

Type and Diagnosis of Lesions Associated with Traumatic Anterior Shoulder Dislocation

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ABSTRACT

Objective: Anterior dislocations are common large joint dislocations due to the anatomical structure and mobility of the shoulder joint and are seen in 1-2% of the population. The most common form is a traumatic anterior shoulder dislocation, approximately 90-95%. The lesions accompanying traumatic anterior shoulder dislocation are mostly Bankart and Hill-Sachs lesions, rotator cuff tear, tuberculum major fracture, and neurological injury. This study evaluates osseous, neurological, and soft tissue lesions in traumatic anterior shoulder dislocations.

Material and Methods: Eighty-four patients (male:62, female:22) who applied to our center due to traumatic shoulder dislocation between January 2014 and January 2021 were evaluated. Demographic data of the patients and accompanying shoulder circumference lesions were detected. The types of lesions were grouped as isolated and combined. The lesions were diagnosed clinically and radiologically (shoulder radiographs and magnetic resonance imaging (MRI)).

Results: The mean age of the patients was 33.4 (18-81) years, 62 were male, and 22 were female. Dislocation-related lesions were detected in 61.1% of the patients. The lesions were seen as isolated and combined. While rotator cuff tears were the most common isolated lesions, Bankart + Hill-Sachs lesions were the most common combined lesions.

Conclusion: Isolated or combined lesions accompanying traumatic anterior shoulder dislocations are common and cause shoulder instability when not treated. It is detected by clinical examination and MRI after a dislocation to diagnose associated lesions. We recommend performing a shoulder MRI to detect associated lesions after shoulder dislocation.

Keywords: Anterior shoulder dislocation, Bankart, Hill-Sachs, Rotator cuff tear

INTRODUCTION

The shoulder joint is multiaxial and consists of the spheroid head of the humerus, the scapula glenoid, and many dynamic and static structures. The glenoid cavity is very shallow, and only 30% of the humeral head is contacted. Static and dynamic stabilizers with fibrocartilaginous labrum increase the glenoid depth by 50% (1). It is the most common major joint dislocation due to the original anatomical structure of the shoulder joint and is a mobile structure in daily practice and is seen in 1-2% of the population (2). Anterior shoulder dislocation constitutes 90-95% of all shoulder dislocations (3,4). Traumatic anterior shoulder dislocation is mainly seen as removing the humeral head from the glenoid by forcing the anterior capsule and labrum due to abduction, hyperextension, and excessive external rotation.

Traumatic anterior shoulder dislocation disrupts joint integrity and causes damage to the structures around the joint. These lesions may occur mostly as Bankart lesions, impacted lesions of the humeral head (Hill-Sachs lesion), rotator cuff tear, and major tubercle fractures by separating the labrum from the glenoid or bone structure (5,6). The injury also occurs in the neural structures around the shoulder, and axillary nerve injury is the most common. Although very rare, vascular injuries may also occur (7). All these associated lesions can be seen in isolation or in a combined manner. Diagnosis of these lesions at an early stage and treatment planning minimizes the deterioration of shoulder functions and especially the development of shoulder instability.

The aim of this study is to evaluate the diagnosis and type of bone, neurological and soft tissue lesions around the shoulder accompanying traumatic anterior shoulder dislocations.

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MATERIAL and METHODS

Patients admitted to our center due to traumatic shoulder dislocation between January 2014 and January 2021 and intervened by us were retrospectively examined. After obtaining the ethics committee's approval, all patient's data from the hospital registration system were evaluated. Patients over 18 years of age, those with anterior shoulder dislocation, those with shoulder anteroposterior (AP) radiography before and after reduction, and those with magnetic resonance imaging (MRI) after reduction were included in the study. Those with non-traumatic shoulder dislocation, collagen tissue diseases, a history of malignancy, and previous shoulder surgery were excluded from the study. After exclusion and inclusion criteria, 84 (male:62, female:22) patients were evaluated. Demographic data (age, gender, and side) and accompanying shoulder circumference lesions of the patients were evaluated. The types of lesions were grouped as isolated and combined. The lesions were diagnosed clinically and radiologically (shoulder AP radiography and MRI).

The primary approach to shoulder dislocation: The physical examination of the patients and neurovascular examination of the affected extremity were performed at first admission. Shoulder trauma series radiographs (AP, Axillary, and scapula X-ray) were taken before reduction. Reduction maneuvers were performed in the emergency department under sedation. Patients who could not achieve appropriate reduction were reduced in the operating room with general anesthesia. Kocher, Milch, and Hippocratic maneuvers were performed in reduction (8). After reduction, a neurovascular examination was performed again, and radiographs were taken.

The patients with appropriate reduction were followed up in velpaeu bandage for an average of two weeks, and MRI was performed to evaluate the accompanying lesions (Bankart lesion, Hill-Sachs lesion, and rotator cuff tear). Those with major tubercle fractures were kept in a velpaeu bandage for an average of 4-6 weeks, and then the bandage was removed, and MRI was performed. Active and passive shoulder exercises were started after the shoulder bandage was removed in patients without dislocation-associated lesions. Treatment was also planned for patients with associated lesions.

RESULTS

All patients were analyzed for lesions associated with shoulder dislocation. The mean age of the patients was 33.4 (18-81) years, 62 were male, and 22 were female. While 89.2% (n=75) of the patients with shoulder dislocations were dominant extremity, 10.8% were non-dominant. While 76% (n=64) of the patients were reduced under sedation in the emergency department, 24% (n=20) were reduced under general anesthesia in the operating room when reduction could not be performed in the emergency department (**Table 1**). The closed reduction was performed for all dislocations. Dislocation-related lesions were detected in 61.1% of the patients. The encountered lesions were isolated and combined. While rotator cuff tears were the most common isolated lesions, and Bankart and Hill-Sachs lesions were the most common combined lesions (**Table 2**).

Table 1: Demographic data of the patients

Average Age (years)	33.4(18-81)
Gender	Male:62, Female:22
Side	Dominant:73, Non-dominant:11
Reduction in ER	76% (64)
Reduction in OR	24% (20)

Table 2: Isolated and combined lesions associated with shoulder dislocation

Isolated Lesions		
Rotator cuff tear	10.7%	9
Neurological deficit	4.7%	4
Tuberculum fracture	7.1%	6
Combined Lesions		
Tuberculum fracture+axillary injury	3.5%	3
RCT+axillary injury	4.7%	4
Bankart +Hill-Sachs	15.4 %	13
Bankart +RCT	10.7%	9
Hill-Sachs +RCT	4.7%	4
Without Lesion	38.9%	32
Total	100%	84

DISCUSSION

Traumatic shoulder dislocations are large joint dislocations that are frequently applied to the emergency department, and the most common type is anterior shoulder dislocation (6). Bone, soft tissue, and neurological lesions accompany the shoulder after traumatic anterior shoulder dislocations. Negative effects on shoulder functions could be prevented by early diagnosis and treatment of these lesions.

When the patient's demographic data were evaluated, traumatic anterior dislocations were mostly seen in young men and on the dominant side. When the literature is examined, similar results are seen in many studies (9,10). Most of our cases were reduced under sedation in the emergency room. Patients who did not accept sedation and patients who could not be reduced despite the reduction maneuvers were reduced under general anesthesia in the operating room. All dislocations were reduced as closed.

In our study, lesions associated with shoulder dislocations were seen as isolated rotator cuff tear, tuberculum major fracture, and axillary nerve injury. The most common isolated lesion was rotator cuff tear, which was observed in 10.7% of the patients. Axillary nerve injury was 4.7%, and tuberculum major fracture was 7.1%. Robinson et al. (5) found isolated rotator cuff tear in 10.1% of the patients, isolated axillary nerve injury in 5.7%, and isolated major tubercle fracture in 15.6% in their study on 3633 patients. In a survey by Carrazzone et al. (11), isolated rotator cuff tear was detected at a rate of 1.8%. In another study by Robinson et al. (12), rotator cuff tear was not detected in isolation but in combination with Bankart lesion. The incidence and rate of lesions associated with shoulder dislocation continue to be discussed in the literature. One of the most important reasons for this difference is attributed to the difference in the shape and rates of lesions in young and older people. While Bankart lesion associated with shoulder dislocation is seen in young people, rotator cuff tear and tuberculum major fracture are more common in older ages (13,14). The type of trauma is also thought to be effective on the type of associated lesions. At the same time, neurological deficits are more common in low-energy traumas and the female gender (5,15). In our study, age and gender grouping could not be made due to the low number of patients. Therefore, the type and ratio of the lesions associated with age or gender could not be determined, and the total patient population was evaluated. We think more precise results would be obtained, especially regarding the type and rate of lesions associated with prospective and large series studies.

Our study found that lesions associated with shoulder dislocation were mainly combined. Axillary nerve injury and major tubercle fractures coexisted in 3.5%, while axillary nerve injury and rotator cuff tear coexisted in 4.7%. The most prevalent combined lesions were the Bankart and Hill-Sachs lesions, with a rate of 15.4%. The coexistence of Bankart and rotator cuff tears was observed at a rate of 10.7%. No isolated Bankart or Hill-Sachs lesion was observed in our cases. Considering the studies, the association of Bankart and Hill-Sachs lesions is common (3,16,17). In their study, Widjaja et al. (3) showed a significant correlation between the incidence of Bankart and Hill-Sachs lesions and that the incidence of one lesion increased the incidence of the other 2.67 times.

As seen in the studies, lesions with anterior shoulder dislocation are seen as isolated or combined. These lesions are diagnosed by careful physical examination and radiological evaluation, especially during the first admission and follow-up. Radiography may reveal injuries with osseous Bankart and Hill-Sachs lesions, but MRI is necessary, especially for soft tissue components (18). Especially in diagnosing a rotator cuff tear, Bankart lesion, and Hill-Sachs lesion, which are involved in shoulder instability, MRI is highly diagnostic, and it is considered an advantage that it shows the lesion in detail and does not emit radiation (19,20). The size of the Hill-Sachs lesion is adequate on recurrent shoulder dislocations. Although the presence of a Hill-Sachs lesion is detected on radiographs, the lesion size can best be determined by MRI images. The treatment of rotator cuff tear, Bankart, and Hill-Sachs lesions is treated surgically or conservatively according to the lesion's size, the lesion's localization of the lesion and the condition of the patient. The clinical results of both treatments are frequently discussed in the literature and have advantages and disadvantages (21,22). Especially in treatment planning, MRI is evaluated, and the decision is made. Gumina et al. (23) recommended MRI in all patients for unexplained pain after shoulder trauma. In patients with axillary nerve injury, most of it heals spontaneously. Our study observed complete recovery in nerve injuries in the first six months to a year. All of the associated lesions in our study were detected in MRI images taken after dislocation, and their treatment and follow-up were performed.

Our study has some limitations, and most importantly, the patients could not be subgrouped according to age and gender due to the low number of cases. Secondly, the results of the treatments applied to the associated lesions could not be evaluated by any scoring.

CONCLUSION

Isolated or combined lesions accompanying traumatic anterior shoulder dislocations are common and cause shoulder instability when treatment is not performed. It can be detected by careful and comprehensive clinical examination and MRI after a dislocation to diagnose associated lesions. We recommend the identification of lesions by MRI when suspected of associated lesions after shoulder dislocation.

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Author Contributions: NG, MS: Project design, Patient applications, conceptualization, methodology, data collection, data analysis, writing manuscript and editing

Ethical approval: All procedures performed in studies involving human participants were in accordance with the institutional and/or national research committee's ethical standards and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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