobilization.

Only 16 patients, or 44% of cases, had benefited from post-immobilization rehabilitation with 20 physiotherapy sessions. The date of onset of the first recurrence is the free time interval between the initial dislocation and the first recurrence [11]. It was on average 6 and a half months (range: 15 days to 4 years). The first recurrence occurred within the first year in 67% of patients. The total number of recurrences is difficult to specify because most of the patients do not know the exact frequency of their recurrence. The average recurrence was 13.5 with a maximum of 26 and a minimum of a single recurrence. The number of recurrences was below 5 for 9 patients (25%), between 5 and 10 for 17 patients (48%) and above 10 for 10 cases (27%).

The triggering circumstances of recurrence were caused by usual daily activities in more than 19 cases (53%), in 8 cases it was due to forced movements (22%), physical exercise in 9 cases (25%). The treatment of the recurrence was carried out in the hospital followed by immobilization of the elbow using the Dujarier method for three weeks in 25 patients, i.e. 69%, 6 cases (17%) reduced by the patients themselves, 4 cases or 11% by the patient's entourage, in only one case, i.e. 3% did we record a spontaneous reduction.

Recidivism is the main reason for consultation in our series. Its degree of impact on everyday life was different from one patient to another, ranging from a simple discomfort with limitation of the upper limb to an interruption of sports and sometimes professional activity. Limitation of the upper limb represented 42% of our series, or 15 patients; 6 cases or 17% had their professional activities interrupted; 11 patients or 30% had an interruption in their sporting activities and finally for 4 cases representing 11% the shoulder instability hampered the patient's daily activity. Recurrence and apprehension are the main reasons for consultation in all patients. The clinical examination of patients showed an amyotrophy of the deltoid muscle in 2 patients, i.e., 5% of the series. Apprehension was present in 28 patients, or 78% of patients. The laxity test was positive in 14 patients representing 39%. The underlying and overlying joints were free and painless. Job's test expressing supraspinatus involvement was positive in a 46- year-old patient, i.e., 3%. The standard X-rays were performed in all our patients preoperatively. They were composed of Anteroposterior images (in internal rotation, neutral rotation and external rotation) and Bernageau lateral images. The CT arthrography was performed in 25 patients, i.e., 69%, the notch of the humeral head known as the Malgaigne notch was present in 24 cases, ie 67% on the anteroposterior images in internal rotation.

The recession of the antero-inferior edge of the glenoid represented 31 cases on the Bernageau profile, or 86%. Samilson stage 1 glenohumeral arthritis was found in 5 cases, i.e., 14%.

In addition, a cuff rupture was found in a single patient 3%. All the patients in our series underwent a Latarjet-type preglenoid coracoid abutment intervention. The time between surgical treatment and initial dislocation was on average 5 years and 6 months.

The stop was fixed using screws. In 13 cases, ie 36%, the stop was fixed by a single screw and in 23 cases, i.e. 64% by 2 screws. 100% of the patients had benefited from a mayo clinic-type elbow bandage and postoperative rehabilitation assisted by a physiotherapist. After analysis of the postoperative results, 78% of patients presented no pain, 16% of the patients presented with pain during intense efforts, and 6% of our patients had pain during their everyday activities.In our series, the shoulder was stable in 83% of cases; The apprehension was present in 14% of cases, we note a single recurrence 3% during a violent trauma which was reduced with good progress. Mobility was measured as a percentage relative to the opposite side. The overall score depends on the measured amplitudes, internal rotation, external rotation, adduction, abduction and anterior elevation of the upper limb. Normal mobility was restored in 28 cases (78%). The decrease in this mobility mainly concerned external rotation.

The overall objective results obtained according to Rowe's rating were 12 excellent results or 33%, 17 good results 47%, 6 average results 17% and 1 bad result or 3%. The subjective results of our series were: 13 patients (36%) were very satisfied, 20 patients satisfied and 3 patients disappointed. In terms of radiology, we found 31cases of perfect position of the abutment, no case of pseudarthrosis, 1 case (3%) of screw migration with lysis of the abutment, 2 cases (5%) of posterior overhang screw, 2 cases (5%) of Samilson stage I glenohumeral arthritis [12].

Figure 1: X-ray showing an anterointernal dislocation of the right shoulder. (Department of orthopedic trauma at CHU Hassan II Fez)

Figure 2: X-ray showing a Malgaigne notch (Department of orthopedic trauma at CHU Hassan II Fez)

Figure 3: Frotal X-ray of the right shoulder showing a stopper in correct position fixed by 2 screws (department of orthopedic trauma at CHU Hassan II fez

Figure 4: AP X-ray of the right shoulder showing Samilson stage I glenohumeral osteoarthritis. (Department of orthopedic trauma at CHU Hassan II Fez)

Figure 5: X-ray of the left shoulder, front showing a migration with lysis of the stop associated with stage II osteoarthritis (Department of orthopedic trauma at CHU Hassan II Fez)

DISCUSSION

Recurrent shoulder dislocation is a condition in young adults because its frequency decreases with age. This could be explained by the fact that this segment of the population is the most active and would suffer many more accidents. In our series, recurrent dislocation of the shoulder is common in the 20-30 age group with an average age of 29.11 years at the time of surgery.

Our data correspond to those of: Gourdins.v [12] with 26.7 years, Rosello O [13], Mizuno. N [14] 29.4 years, Greisser.MJ [15] with 25.8 years, Dossim. A [16] with 23 years, Collin. P [17] with 26.5, who found a high rate in the same age group.

In our study, the sex ratio is 6.2 in favor of the male sex with 31 men and 5 women. These data are consistent with those of ROSELLO. O [13], Greisser.M. J [15], HOVELIUS L [18], KIM SH [19], who also found a male predominance.

The dominant side was affected in 72% of cases, the dislocation was found on the right side in 64% of cases and the left in 36% of cases. There is no case of bilaterality.

Our data reflect that of the literature with WEI-YU [20] (53% right and 43% left); Dossim. A [91] 69% right and 31% left, Allain [91] 74% right and 26% left, Gayet [21] 52% right and 42% left.

In our study there is no family history of shoulder dislocation, in some studies up to 1/4 of a family history of recurrent shoulder dislocations [22].

Seizures can be the basis of dislocation or instability of the shoulder. The dislocation is secondary to either muscle contraction or trauma occurring during convulsions. For Bhûler [23], the risk of recurrence is high, up to 47%, and can be explained by the importance of glenoid and humeral lesions.

In our series 4 patients had epilepsy and during an epileptic seizure, 3 patients had presented an initial dislocation of the shoulder and the other patient had presented the dislocation during intense effort.

Literature reports cases of shoulder dislocation associated with rheumatoid arthritis or joint hyper laxity [24].

Shoulder instability is a relatively common problem in athletes. It can be explained by repetitive trauma and strain or congenital laxity [24, 26].

In our series, the dislocation is generally of traumatic origin, usually occurring during a road accident or sports accident. This is also the case for the following authors: Rosello. O [13] 83%, Owens [27]: 96%, J. Jan [28]: 78%, HOVELUIS [18]: 71%, ROWE [29]: 96%.

In our series, the dislocation was linked to trauma in 89% of cases and atraumatic in 11% of cases. Pain, functional impotence, epaulet sign, and subacromial depression are the most common signs. These same signs are encountered in almost all of the authors [30, 31] concerning the antero-internal dislocation of the shoulder.

The standard x-ray of the shoulder allowed us to make the diagnosis of the anterointernal dislocation. It included a AP view, lateral of Lamy or Bernageau. Various authors [32, 33,34] recommend these incidences which make it possible to make a differential diagnosis with the posterior dislocation.

Computed tomography makes it possible to confirm the diagnosis, to make a differential diagnosis with other types of dislocation, but also to determine the therapeutic indications in accordance with literature [35, 36]. Patients with a malgaigne notch of more than 50% of the diameter as well as those with an old dislocation of more than 6 months should have benefited not from a reduction of the dislocation but from a WAKIM BEAUFILS PH shoulder prosthesis [36].

In the absence of an associated lesion, treatment for anterointernal dislocation of the shoulder is orthopedic. There are several methods of reducing dislocation, all of which are far from unanimous; however, two reduction techniques are commonly used. Milch's technique which consists in putting the arm in

abduction to 150 degrees, the head is then pushed back then the limb is put in internal rotation elbow to body.

The Rocher technique [37] involves placing the elbow inwards and the arm in external rotation. The reduction should be done under general anesthesia to avoid any worsening of the lesions. In our study, 78% of patients received reduction under general anesthesia.

Immediate immobilization is an important intervention allowing good healing of the capsule-ligament structures. The absence or insufficient immobilization exposes a significant risk of recurrence.

Most of the authors recommend immobilization of the elbow to the body in internal rotation for 3 weeks [28]. According to Rowe [29], immobilization decreases the risk of recurrence by 10 to 15%.

Kiviluoto [38] notes a higher risk in patients immobilized for less than a week compared to those immobilized for 3 weeks.

For Hovélius [39], there is no difference in the occurrence of recurrence between immobilized patients and non-immobilized patients.

Studies by Kralinger [40] indicate that immobilization does not reduce the risk of recurrence. Itoi [41] proposes an immobilization in external rotation which allows better healing of Bankart lesions by providing closer contact between the glenoid cavity and the humeral head.

In our study, 78% of patients benefited from Dujarier-type immobilization for 3 weeks. Rehabilitation prevents recurrence and aims to recover joint amplitudes, strengthen internal rotators and also includes proprioceptive rehabilitation [41].

Saraglia [42] found that there is a relationship between the duration of rehabilitation and the incidence of recurrence 44% in non-rehabilitated patients compared to 17% for patients who received an adapted rehabilitation program.

In our series, 44% of patients benefited from rehabilitation. The amount of free time between the initial accident and the first recurrence is an important concept. According to Trillat [43] and Benammar [44], the recurrence rate during the year is 82 and 80%. The other recurrences usually occur with minimal trauma often even during sleep. The recurrences are less painful and closer.

Table 1: The number of recurrences in litterature

Recurrences	< 5	5-10	>10
LE NEN [45]	51,4%	25,2%	24,3%
Mandrino [46]	37%	26%	20%
Notre série	25%	48%	27%

The comparison of our series compared to other series studied in the literature which used the Latarjet technique and other techniques, shows a complication rate varying between 7% and 8.6%.

Intraoperative fractures of the stopper during its fixation on the neck of the scapula may occur. Gazielly [47] revealed two cases in his series while Walch noted 14 cases. In our study, no case of intraoperative abutment fracture was noted.

Hematomas can occur; 4cases in the series of Benammar [48], 2cas in the series of Vander- Maren [49], and that of Huguet [50], a case in the series of Kinesi [51].

Cases of phlebitis have been found in Walch's series [52]. 0.3% and that of Dejour [53]. 1.3%. In our series, there are no cases of hematomas or phlebitis of the upper limb.

Table 2: Complications reported in litterature

Complications	Bénammar [48].	Kinesi [51].	Déjour [53].	Walch [52].	Gazielly [47].	Levigne [54].	Notre Série
Intraoperative fractures of the stopper	-	-	-	14cas	2cas	-	0
Hematomas	4cas	1cas	-	-	-	-	0
Infections	-	-	1,3%	1,5%		0,6%	0
phlebitis	-	-	1,3%	0,3%	-	-	0
Neurological	3%	-	0,2%	1,5%	-	4%	5%

The stability analysis shows that our results are comparable to those in literature.

The low rate of recurrence may be due to the relatively small number of cases, although the analysis of a recent series by ALLAIN. J of 56 cases with a mean follow-up of 14 years shows an absence of recurrences while others publications give higher rates.

Table 3: Results of other studies treated using s Latarget's technique

	GORDI NS.V [12].	MIZUNO. N [14].	VANDER -MAREN [49].	HUGUET [50].	L. Doursi nian [55].	Notre série
perfect	**74.1%**	**91%**	**66%**	**79%**	**91.6%**	**83%**
Apprehension	**3.3%**	**-**	**30%**	**17.6%**	**4.2%**	**14%**
Recidivism	**3.3%**	**6%**	**3%**	**1.4%**	**4.2%**	**3%**
Subluxation	**19.3%**	**3%**	**-**	**-**	**-**	**-**

Several factors can generate postoperative pain; the duration of the operation, the longer it is, the more discomfort the patients have. The results of the Walach series show 55% osteoarthritis in patients who present with persistent pain compared to 31% who do not present any pain. Athletes have less pain than non-athletes.

In our series, 78% of patients present no pain, these results are comparable to literature which finds a rate between 60 and 78% **[**49, 50**]**.

Table 4: Comparison of pain with other studies in litterature

	Huguet [50].	L. Doursinan [55].	Notre série
Absent	**69%**	**88%**	**78%**
Forced Mouvements	**26%**	**12%**	**16%**
Daily activities	**5%**	**-**	**6%**

In our series, normal mobility was restored in 78% of cases. The decrease in mobility mainly involved external rotation, as reported literature [20, 52, 55]. According to studies, the attitude taken towards the subscapularis plays an important role in this deficit. The joint was approached for a long time by complete section of the subscapularis, the suture of which is not without morbidity. Under Patte's influence, the section of the scapular was made in an inverted L in order to preserve the lower 1/3 which will act as a hammock in stabilization.

Currently most authors [56, 57] fix the stopper through an opening of the middle 1/3 junction 1/3 lower of the subscapularis in the direction of its fibers. However, if the horizontal approach is more respectful of the anatomical and functional muscle structures, it makes the operation difficult due to the reduced exposure of the joint. Postoperative osteoarthritis, a protruding stopper, a relatively long immobilization are complications of this technique.

Table 5: Comparison of objective results with other studies

	Walch [52]	Leving [54]	Mole [58]	Notre série
Study	**356**	**52**	**82**	**36**
Excellent	**38%**	**33%**	**33%**	**33%**
Good	**38%**	**41%**	**41%**	**47%**
Average	**17%**	**22%**	**22%**	**17%**
Bad	**7%**	**4%**	**4%**	**3%**

In our series we found 80% good results, which is comparable with the literature.

Many series have studied the radiographic position of the stop. Out of 56 patients operated using Latarget's technique; Allain *et al*., [59] observed 53% of stops being too lateral and 5% internal, the others were well positioned. In the series by Cassagnaud [60], 10% of the stops are boundless on the tomodensitometry.

All the authors have emphasized the importance of the position of the stopper in relation to the final result. The optimal position of the graft is difficult to define but it is recognized that it should be below the equator, neither too internal nor too external.

In our series, the position of the stopper was perfect in 86% on standard X-rays.

There is only one case of abutment lysis in our series, which is a low rate compared to the literature [52, 61]. Dossim [16] and Collin [17] found a rate of 6.4% and 12% stopper lysis, respectively.

In our series the incidence of glenohumeral osteoarthritis was only 3%. This incidence is much greater in the series with a greater periods of data collection; 70% in the series by Singer *et al*., [62] with an average follow-up of 20 years.

The frequency of osteoarthritis is variously assessed in the literature [63-65]. According to NEN [64] the factors of osteoarthritis are:

- The age at the time of operation, the older the patient is during the operation, the greater the risk of osteoarthritis.
- The number of recurrences, the frequency of osteoarthritis seems to increase with the number of preoperative recurrences.
- The external rotator deficit is an arthrogenic factor.
- The existence of a ruptured rotator cuff is a predisposing factor.
- Pre-existing preoperative arthritis.
- A horizontal overhang of the stop.
- Finally, the rate of osteoarthritis increases with the decline in studies.

Table 6: Comparison of osteoarthritis in littérature

	Gordin.V	MIWUNO.N	Vander-Maren [49]	Huguet [50]	Collin [92]	Picard [66]	Notre série
No Osteoarthritis	**39%**	**70.6%**	**85%**	**64%**	**90%**	**80%**	**97%**
Osteoarthritis I	**27%**	**14.7%**	**12%**	**27.5%**	**6%**	**15%**	**3%**
Osteoarthritis II	**23%**	**5.9%**	**3%**	**7%**	**-**	**5%**	**-**
Osteoarthritis III	**11%**	**8.8%**	**-**	**1.5%**	**4%**	**-**	**-**

CONCLUSION

Recurrent dislocation of the shoulder is a common pathology in young adults, especially males, which significantly impedes daily activities.

Among the many surgical procedures offered, the Latarjet technique is the most used, because it is an effective method, quick to perform, allowing to have a triple anterior locking:

- Bone thanks to the stopper,
- Capsular thanks to the suture of the external flap.
- Muscular by a hammock effect of the subscapularis.

Our study shows, and this is in accordance with the literature, that the Latarjet technique makes it possible to restore normal mobility and perfect stability in the majority of cases.

Complications such as pseudarthrosis, lysis of the stop, osteoarthritis are rare. Our study shows, 17% average results and 3% of bad results.

These results confirm the impression of a reliable, easily performed, and low morbidity intervention, which ensures maximum prevention of recurrence and a good quality of functional result.

Conflicts of interest: The authors declare no conflict of interest.

Authors' Contributions

All authors contributed to this article and approved the final version of this manuscript.

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