Classification and management of shoulder and elbow trauma
Bruinsma, W.E.

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: http://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
Chapter 4

Treatment of a Primary Anterior Shoulder Dislocation;
Do Not Always Treat Nonoperatively

Remy van der Heiden, Wendy E. Bruinsma, Gino M.M.J. Kerkhoffs,
J. Carel Goslings en Niels W.L. Schep

'Trauma Unit
'Department of Orthopedic Surgery
Academic Medical Center, Amsterdam

ABSTRACT

According to the current guidelines, primary anterior shoulder dislocations are treated nonoperatively by short-term immobilization of the shoulder after relocating the shoulder. Shoulder stabilization surgery—either open or arthroscopically—reduces the risk of recurrence and improves the long-term functional outcome. Active young adults are known to have up to a 90% increased risk of recurrent dislocation after nonoperative treatment of a primary shoulder dislocation. Particularly active young men benefit from shoulder stabilization surgery. Shoulder stabilizing surgery using an open approach has a lower recurrence rate than through an arthroscopic approach. We therefore recommend a shoulder stabilizing surgery for young adult men with a primary anterior shoulder dislocation.
INTRODUCTION

Anterior shoulder dislocations are the most prevalent dislocations with an incidence of 8-24 per 100,000 persons per year\(^9\). The prevalence, expressed in cumulative incidence, is 0,7% for men, and 0,3% for women up to 70 years of age\(^6\). The highest incidence of anterior shoulder dislocations has been reported for men age 21-30 years and women age 61-80 years\(^8\). The current guideline in the Netherlands, a CBO-guideline from 2005, advises to treat patients with a primary anterior shoulder dislocation nonoperatively en to be cautious with early operative treatment\(^1\). After repositioning, the shoulder should be briefly immobilized with a sling and the patient should start exercising immediately. The current guideline also states that only complicated dislocations – a dislocation combined with vascular damage or with a fracture, or a non-repositionable dislocation – as well as the occurrence of a recurring shoulder dislocation warrants operative treatment. According to more recent studies a shoulder stabilizing surgery after a primary anterior shoulder dislocation produces a lower recurrence rate, a better shoulder function as well as a better quality of life \(^7, 8, 12\). The recurrence rate after a primary anterior shoulder dislocation is between 49 and 90\%\(^2, 5, 10\). Improved shoulder function and quality of life after a shoulder stabilizing surgery may possibly be attributed to the prevention of recurrent shoulder dislocations en corresponding damage to the shoulder joint. This topic however, remains controversial. The purpose of this paper is to provide an overview of the anatomy of the shoulder, as well as the pathophysiologic mechanism and treatment options of anterior shoulder dislocations. We also analyzed the literature for evidence whether or not a shoulder stabilizing surgery should be offered to a patient after a primary anterior shoulder dislocation.

Literature Search

We searched the Medline-, Cochrane- and Embase-databases for publications that compared outcome of nonoperative treatment after a primary shoulder dislocation with outcome of operative treatment. We also searched for publications comparing open procedures with arthroscopic treatment. Only publications that described an open or arthroscopic Bankart procedure, a Bristow-arthroscopic procedures or capsular tightening of the shoulder were included. Besides the included publications we also added the CBO-guideline (figure 1).
Figure 1. Flowchart depicting the selection of articles based on treatment of primary anterior shoulder dislocations. After selection 21 articles remained to which the CBO-guideline was added.

Anatomy

The glenohumeral joint is a ball and socket joint. The head of the humerus (caput humeri) articulates with the shoulder blade (scapula) at the glenoid fossa (cavum glenoidale scapulae). This anatomic construction ensures movement in 3 axes, enabling internal and external rotation, ab- and adduction and flexion and extension in the shoulder. To accomplish stability in spite of this mobility, the joint capsule as well as the muscles of the rotator cuff ensure that the caput humeri stays in her spot in the glenoid fossa. The joint capsule is attached to a rigid cartilage ring around the joint cavity, the labrum. The labrum provides a bigger articular surface as well as more depth of the joint cavity, benefitting joint stability. The joint capsule is also attached to the tendons of the rotator cuff. The rotator cuff consists of the M. subscapularis, M. infraspinatus, M. supraspinatus and the M. teres minor.
Pathophysiologic mechanism of an anterior shoulder dislocation

An anterior shoulder dislocation is caused by (forced) exorotation and abduction of the arm. Shoulder dislocations in young people are generally attributed to sport injuries, whereas in older people dislocations are mainly caused by a fall on an outstretched hand\cite{9}. An anterior shoulder dislocation may be accompanied by a Bankart-lesion, Hill-Sachs lesion, injury to the rotator cuff and fractures of the greater tuberosity. A Bankart-lesion is a tear in the lower part of the labrum and is present in over 90% of the dislocations\cite{24}. The phrase ‘Bony-Bankart’ is used to indicate a fracture of the anterior edge of the glenoid. In case of a Hill-Sachs lesion the glenoid causes an impression fracture in the posterolateral part of the humerus\cite{5}. Boileau et al. analyzed risk factors for recurrence of shoulder dislocation and describes an increased risk for a recurrence after nonoperative treatment when a bony defect of the glenoid amounts to more than 25% of the articular surface\cite{2, 19}. In these patients a primary surgical treatment is advised. An anterior shoulder dislocation may also be accompanied by rotator cuff injury. A recent prospective study in 3633 patients reports a 12% incidence of rotator cuff injury after an anterior shoulder dislocation\cite{18}. These accompanying injuries are associated with a decrease in stability and in turn lead to an increase in recurrence rate, after nonoperative treatment as well as after operative treatment\cite{5, 18}.

Radiographic Imaging

According to the current CBO-guideline an X-ray before as well as after repositioning of the shoulder is necessary in order to rule out bony injury and to assess the quality of the reposition. Ultrasound and MRI may be used to assess the rotator cuff. According to two meta-analyses, ultrasound and MRI had a sensitivity of 96% vs. 91% for detecting full-thickness rotator cuff tears; the specificity was 93% and 97%\cite{20, 21}. For partial-thickness tears the specificity was comparable, but the sensitivity was lower; 84% with ultrasound and 80% with MRI\cite{20, 21}. According to the current CBO-guideline, ultrasound and MRI should be obtained only when the patient has been diagnosed with persisting shoulder complaints.

TREATMENT OF ANTERIOR DISLOCATIONS

The primary treatment goal is safe, atraumatic repositioning of the shoulder as fast as possible. Repositioning can be done under local or general anesthesia. No superior repositioning technique has been described, though little comparative evidence exists\cite{16, 24}.

Nonoperative treatment

The current CBO-guideline recommends immobilization during 2-4 weeks, potentially followed by physical therapy. The arm should be immobilized through a sling holding the arm in internal rotation. Physical therapy should be focused on regaining full range of motion (ROM) in the shoulder and subsequently on strengthening the rotator cuff.
Operative treatment

The most frequently used technique to stabilize the shoulder is the procedure described by Bankart. Sutures or anchors are placed in the glenoid rim to fix the labrum and anterior part of the shoulder capsule to the bone. The Bankart-procedure is a proven effective method to stabilize the glenohumeral joint and is associated with low morbidity(6). A different operative treatment method for instability of the shoulder joint is a capsular shift procedure, whether or not combined with a Bankart-procedure. With this technique an incision is made in the shoulder capsule. Two capsular imbrication steps follow, ensuring tightening of the capsule around the caput humeri, enhancing glenohumeral stability(6). A Bristow-Latarjet procedure is also an option. With this procedure an osteotomy of the coracoid process is performed. Afterwards, the free part of the coracoid process is attached to the anterior rim of the glenoid, thus blocking anterior dislocation of the caput humeri(25). A recent review reported a recurrence rate of instability after a Bristow-Latarjet procedure of 2.4-12%(5, 10, 23). The surgeon can choose between open and arthroscopic approach for each procedure(8).

Operative vs. Nonoperative treatment

In 2007 a randomized controlled study compared operative treatment through an open Bankart repair vs. nonoperative treatment in patients with a primary anterior shoulder dislocation(12). After a follow-up time of 2 years, the recurrence rate was 56% in nonoperatively treated patients, vs. 3% in the operatively treated group. Patients that were treated operatively also had better functional outcomes. After a follow-up time of 10 years, 72% of operatively treated patients had ‘good’ results measured by the Oxford shoulder score. In the nonoperatively treated group, 26% had good results. The Oxford shoulder-score is a questionnaire filled out by patients and is a measure for pain and disability of the shoulder experienced by the patient(12).

A meta-analysis of 163 young men, randomized between nonoperative treatment and operative treatment, reported a recurrence risk of dislocation of 16% in the operatively treated group vs. 62% in the nonoperatively treated group. Glenohumeral joint movement (expressed as percentage of movement compared to the non-affected shoulder) was 95% in the operatively treated group vs. 99% in the nonoperatively treated group(7). Flexion in particular was diminished after a Bankart-procedure. However, the clinical relevance of the diminished mobility was low(7). The Western-Ontario shoulder instability (WOSI)-score, in which a low score depicts a better function and better quality of life, was significantly higher for the operatively treated group compared to the nonoperatively treated group (287 vs. 634). In addition, 11% of patients in the operatively treated group were dissatisfied about their shoulder function compared to 53% of patients in the nonoperatively treated group(7). There is not much known about the application of the capsular shift procedure after a primary anterior shoulder dislocation(11). Promising results have been reported in two case series in which a capsular shift was performed in athletes; a return to previous level of activity was accomplished in 65-85% of athletes(4, 22).

Randomized trials have also demonstrated a lower recurrence rate of shoulder dislocations after arthroscopic procedures compared to nonoperative treatment(7, 8, 12, 13, 15, 17). In arthroscopically treated patients the recurrence rate was 7-16% compared to 29-47% in nonoperatively treated patients(13, 17).
Open vs. arthroscopic approach

There is an ongoing discussion about the advantage of an arthroscopic approach over an open approach. A 2007 meta-analysis of 18 comparative studies demonstrated a higher recurrence risk and instability after arthroscopic treatment (18 and 12%) compared to open treatment (8 and 5%)\(^{14}\). In more recent studies, there are no significant differences found for recurrence risk and shoulder function as measured by the Constant-Murley-score\(^{8, 15}\). However, these studies were all retrospective studies. A recently published randomized trial reported a significantly higher recurrence rate (23% vs 11%, \(p = 0.05\)) at a follow-up time of 2 years after arthroscopic stabilization surgery\(^{26}\). There was no difference in functional outcome between the two approaches.

DISCUSSION

This literature study has demonstrated that an operative treatment of a primary anterior shoulder dislocation leads to a lower recurrence rate and better shoulder function compared to nonoperative treatment. The results of an open approach and an arthroscopic approach are comparable. However, if all primary shoulder dislocations were to be treated operatively, a large number of patients would be overtreated.

The patients that were enrolled in these studies and were randomized between nonoperative treatment and operative treatment were mostly young men with an active lifestyle. Most studies also enrolled only men. In the studies that did include women, their percentage varied between 4 and 20. The mean age of enrolled patients was between 20 and 28 years.

A number of studies have shown that this specific study population of active, young adult males (younger than 30 years) has a strongly increased risk of recurrent shoulder dislocations\(^5, 10, 23\). One of these reviews reported a recurrence risk of up to 90% in patients younger than 24 years old. For these reasons we have aimed our suggested treatment at young adult males\(^5\).
CONCLUSION

Shoulder stabilizing surgery after a primary anterior shoulder dislocation decreases the recurrence risk compared to nonoperative treatment. It also increases long-term functional outcome. Especially active, young adult males seem to benefit from surgical treatment after a primary anterior shoulder dislocation. Shoulder stabilizing surgery using an open approach has a lower recurrence rate than through an arthroscopic approach. We recommend a shoulder stabilizing surgery for young adult men with a primary anterior shoulder dislocation.

SIDE NOTE

The article in this thesis differs from the published article because we added new evidence comparing an open vs. arthroscopic approach for shoulder stabilizing surgery that was not yet available at the time of publication.
REFERENCES


