Has the management of shoulder dislocation changed over time?

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Abstract Anterior shoulder dislocation is a disabling injury affecting all ages, young and old alike. Recently, the treatment of traumatic shoulder dislocation has included immobilisation for varying periods of time followed by physiotherapy. This study is the first in this country to address the demographic data and recurrence rates of shoulder dislocation. Three hundred and eight patients (170 men and 138 women) were followed up for an average of 5.9 years. The most frequent mechanism of injury was a fall (65.66% of cases), and in 92.1% of the patients, the shoulder was reduced in the Emergency Department without the need for sedation or general anaesthesia. The overall recurrence rate in all ages was 50%, but rose to 88.9% in the 14–20-year age group. The duration of immobilisation did not affect the rate of re-dislocation of the humeral head. We believe that conventional shoulder immobilisation in a sling offers no benefits, and it would be preferable not to immobilise the shoulder at all.

Résumé Les luxations antérieures de l'épaule sont une affection qui peut survenir à n'importe quel âge, aussi bien chez les jeunes que chez les patients plus âgés. Jusqu'à ce jour, le traitement des luxations de l'épaule comprend une immobilisation suivi d'une période de rééducation. Cette étude est la première qui met en évidence des données

démographiques et des résultats concernant la récurrence de la luxation. Trois cent huit patients (170 hommes et 138 femmes) ont été suivis pendant une période de 5,9 ans. Le mécanisme le plus fréquent a été la chute (65,66%) et dans 92,1% des cas la luxation a été réduite aux services d'urgence, sans anesthésie générale et sans sédation particulière. Le taux de récurrence quel que soit l'âge a été de 50% mais augmente à 88,9% dans le groupe des patients les plus jeunes (14 à 20 ans). Le temps d'immobilisation n'affecte pas le taux de reluxation. Nous pensons que l'immobilisation conventionnelle de l'épaule n'apporte aucun bénéfice et qu'il est préférable de ne pas immobiliser celle-ci à la suite d'une luxation.

Introduction

The shoulder is the most commonly dislocated joint in the human body [9, 11]. A previous study has shown that glenohumeral dislocation occurs more frequently than all other dislocations put together [19]. Shoulder dislocations may be posterior or inferior, but in up to 98% of the cases, they occur when the humeral head is displaced anteriorly [22].

Many manoeuvres for the relocation of the humeral head have been described, generally involving either traction on the humerus or manipulation of the scapula. The Hippocratic, Kocher, Eskimo, Stimson, Milch and Spaso manoeuvres all involve different types of distal traction on the humerus [14]. Although analgesia may not be necessary to achieve reduction, narcotics and muscle relaxants or intra-articular injections have been used to effect in the reduction of the humeral head [18].

Traditionally, the initial management of these patients consisted of post-reduction immobilisation and a rehabilitation programme. However, recurrent dislocation arising

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from an injury of the glenohumeral capsule, ligaments, labrum or rotator cuff is common [18]. The literature suggests recurrence rates of between 67 and 97%, with patients under the age of 30 at greatest risk [4].

Many methods of treatment have been applied in the last decade in order to reduce the rate of recurrence after the first-time shoulder dislocation. Recently, cadaveric and clinical studies have suggested lower recurrence rates when the shoulder is immobilised in external rotation [6, 9, 10]. There are also good data for surgical stabilisation in first-time traumatic anterior dislocation for young athletic individuals. Operative treatment promises a better outcome in terms of preventing recurrence and offering higher levels of sports performances and recreational activities [15].

The aim of this retrospective study was to determine the incidence rate and describe the epidemiology with respect to the effect of the treatment protocol in anterior shoulder dislocation.

Materials and methods

Between November 1996 and April 2001, 369 patients over 14 years of age presented to the Emergency Department with acute shoulder dislocation without concomitant fracture of the upper humerus, tuberosities or shoulder girdle. Fifteen (4%) posterior and 354 (96%) anterior dislocations were found; only anterior dislocations were considered for inclusion in the study.

After the X-ray confirmation of anterior shoulder dislocation, the patients were placed in a supine position. Intravenous or intramuscular narcotics (morphine with or without diazepam) were used for analgesia.

The surgeon explained the procedure and demonstrated the movements to the patient. It was essential to keep the patient reassured and relaxed and to carry out the procedure slowly and gently. The importance of taking as much time as needed to effect the reduction was emphasised, as pain with resultant muscle spasm will hamper reduction efforts.

The method most frequently employed to relocate the anteriorly displaced humeral head was Hippocrates's in 248 patients (70%), while Milch's was applied in 106 patients (30%). If Milch's method failed, a Hippocrates manoeuvre was chosen. The overall success of Milch's method was 67% (71 patients) and of Hippocrates' method 89.9% (255 patients). In 7.9% of cases (28 patients), reduction was performed either under sedation or general anaesthesia (Fig. 1).

A post-reduction film was performed and the limb placed in a sling for an average of 3 weeks (range, 20±14 days).

At the final follow-up, 46 of the 354 patients with anterior shoulder dislocation could not be found. The remaining 308 patients were evaluated with the use of a

Anteriorly Dislocated Shoulder

Reduction under general anaesthesia

Fig. 1 Treatment protocol

questionnaire, which was either sent by mail or administered on the telephone (Table 1). The follow-up was 4–9 years (average 5.9 years).

Age distribution The patients were divided into eight age categories by decade except for the first (14–20) and last (80+) categories.

Statistics The Microsoft Excel Program and the SPSS Program were used for the creation of tables and graphs. The SPSS program was used for the statistics of the study. The data were analysed using the chi-square test and the Mann-Whitney test for testing two independent samples. P values less than 0.05 were considered to be statistically significant.

Table 1 Questionnaire details

Patient's personal information
Age
Gender
Dominant arm/side of dislocation
Type of occupation/sports activities
Mechanism of injury
Mode of reduction
Medication/sedation-general anaesthesia
Length of immobilisation
Recurrence
Times of recurrence
Listing for surgery

Results

From the total of 369 patients attending the Emergency Department with anterior shoulder dislocation during the reviewed period, 203 were men (55%) and 166 (45%) were women.

In the study group of 308 patients, a similar frequency between men (170 patients; 55.2%) and women (138 patients; 44.8%) was found. The dominant hand was involved in 174 of 308 cases (56.5%). The mean age was 47 ± 21 years. Men had a mean age of 37 ± 17 years, and women a mean age of 59 ± 19 years ($P \leq 0.001$).

The frequency of the mechanism of dislocation is shown in Table 2. A fall was responsible for up to 65.66% (204 patients) of the cases.

When analysing the mechanism of dislocation in relation to age, it was found that mechanisms like simple falls and rapid movements had a different frequency according to age. Rapid movement was often seen in relatively younger ages and patients with recurrence, whereas falls were seen in older patients ($P \leq 0.001$).

The mean number of days in which the arm was placed in a sling was 20 ± 14 . No significant difference was found between the days of immobilisation and recurrence rate ($P > 0.05$).

Patients who suffered a recurrence were asked about the first time they had the dislocation. The results showed that a dislocation at a young age was more likely to lead to a recurrence ($P \leq 0.001$) (Fig. 2).

Overall, the recurrence rate of anterior shoulder dislocation was found to be 50% (154 patients). Men had a higher rate of recurrence (96/170 patients; 56.5%) than women (58/138 patients; 42%) ($P < 0.001$).

It is worth mentioning that young patients between 14 and 20 years old with first-time dislocation had an 88.9% possibility (32/36 patients) of recurrence. In the 21–30 years

Fig. 2 First dislocation age in patients with recurrent anterior shoulder dislocation ($P \leq 0.001$)

of age group, the rate was also high, almost 70% (44/64 patients). In older ages and especially in women, there was also a 30–40% possibility for recurrence (Fig. 3).

The number of recurrent dislocations in each patient ranged from 1 to 8, with a median value of two episodes.

Surgery was performed in 30 of the 308 patients (9.7%) due to recurrence. All of them were under 50 years of age. No difference was found between the number of men and women who had an operation ($P = 0.8$).

Sixteen of the 308 patients (5.1%) changed their original work. Neither the side of the dislocated shoulder (left or right) nor the dominance of the limb (dominant or non-dominant) showed any correlation with the previous result ($P = 0.75$). Finally, of the 86 patients involved in sports, 58 (67.4%) continued without any restriction, 22 (25.6%) reduced their activities and 6 (7%) stopped participating in sports.

Table 2 Mechanism of anterior shoulder dislocation

Mechanism of dislocation	Number of patients	Percent
Simple fall	198	64.3%
Fall from a bike	4	1.3%
Fall from height	2	0.6%
Assault	2	0.6%
Rapid movement	58	18.8%
Sneezing	2	0.6%
Swimming	2	0.6%
Direct force	6	1.9%
Car accident	6	1.9%
Weight exercises	4	1.3%
Work accident	2	0.6%
During sleep	8	2.6%
Pull	14	4.5%
Total	308	100%

Discussion

Anterior shoulder dislocation is a common injury affecting a wide cross-section of the population [4]. Our study shows that the demographics of the population have not changed over time. In this country, the initial treatment of anterior shoulder dislocation has also remained unaltered, consisting of immobilisation in a sling for a short period of time followed by physiotherapy.

Traction, leverage, scapular manipulation and combinations of the above have been described as the basic methods of reduction of the anteriorly dislocated shoulder [16]. The best treatment method is one that is highly effective, quick, can be done with minimal analgesia or muscle relaxants, requires little assistance and causes no additional injury to

Fig. 3 Rate of recurrence in relation to age ($P \leq 0.001$)

the shoulder. Traction methods comprise the largest group and can be further subdivided according to the position of the arm while the technique is applied [16].

The reduction techniques used by the emergency practitioners were the Hippocrates's method in 70% and Milch's method in 30%. In our cases, the success rate was 89.9 and 67%, respectively. In total, 7.9% of the patients needed sedation or general anaesthesia for a successful reduction. In the literature, success rates between 70–90% have been reported with various techniques [14, 16]. Although the Hippocrates's method is more painful and needs the aid of a second person, we found that it is more effective in relocation of the humeral head.

Intravenous or intramuscular medication, regional anaesthetic techniques—such as interscalene brachial plexus or suprascapular nerve blockade—and intra-articular injections have been reported as aids for reduction of acute glenohumeral dislocation with satisfactory results [5, 18]. Although an intravenous or intramuscular medication was applied in our study, intra-articular local anaesthesia and suprascapular nerve blocks have the potential advantages of allowing prompt patient discharge once reduction has been achieved, as they lack the cardiorespiratory side effects of intravenous sedation/analgesia [5, 18].

In young patients, common features of anterior traumatic dislocation are the avulsion of the anteroinferior glenohumeral ligament and capsulolabral detachment (Bankart lesion), while in older ages rotator cuff tears can accompany anterior dislocation in up to 60% of the cases [17, 18]. These changes have a poor healing probability and a destabilising effect on the joint, predisposing to recurrent shoulder dislocation.

A number of studies of non-operative treatment after shoulder dislocation have been unable to show that any

given treatment is better than another regarding the rate of recurrence [15, 22]. Aronen and Yoneda have suggested that immobilisation followed by intensive physiotherapy regimes can successfully prevent recurrence in 75–82% of first time dislocations [2, 25]. On the other hand, Burkhead and Taylor have not been able to reproduce these results, suggesting success rates in only 10–18% of the patients [3, 23]. Three recently reported studies, one in cadavers [6] and two in patients [9, 10], promise lower recurrence rates when the arm is placed in external rotation. The authors concluded that in that position there is better reapproximation and reapposition of Bankart lesions compared to the conventional position of internal rotation.

There is little consensus regarding the duration of immobilisation following traumatic anterior shoulder dislocation. There are a number of studies that suggest that immobilising primary traumatic anterior shoulder dislocations may not be effective in preventing recurrence [7, 8, 12]. Conversely, some papers have claimed that immobilisation did reduce the rate of recurrent dislocations [20, 21]. In this study, the period of immobilisation did not have any significant correlation with the recurrence rate of shoulder dislocation ($P > 0.05$).

Although the optimal position and length of immobilisation after successful reduction are still under discussion, there is overwhelming agreement in the literature that the age of the patient at the first episode of dislocation is the most important prognostic factor for recurrence [4]. Rowe suggested recurrence rates of 94% of patients under the age of 20 years compared to 14% in patients aged over 40 years [20]. In a prospective study of primary dislocations in young people, Hovelius found that the 2-year recurrence rate was 47% in patients aged 12–22 years and 13% in the

30–40 years age group [8]. A peak rate of 53% was seen among patients aged 17–19 years.

Our study shows that a higher recurrence rate (88.9% in the 14–20-year group; 68.8% in the 20–30-year group) occurs at younger ages, predominantly in men regardless of the reduction technique and the duration of immobilisation. This finding emphasised that the prognosis after a primary glenohumeral dislocation is poor in the young. After the age of 60 years, there is also a second—lower than in younger groups—peak of increased recurrence rate predominantly in women.

Over the last 2 decades, there has been a trend to perform early surgical reconstruction in young patients who require complete shoulder stability before being able to return to work or sports. Larrain et al. in a prospective study compared the results of arthroscopic repair in acute anterior shoulder traumatic dislocation with those of nonoperative treatment in young athletes. In the surgical group, there was only 4% redislocation, whereas in the non-operative group, the rate was 94.5% [13]. Similar results have also been reported by Wintzell [24] and Arciero [1].

Treatment of anterior instability of the shoulder is a balance between gaining glenohumeral stability and minimising the loss of glenohumeral motion. The choice of treatment must be individualised on the basis of the patient's age, occupation and level of participation in sports as well as on the degree of instability of the shoulder.

Conclusion

This study shows that demographic data and recurrence rates are similar to other populations. Additionally, it reconfirms the finding that age at the time of primary shoulder dislocation is the most significant prognostic factor for the rate of recurrence. There is still much to be understood about how long and in which position the shoulder should be immobilised and when a surgical approach is indicated. Further studies are required in order to solve these issues.

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