

Demographic and Clinical Analysis of Shoulder Dislocations in the Emergency Department

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Abstract

Objective: The shoulder joint is the most frequently dislocated joint in the human body due to its wide range of motion, accounting for approximately 50% of all joint dislocations. This study was designed to retrospectively evaluate the demographic characteristics, etiological factors, treatment methods, surgical outcomes, and recurrence rates in patients with shoulder dislocation.

Materials and Methods: Between January 2008 and June 2014, 740 patients (1,063 presentations) who presented to the emergency department with shoulder dislocation were retrospectively reviewed. In addition to data obtained from the automation system, supplementary information—including dominant hand, cause of dislocation, post-reduction recurrence, and surgical intervention—was collected via telephone from 248 reachable patients. The data were analyzed in terms of demographic characteristics, dislocation type, reduction method, and complications.

Results: The mean patient age was 37.7 ± 19.2 years, with 74.3% being male. Dislocations occurred most frequently in the third decade of life (30.6%), in the dominant arm (64.5%), and in the right shoulder (58.1%). Falls were identified as the primary etiology in 69.8% of cases. Anterior dislocation was detected in 93.1% of cases, and 91.5% were successfully reduced in the emergency department without requiring general anesthesia. While the overall post-reduction recurrence rate was 53.2%, this rate decreased to 15.2% in surgically treated patients. Males were observed to have a significantly higher risk of recurrence.

Conclusion: Shoulder dislocations occur more frequently in young males, predominantly in the dominant arm and as anterior-type dislocations. Although surgical treatment significantly reduces recurrence rates, only a small proportion of patients opt for surgical intervention. These findings highlight the need for more active consideration of surgical options in high-risk patients with recurrent dislocations.

Keywords: Emergency room, Shoulder dislocation, Shoulder reduction

Introduction

Shoulder instability is a prevalent and complex orthopedic condition characterized by abnormal mobility of the humeral head within the glenohumeral joint. This condition manifests with pain, muscle weakness, and recurrent dislocations, occurring particularly frequently among young active individuals, athletes, and those who engage in repetitive overhead activities (1). Traumatic causes account for approximately 95% of shoulder dislocations, typically resulting from falls, impacts, or sudden movements (2). In young patients, especially those under 20 years of age, recurrence rates following initial dislocation

may exceed 90%, underscoring the critical importance of early and effective treatment (2, 3). Chronic instability can lead to serious long-term complications including osteoarthritis, joint stiffness, and functional limitations (4). From an economic perspective, the management of shoulder instability creates a multibillion-dollar burden due to medical interventions, rehabilitation, and lost productivity (5). Therefore, accurate diagnosis and treatment of shoulder instability are of paramount importance at both individual and societal levels (6). The history of shoulder instability traces back to the earliest medical records. The Edwin Smith Papyrus (circa 3000 BCE) contains information about the treatment of shoulder dis-

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locations (7). Hippocrates (460 BCE) developed various reduction techniques using hands, heels, and wooden implements, and recommended cauterization to prevent recurrent dislocations (8). These methods remained in widespread use until the 19th century. During the 20th century, open surgical techniques such as the Putti-Platt procedure were developed, though these methods often restricted joint range of motion and increased osteoarthritis risk (4). The advent of arthroscopic techniques in the late 20th century enabled less invasive and more successful treatments, with arthroscopic Bankart repair now considered the gold standard for recurrent anterior instability (9). The shoulder complex consists of the glenohumeral, acromioclavicular, sternoclavicular, and scapulothoracic joints. The glenohumeral joint is the most mobile joint in the human body and also the most frequently dislocated (10). The stability of this joint is maintained by static and dynamic stabilizers. Static stabilizers include the glenoid labrum, joint capsule, and ligaments; the labrum increases the depth of the glenoid cavity by up to 50% (11). Dynamic stabilizers comprise the rotator cuff muscles (supraspinatus, infraspinatus, teres minor, subscapularis), biceps tendon, and periscapular muscles (12). The deltoid muscle provides power for joint movement and controls scapular position (13). The relatively small size of the glenoid cavity compared to the humeral head predisposes the joint to instability (10). Two main clinical types are recognized: TUBS (Traumatic, Unidirectional, Bankart lesion, requiring Surgery) and AMB-RII (Atraumatic, Multidirectional, Bilateral, Rehabilitation/Inferior capsular shift) (14). Diagnosis is established through detailed patient history, physical examination, and imaging studies. Physical examination includes specialized tests such as the Sulcus Sign, Load and Shift Test, Apprehension Test, and Jobe Relocation Test (15). Imaging modalities include plain radiographs, CT, MRI, and MR arthrography; these techniques are critical for identifying associated injuries such as Bankart or Hill-Sachs lesions (11). The management of shoulder instability depends on the type and severity of instability, as well as the patient's age and activity level. For initial dislocations, particularly in elderly patients, conservative treatment is preferred (16). This typically involves 3 weeks of immobilization followed by rehabilitation exercises (16). However, surgical intervention is often necessary in young patients due to their high risk of recurrence (2, 3). The most common surgical procedure is arthroscopic Bankart repair, in which the torn labrum is reattached to the glenoid rim, with success rates exceeding 90% (17). The Latarjet procedure may be performed in patients with significant bone loss (3). Thermal capsulorrhaphy was previously used for multidirectional instability but

has fallen out of favor due to high failure rates (18). Post-operative rehabilitation is crucial for restoring joint range of motion, strength, and stability, and generally includes periods of immobilization followed by passive and active exercises along with strengthening protocols (19). This study aims to examine the demographic and clinical characteristics of patients with shoulder instability, their rates of emergency department visits, and post-treatment recurrence rates. By analyzing data from patients treated at our institution over the past five years, we will identify risk factors for recurrence and evaluate the effectiveness of current treatment protocols (20). Additionally, we will investigate the role of advanced imaging techniques in identifying associated lesions and guiding surgical decision-making (58, 64). The findings of this study will contribute to the existing body of knowledge on shoulder instability management and aid in the development of future clinical guidelines (21). Due to its high prevalence and recurrence rates, shoulder instability remains an important research topic in orthopedics. This thesis seeks to improve understanding and management of this condition through examination of patient demographics, clinical characteristics, and treatment outcomes (5). Early diagnosis, appropriate treatment, and effective rehabilitation are critically important for optimizing patient outcomes (22).

Materials and Methods

This study was conducted at Bağcılar Training and Research Hospital Emergency Department after obtaining ethics committee approval. The study was designed retrospectively. Patients diagnosed with shoulder dislocation in the emergency department between February 2009 and June 2014 were included in the study. Patient records were retrieved from the hospital information system using ICD codes for shoulder dislocation, and through contact information obtained, patients were reached by phone to collect data on age, sex, side of dislocation, location where reduction was performed, dominant arm, presence of recurrent dislocations, post-reduction surgical intervention, causative event, associated pathologies, and post-reduction complications. Among the causative events, assault and sports injuries were classified as direct trauma. Additionally, classifications included traffic accidents, falls, and non-traumatic forced joint movements. All patients were contacted by phone using the contact information available in hospital records. Telephone contact was established with 248 patients, who were questioned about whether they underwent surgery at our hospital or another center following the procedure, whether recurrent dislocation occurred, and whether any complications developed.

Table 1. Age distribution by decades of shoulder dislocations in reachable patients

	Number of patients	Percentage (%)	Number of recurrences	Recurrence rate (%)
0-9 Age	1	0.4	1	0.8
10-19 Age	38	15.3	24	18.2
20-29 Age	69	27.8	50	37.9
30-39 Age	45	18.1	25	18.9
40-49 Age	29	11.7	16	12.1
50-59 Age	22	8.9	6	4.5
60-69 Age	21	8.5	6	4.5
70-79 Age	17	6.9	3	2.3
80-89 Age	6	2.4	1	0.8

Data were analyzed using SPSS 20.0 for Windows software package. Continuous data were expressed as mean and standard deviation, while categorical data were presented as percentages and numbers. Normal distribution of continuous variables was assessed using histograms and the Kolmogorov-Smirnov test. For normally distributed data, the Student's t-test was used to compare means, while the Mann-Whitney U test was used for non-normally distributed data. Differences between categorical variables were evaluated using the Chi-square test. A p-value <0.05 was considered statistically significant.

Table 2. Characteristics of Shoulder Dislocations in Reachable Patients

	Number of Cases	Percentage (%)
Cause of Dislocation		
Falls	173	69.8
Motor vehicle accidents	18	7.3
Direct trauma	25	10.1
Non-traumatic forced joint motion	32	12.9
Side of Lesion		
Right	144	58.1
Left	95	38.3
Bilateral	9	3.6
Dislocation Type		
Anterior	231	93.1
Posterior	12	4.8
Inferior	5	2.0
Dominant Side Involvement?		
Dominant	156	62.9
Non-Dominant	92	37.1
Number of dislocation episodes		
1	121	48.8
2	25	10.1
>2	102	41.1

Results

The patients' mean age was 37.7 ± 19.2 years, with 545 males (74.3%) and 189 females (25.7%). The mean age of female patients was 55.3 ± 19.9 years, while the mean age of male patients was 31.6 ± 14.6 years. The mean age of female patients was significantly higher than that of male patients ($p < 0.001$).

Shoulder dislocations were most frequently observed in the third decade of life. Similarly, the highest recurrence rates also occurred in this decade. A marked decline in both incidence and recurrence rates was observed beyond the sixth decade.

Table 2 presents the characteristics of shoulder dislocations in reachable patients. Among these patients, falls were the most common cause of dislocation, occurring in 173 cases (69.8%). Dislocations were most frequently observed in the right arm (58.1%), and in 62.9% of patients, the dislocation occurred in their dominant arm. The anterior direction was the most common dislocation type (93.1%).

Table 3. Reduction-Related Data in Reachable Patients with Shoulder Dislocations

	Number of Cases	Percentage (%)
Location of reduction		
Emergency Department	227	91.5
Operating Room	21	8.5
Recurrence status		
Recurrence present	132	53.2
No recurrence	116	46.8
Post-Reduction Surgery		
Surgical intervention performed	33	13.3
No surgical intervention	215	86.7
Postoperative Recurrence Rate		
Recurrence occurred	5	15.2
No recurrence	28	84.8

Table 4. Distribution of Shoulder Dislocation Types by Reduction Location in Accessible Patients

	Emergency Department	Operating Room
Anterior	211	20
Posterior	11	1
Inferior	5	0

Among the accessible patient cohort, 227 shoulder dislocations (91.5%) were successfully reduced in the emergency department, while 21 cases (8.5%) required reduction in the operating room. As detailed in Table 4, the distribution by dislocation type revealed that all inferior dislocations were managed in the emergency setting, whereas only one posterior dislocation necessitated operating room intervention. Statistical analysis demonstrated no significant association between reduction location and dislocation type ($p=0.573$).

Reachable patients were asked whether their shoulder dislocation recurred after reduction; 132 patients (53.2%) reported recurrence, while 116 (46.8%) reported no recurrence. It was observed that the likelihood of redislocation is high after experiencing a shoulder dislocation once. Among reachable patients, 13.3% underwent surgery after reduction. Recurrent shoulder dislocation occurred in 5 (15.2%) of the surgically treated patients. The recurrence rate was lower in those who had surgery. Additionally, postoperative recurrence was identified in 4 patients under 40 years of age compared to only 1 patient over 40. Fourteen patients (5.6%) had a proximal fracture accompanying their shoulder dislocation. In 7 of these patients (50%), the fractured bone was the humerus.

Recurrent shoulder dislocation was present in 31.0% of female patients compared to 62.1% of males, demonstrating significantly higher recurrence rates in male patients ($p<0.001$).

Discussion

Shoulder dislocation is a medical problem as ancient as our historical records of medicine. It was described during Ancient Egyptian and Hippocratic eras, with treatment approaches emerging concurrently with medical history (8). The shoulder joint is the most mobile joint in the human body and is at higher risk of injury compared to other joints (23). The humeral head's articular surface is four times larger than the glenoid fossa's articular surface, and its "ball-and-socket" configuration - combined with the joint capsule's accommodating elasticity - provides extensive range of motion. Consequently, the shoulder joint is the most frequently dislocated joint in the body due to its high susceptibility to trauma. In patients with shoulder

Table 5. Distribution of Recurrent Shoulder Dislocation by Gender

Recurrence status	Sex		
	Female	Male	Total
No	49	67	116
Yes	22	110	132
Total	71	177	248

dislocation, fear of recurrence may lead to limitations in daily activities and occupational performance (22). The reported prevalence of shoulder dislocation in adults aged 18-70 is 1.7% (24). Shoulder dislocation occurs more frequently in males (21). Simonet et al. demonstrated higher incidence rates in males compared to females, particularly among young male patients (25). Michael et al. reported that 71.8% of dislocations occurred in males, with peak incidence between 20-29 years (47.8%) and 15-29 years (46.8%), identifying young age and male sex as risk factors (5). Taş et al. found 96.5% male predominance in 21-30 year-olds versus 66.7% females in 61-70 year-olds (20). Owens et al.'s US military study identified significant demographic risk factors: male sex, Caucasian race, military service, junior rank, and age <30 years (26). Hazmy et al. reported 77% male cases (27), while Yeap et al. documented 71.4% males and 28.6% females, with peak incidence in males aged 21-30 (28). Owens et al.'s 9-month study of 4,141 military academy students identified 117 new dislocations (86.3% male, 13.7% female) (29). Our study similarly showed 74.3% male and 25.7% female cases, with peak incidence at 20-29 years (27.8%), confirming young male sex as a risk factor. Michael et al. reported falls (58.8%) as the most common mechanism, with 47.7% occurring at home and 34.5% during sports/recreation; 48.3% of injuries occurred during sports/leisure activities (5). Taş et al. attributed 74.5% of dislocations to falls (20). Hazmy et al. reported etiologies as: falls (37%), traffic accidents (23%), sports injuries (17%), and pathological causes (13%) (27). Yeap et al. found falls (particularly in patients ≥ 40 years) and motor vehicle accidents (predominantly younger patients) as main causes (28). Te Slaa et al. reported 37% sports-related and 28% home-related injuries (30). Owens et al. documented 43.6% contact and 41% non-contact mechanisms (29). Our study similarly showed falls (69.8%) as the leading cause, followed by forced joint motion (12.9%), direct trauma (10.1%), and traffic accidents (7.3%). Hazmy et al. reported 68% right-sided dislocations (27), while our study found 58.1% right, 38.3% left, and 3.6% bilateral cases. Antero-inferior dislocations comprise 95% of cases, with 3% posterior and 2% other types (26). Taş et al. reported 93.4% anterior dislocations (20), Hazmy et al. 96.2%, Yeap et al. 98% anterior vs 2% posterior, and

Owens et al. 80.3% anterior, 10.3% posterior, and 9.4% multidirectional. Our findings were consistent: 93.1% anterior, 4.8% posterior, and 2% inferior dislocations.

Without proper medical/surgical treatment, shoulder dislocations carry high recurrence risk (31). Taş et al. reported 82.7% first-time vs 17.3% recurrent cases, noting younger age in recurrent cases (20). Hazmy et al. documented 73.6% first-time dislocations (27), Yeap et al. 69.2% vs 30.8% recurrent (28). Te Slaa et al. reported 26% 4-year recurrence probability, with 64% recurrences in patients <20 vs 6% in >40 year-olds, and no significant sport participation difference (31). Our study showed 53.2% overall recurrence (20% in <20 year-olds, 57.9% in <30 year-olds), with higher rates in males (62.1%) vs females (31.0%), confirming increased recurrence in younger patients.

Taş et al. performed 79.3% reductions in ED vs 20.7% under general anesthesia (20). Hazmy et al. achieved 92.4% successful closed reductions, with 7.6% requiring surgical reconstruction (27). Yeap et al. successfully reduced 97% without general anesthesia (28). Our study similarly showed 91.5% ED closed reductions vs 8.5% OR procedures under general anesthesia. Yeap et al. identified greater tuberosity fractures in 16.9% of patients (half aged 41-50) (28). Te Slaa et al. reported fracture-associated dislocations in 19% and nerve injuries in 21% (31). Our study found associated fractures in 5.6% of dislocations, 50% involving the humerus.

Conclusion

The study determined that shoulder dislocation occurs more frequently, particularly in young males, with falls being the most common cause, and predominantly manifests as anterior dislocation. Dislocations were observed more commonly in the dominant limb and right shoulder region. However, the vast majority of cases were successfully reduced in the emergency department without requiring general anesthesia and without complications. Male sex was identified as a risk factor for recurrent dislocation. The recurrence rate was found to be significantly lower in patients who underwent surgical treatment compared to those who did not. Nevertheless, despite this positive effect of surgery in reducing recurrence, it is noteworthy that the rates of surgical intervention after dislocation remain considerably low.

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