ÖZGÜN ARAŞTIRMA ORIGINAL RESEARCH

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APPROACH DIFFERENCES OF ORTHOPEDICS AND EMERGENCY MEDICINE PHYSICIANS IN CURRENT TREATMENT PRACTICES OF ACUTE TRAUMATIC FIRST TIME ANTERIOR SHOULDER DISLOCATION

AKUT TRAVMATİK İLK KEZ ÖNE OMUZ ÇIKIĞININ GÜNCEL TEDAVİ UYGULAMALARINDA ORTOPEDİ VE ACİL TIP UZMANLARININ YAKLAŞIM FARKLILIKLARI

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Öz

Amaç

Anterior glenohumeral eklem çıkıklarının yerine oturtulmasına (redüksiyonuna) yönelik çok sayıda teknik tarif edilmiştir. Bununla birlikte, glenohumeral eklem çıkığı redüksiyonu için en iyi teknik konusunda fikir birliği yoktur. Bu çalışma, akut travmatik ilk kez öne (anterior) omuz çıkığının tedavisinde acil uzmanları ve ortopedi cerrahlarının yaklaşımlarını değerlendirmeyi amaçlamaktadır.

Gereç ve Yöntem

Bu kesitsel çalışmada kullanılan veriler, Türkiye Ortopedi ve Travmatoloji Derneği posta grubu ve Türkiye Acil Tıp Hekimleri Derneği posta grubundan web tabanlı bir anket yoluyla elde edilmiştir. Veritabanına kayıtlı tüm ortopedi cerrahları ve acil tıp doktorları anketin amacına ilişkin bir bilgilendirme postası ve çevrimiçi anket formuna (Google Forms, Alphabet Inc., Mountain View, CA) bir bağlantı aldı. Anket, karşılık gelen cevap seçenekleriyle gösterilen 13 sorudan oluşuyordu. Türkiye'deki ortopedi cerrahları ve acil tıp hekimleri arasında akut travmatik ilk kez anterior omuz çıkığının tedavisine yönelik güncel uygulamalar değerlendirildi.

Bulgular

Bu ankete toplam 152 ortopedi cerrahı ve 151 acil uzmanı katılmıştır. Acil uzmanlarının omuz çıkığını redükte etmek için en sık kullandıkları manevralar Hipokrat tekniği (% 19,2) ve Cunningham tekniği (% 19,2) iken, ortopedi cerrahları Hipokrat tekniğini (% 23,7) ve Kocher tekniğini (% 29,6) tercih etti. Ortopedi cerrahlarının omuz eklemi çıkığını azaltmak için acil uzmanlarına göre daha çok Kocher ve Milch manev-

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ralarını tercih ettikleri bulundu (sırasıyla p <0,001 ve p = 0,005). Hem redüksiyon öncesi hem de redüksiyon sonrası prosedürler ortopedi cerrahları ve acil tıp doktorları arasında değişkenlik gösterdi.

Sonuç
Acil uzmanı ve ortopedi cerrahlarının omuz çıkığı olan bir hastayı bir ekip olarak tedavi etmeleri ve uzlaşı için ulusal bir kılavuz oluşturmaları daha uygun olacaktır.

Anahtar Kelimeler: Glenohumeral çıkık, Ortopedi cerrahı, Acil bölümü, Manevra, Anket

Abstract

Objective
Numerous techniques for the reduction of anterior glenohumeral joint dislocations have been described. However, there is no consensus on the best technique for reducing a dislocated glenohumeral joint. This study aimed to evaluate the approach of emergency specialists and orthopedic surgeons in the treatment of acute traumatic first-time anterior shoulder dislocation.

Material and Methods
Data used in this cross-sectional study were obtained through a web-based survey from the Turkish Orthopedics and Traumatology Association mail group and Emergency Medicine Physicians Association of Turkey mail group. All orthopedic surgeons and emergency medicine physicians who were registered in the database received an information mail regarding the aim of the questionnaire and a link to the online survey form (Google Forms, Alphabet Inc., Mountain View, CA). The survey consisted of 13 questions, which are shown with their corresponding answer options. The current practices regarding the management of acute traumatic first-time anterior shoulder dislocation among orthopedic surgeons and emergency medicine physicians in Turkey were evaluated.

Results
A total of 152 orthopedic surgeons and 151 emergency physicians participated in this survey. The most common maneuvers used by emergency physicians to reduce shoulder dislocations were the Hippocrates technique (19.2%) and Cunningham technique (19.2%), while orthopedic surgeons preferred the Hippocrates technique (23.7%) and Kocher technique (29.6%). It was found that orthopedic surgeons preferred Kocher and Milch maneuvers more for shoulder joint dislocation reduction compared to emergency physicians ($p < 0.001$ and $p = 0.005$, respectively). Both the pre- reduction and post-reduction procedures showed variability between orthopedic surgeons and emergency physicians.

Conclusion
It would be more appropriate for the emergency physician and orthopedic surgeons to treat a patient with shoulder dislocation together as a team and beneficial to establish a national guideline for consensus.

Keywords: Glenohumeral dislocation, Orthopedic surgeon, Emergency department, Maneuver, Survey

Introduction

The glenohumeral joint has a high range of motion with an increased risk of instability. Shoulder dislocation is the most common traumatic dislocation in the emergency department and constitutes approximately half of all joint dislocations (1,2). The shoulder is the most commonly dislocated joint in the body, most frequently the anterior type (95%–97%), followed by the posterior type (2%–4%) and inferior type (0.5%) (3).

Numerous techniques for the reduction of anterior glenohumeral joint dislocations have been described (1-4). However, there is no consensus on the best technique for reducing a dislocated glenohumeral joint (5). Furthermore, there is limited comparative literature on the relative strengths, weaknesses, and effectiveness of these techniques to guide the clinicians (5). The ideal reduction technique should be easily applicable, atraumatic, and pain-free. Moreover, it should require minimal assistance or medication and should not lead to additional injury to the glenohumeral joint or neurovascular structures during reduction (5,6).

Ideally, glenohumeral joint dislocations should be reduced under general anesthesia with adequate analgesia and muscle relaxation in the operating room because relaxation is a key factor for successful reduction (5-7). However, in current practice, most physicians attempt an initial reduction maneuver in the emergency room without sedation (7). In their review, Riebel and McCabel concluded that reduction of most glenohumeral joint dislocations could be performed in the emergency department using simple methods.

They reported that rarely more than one method was required; however, in 5%–10% of cases, reduction cannot be performed in the emergency department (8).

Furthermore, there is no consensus as to whether immobilization is helpful or, if so, what the optimal duration of immobilization is. Moreover, immobilization does not reduce the recurrence rate in patients with acute traumatic first-time anterior shoulder dislocation (ATFASD) and is performed mainly for comfort (9).

There are several questions that a clinician managing patients with ATFASD must answer. The two most important questions waiting to be answered are as follows: (i) What is the best maneuver of reduction for a dislocated glenohumeral joint? (ii) Is immobilization necessary after reduction? If necessary, what is the optimal duration of immobilization? We believe that there are differences in approach to shoulder dislocation between emergency specialists and orthopedic surgeons. Moreover, the applied reduction maneuvers and protocols before and after reduction differ considerably among physicians. This study hypothesizes that there is no consensus in the management of ATFASD between emergency and orthopedic specialists. To the best of our knowledge, no study has evaluated this relationship in literature. Therefore, this study aimed to evaluate the approach of emergency specialists and orthopedic surgeons to ATFASD.

Material And Methods

Data used in this cross-sectional study were obtained through a web-based survey from the Turkish Orthopedics and Traumatology Association mail group and Emergency Medicine Physicians Association of Turkey mail group. The study was conducted under the principles of the Declaration of Helsinki. Local ethical committee approved the study (University of Kyrenia, Date: 18.01.2021, Number: 2021/01-001). All orthopedic surgeons and emergency medicine physicians who were registered in the database received an information mail regarding the aim of the questionnaire and a link to the online survey form (Google Forms, Alphabet Inc., Mountain View, CA). The survey consisted of 13 questions, which are shown with their corresponding answer options in Appendix 1. The current practices regarding the management of ATFASD among orthopedic surgeons and emergency medicine physicians in Turkey were evaluated.

The demographic data of participants who are orthopedic surgeons and emergency medicine physicians, including (i) age; (ii) institution where the participants are specially trained; (iii) institution where the participants work; and (iv) years of experience, were assessed. Furthermore, the participants were asked various questions about the current practices regarding the management of ATFASD (Appendix 1).

Statistical Analyses

Statistical analyses were performed using SPSS (Statistical Package for the Social Sciences) software version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as means, medians, standard deviations, ranges, and percentages. Data were tested for normality using the Kolmogorov-Smirnov test. Pearson's chi-square test or Fisher's exact test were used to analyze categorical variables as appropriate. The Mann–Whitney U test was used to analyze continuous variables. A P-value < 0.05 was considered significant.

Results

A total of 152 orthopedic surgeons and 151 emergency specialists participated in this survey. The mean age of the study participants was 36.9 ± 8 years (range, 23–72). The demographic data of the 303 participants are presented in Table 1.

The comparison of commonly used reduction techniques is shown in Table 2. The reduction techniques showed a variability of 65.4% of the responders, who answered that they used four classic reposition techniques. The most commonly used maneuver was Hippocrates technique (21.5%), followed by the Kocher technique (18.5%), traction-countertraction maneuver (14.5%), and Cunningham technique (10.9%), respectively. The most common maneuvers used by emergency specialists to reduce shoulder dislocations were the Hippocrates technique (19.2%) and Cunningham technique (19.2%), while orthopedic surgeons preferred the Hippocrates technique (23.7%) and Kocher technique (29.6%). It was found that orthopedic surgeons preferred the Kocher and Milch maneuvers more for shoulder joint dislocation reduction compared to emergency specialists ($p < 0.001$ and $p = 0.005$, respectively). However, orthopedic surgeons preferred scapular manipulation, external rotation, and Stimson maneuvers less for shoulder joint dislocation reduction with regard to emergency specialists ($p < 0.001$, $p < 0.001$, and $p = 0.002$, respectively). For other reduction maneuvers, there was no statistically significant difference between emergency specialists and orthopedic surgeons ($p > 0.05$).

The comparison of the pre-reduction procedures is presented in Table 3. The pre- reduction procedures showed variability between orthopedic surgeons and emergency specialists. Although there was no significant difference between the use of radiography and ultrasonography before reduction (p = 0.498 and p = 0.248), it was observed that orthopedic surgeons more frequently used computed tomography before reduction than emergency specialists (p = 0.014). While the use of anesthesia, sedation, or analgesia in the pre-reduction period is more common among emergency specialists (p = 0.002), orthopedic surgeons more frequently used fentanyl and ketamine before shoulder joint dislocation reduction compared to emergency specialists (p < 0.001 and p < 0.001, respectively). There was no statistically significant difference in the use of other medications between emergency specialists and orthopedic surgeons (p > 0.05).

Table 1 Demographic data of the participants

	Emergency specialist	Orthopedic surgeon	P-value
Age (median)	34 ± 5.8 (34)	39.9 ± 8.9 (38)	**<0.001***
Training institution			
Research and training hospital	53 (35.1%)	64 (42.1%)	**<0.001****
University hospital	98 (64.9%)	88 (57.9%)	
Workplace			
Private hospital	3 (2%)	31 (20.4%)	0.256**
State hospital	49 (32.5%)	34 (22.4%)	
Research and training hospital	46 (30.5%)	40 (26.3%)	
University hospital	49 (32.5%)	41 (27%)	
Others	4 (2.6%)	6 (3.9%)	
Years of experience			
1–6 years	54 (35.8%)	36 (23.7%)	**<0.001****
6–10 years	54 (35.8%)	49 (32.2%)	
11–20 years	37 (24.5%)	39 (25.7%)	
≥20 years	5 (3.3%)	27 (17.8%)	

*Mann–Whitney U test; **Fisher's exact test. Bold values indicate significance.

Table 2 Comparison of commonly used reduction techniques

Reduction techniques	Emergency specialist	Orthopedic surgeon	Total	P-value
Hippocrates	29 (19.2%)	36 (23.7%)	65 (21.5%)	0.478
Kocher	11 (7.3%)	45 (29.6%)	56 (18.5%)	**<0.001**
Traction-countertraction	16 (10.6%)	28 (18.4%)	44 (14.5%)	0.088
Cunningham	29 (19.2%)	4 (2.6%)	33 (10.9%)	**<0.001**
External rotation	18 (11.9%)	6 (3.9%)	24 (7.9%)	**<0.001**
Milch	2 (1.3%)	13 (8.6%)	15 (5%)	0.005
Scapular manipulation	14 (9.3%)	1 (0.7%)	15 (5%)	**<0.001**
Stimson	9 (6%)	–	9 (3%)	**0.002**
Chair method	3 (2%)	3 (2%)	6 (2%)	0.938
Spaso	2 (1.3%)	–	2 (0.7%)	0.232
Eskimo	1 (0.7%)	–	1 (0.3%)	1.000

Bold values indicate significance.

Table 3 Comparison of the pre-reduction procedures

	Emergency specialist	Orthopedic surgeon	Total	P-value
Imaging method used of the pre-reduction				
Radiography	149 (98.7%)	151 (99.3%)	300 (99%)	0.498
CT	7 (4.6%)	19 (12.5%)	26 (8.6%)	**0.014**
USG	3 (2%)	–	3 (1%)	0.248
Do you use anesthesia, sedation, or analgesia in the pre-reduction period?				
Yes	123 (81.5%)	100 (65.8%)	223 (73.6%)	**0.002**
No	28 (18.5%)	52 (34.2%)	80 (26.4%)	
Types of drug				
Fentanyl	63 (41.7%)	20 (13.2%)	83 (27.4%)	**<0.001**
Propofol	36 (23.8%)	48 (31.6%)	84 (27.7%)	0.132
Dormicum	69 (45.7%)	63 (41.4%)	132(43.6%)	0.456
Ketamine	24 (15.9%)	2 (1.3%)	26 (8.6%)	**<0.001**
Diazem	–	3 (2%)	3 (1%)	0.255
Analgesic (NSAID/others)	2 (1.3%)	5 (3.3%)	7 (2.3%)	0.248

Bold values indicate significance.

Table 4 Comparison of the post-reduction procedures

	Emergency specialist	Orthopedic surgeon	Total	P-value
Immobilization of the post-reduction				
Yes	144 (95.4%)	152 (100%)	296 (97.7%)	**0.007**
No	7 (4.6%)	–	7 (2.3%)	
Duration of immobilization (weeks)				
1 week	55 (37.9%)	20 (13.2%)	75 (24.8%)	
2 weeks	48 (33.1%)	32 (21.1%)	80 (26.4%)	**<0.001**
3 weeks	27 (18.6%)	94 (61.8%)	121 (39.9%)	
4 weeks	15 (10.3%)	6 (3.9%)	21 (6.9%)	
Do you use imaging method (based on X-ray) after reduction?				
Yes	45 (29.8%)	77 (50.7%)	122 (40.3%)	**<0.001**
No	106 (70.2%)	75 (49.3%)	181 (59.7%)	
Timing of imaging method (based on X- ray)				
Immediately	34 (22.5%)	27 (17.8%)	61 (20.1%)	
1–2 weeks	4 (2.6%)	22 (14.5%)	26 (8.6%)	**<0.001**
2–4 weeks	4 (2.6%)	22 (14.5%)	26 (8.6%)	
4–6 weeks	3 (2%)	6 (3.9%)	9 (3%)	

Bold values indicate significance.

The comparison of the post-reduction procedures is presented in Table 4. The post- reduction procedures showed variability between orthopedic surgeons and emergency specialists. Arm sling use and immobilization after shoulder reduction are more commonly performed by orthopedic surgeons than by emergency specialists ($p = 0.007$ and $p < 0.001$, respectively). While the use of radiological imaging is more common among orthopedic surgeons ($p < 0.001$), this assessment was conducted in a longer period than the initial reduction ($p < 0.001$).

Discussion

In our study, the two groups showed difference in reduction and anesthesia technique choices, immobilization time and post-reduction imaging preferences. ATFASDs frequently present in emergency departments. It is often reduced in the emergency room by emergency specialists or orthopedic surgeons (10). Although ATFASD is a common traumatic condition, a comprehensive management protocol or standardized guidelines are still lacking (10). Our objective was to collect information regarding management of patients with ATFASD by emergency specialists and orthopedic surgeons in Turkey. In this context, this survey revealed variations between orthopedic surgeons and emergency specialists in the management of ATFASD, particularly concerning analgesia or sedative use, methods of reduction, and post-reduction approach. Evidently, a protocol for the management of ATFASD is not usually available for orthopedic surgeons and emergency specialists. Even so, the majority of respondents preferred systemic sedation before reduction, pre-reduction radiography, and frequent immobilization of the shoulder after reduction. Similarly, a wide variety of clinicians in the management of ATFASD was detected in surveys conducted in Germany, the UK, and the Netherlands (2,10,11).

Another difference between orthopedic surgeons and emergency specialists is the post-reduction procedure. The use of radiological assessment is more common in orthopedic surgeons. In the post-reduction period, patients are examined by orthopedic surgeons in the outpatient clinic, and orthopedic surgeons are probably more curious about complications that can be observed after reduction, such as Bony Bankart lesion, Hill-Sachs defect, rotator cuff tear, and greater tuberosity fracture. To evaluate these pathologies, orthopedic surgeons need radiologic imaging, such as magnetic resonance imaging, ultrasonography, and computed tomography. Moreover, post-procedural imaging is controversial, and the process is one of causes of the long stay in emergency departments (12). Considering that plain radiography is insufficient in such cases, due to time limit, emergency physicians might not prefer imaging. These could be the explanations for the differences.

The optimum duration and position of immobilization is still not well established (13). In patients aged <30 years, the re-dislocation rate was higher in cases of immobilization for 1 week compared to those for 3 weeks (14). Itoi et al. reported better outcomes with at least 3 weeks of immobilization in external rotation and abduction (15-17). In our study, when the immobilization time was evaluated, there was a significant difference between both physician groups. While emergency specialists mostly (37.9%) preferred immobilization for 1 week, most orthopedic surgeons (61.8%) preferred 3 weeks as immobilization period.

Previous studies demonstrated a higher reduction rate with a combination of sedation and analgesia but more complications with sedation alone (18,19). In our study, 73.6% of respondents preferred to use anesthesia, sedation, or analgesia before reduction. Our study concluded that the use of anesthesia, sedation, or analgesia in the pre-reduction period is less common among orthopedic surgeons. These differences can be due to the increased familiarity of emergency specialists to these methods.

Numerous techniques for reduction of the shoulder dislocation have been described. Traditional reduction techniques for glenohumeral dislocation are not easily applicable and frequently require sedation (20). Traditional techniques, such as the Hippocrates method and Kocher maneuver, are no longer recommended due to complications, such as axillary nerve injury and humerus shaft and neck fracture (21). In our study, we found that 40% of the respondents ($n = 121$) preferred these two methods. Orthopedic surgeons ($n = 81$) constituted two-thirds of these participants. Although nine emergency specialists who participated in the survey stated that they use the Stimson technique, none of the orthopedists reported that they prefer the Stimson technique. We think that the need for more time in the Stimson technique is effective on this result. We observed that emergency specialists mostly prefer more manipulative and new reduction techniques instead of techniques that require traction.

While it is observed that the intervention for shoulder dislocation in the emergency department is performed by emergency specialists in the light of more up-to-

date information, it is noted that the follow-up and treatment phase is better managed by orthopedists after the first intervention. While this is an expected result, it should be kept in mind that patients who have first responded and been discharged in the emergency department should be called for control examination by the orthopedist to avoid possible delay or deficiency in subsequent treatments.

Limitations

This study provides valuable information on many issues, but there are limitations due to the nature of the survey study. One of these is the uncertainty on whether there are any previous attempts performed by the emergency physicians before they consult the case to the orthopedic surgeons. Because patients with acute diseases present to the emergency departments first and are primarily managed by emergency physicians. Moreover, the participants were not asked if patients who undergo shoulder reduction have any concomitant fracture or any nerve and vessel damage. This may be another cause and explanation for the preference differences between the orthopedic surgeons and emergency physicians.

Conclusions

Considering these differences, we conclude that it would be more appropriate for the emergency specialists and orthopedic surgeons to treat a patient with shoulder dislocation together as a team and beneficial to establish a national guideline for consensus.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Ethical Approval

The study was conducted under the principles of the Declaration of Helsinki. Local ethical committee approved the study (University of Kyrenia, Date: 18.01.2021, Number: 2021/01-001).

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Appendix 1: *Survey of examination and treatment attitudes for first-time acute shoulder dislocation*

Traumatic shoulder dislocations are the most common dislocations encountered by emergency specialists and orthopedic surgeons. However, no consensus was provided regarding reduction maneuver, preference of sedation or immobilization. This survey will determine treatment patterns and identify approach differences. The objective of this survey is to investigate the most preferred reduction maneuvers and utilization of sedation, immobilization. We ask respondents to answer demographic questions, their preferred method of shoulder reduction technique, and their preferred immobilization status after reduction. The survey includes six mainly, totally 13 questions. Time expected to take the survey is 5-7 minutes, we appreciate your time spent filling the survey and value your experienced input.

1.Age:

2.Gender:

3.Your Institution: Training research hospital / university hospital / state hospital / others

4.Your working time in the profession:
1–5 years / 5–10 years / 10–20 years / >20 years
Please answer the questions below.

5.Please indicate the maneuver you use the most for shoulder dislocation reduction ……

6.Among the following maneuvers and techniques, please tick those used for shoulder dislocation reduction.
a) Milch maneuver
b) Janecki forward elevation technique
c) Eskimo technique
d) Boss-Holzach-Matter method
e) Bhan maneuver
f) Eachempati method
g) Hanging arm technique
h) Kocher maneuver
i) DePalma method
j) Hippocrates method
k) Spaso technique
l) Snowbird technique
m) Stimson maneuver
n) Legg maneuver
o) Doshi method
p) Chair method
q) Noordeen method
r) Arlt method
s) Aufmesser method
t) Surfer method
u) Matsen maneuver
v) Traction-countertraction maneuver
w) Slump method
x) Bokor-Billmann technique
y) Cunningham technique
z) Scapular manipulation technique
aa) FARES method
bb) Manes method
cc) Walz method

7.Do you use sedation or anesthesia for reduction of shoulder dislocation?
No / Yes ……

8.If your answer is yes, please specify the drug you prefer (the name of the medication)
……

9.Do you use a shoulder arm sling followed by reduction of the shoulder dislocation? No / Yes

10.If yes, please indicate the duration you follow the patient in arm sling ……

11.Do you prefer obtaining direct radiography views before reduction of shoulder dislocation?
Yes / No

12.After reduction of simple shoulder dislocation do you order:
a. Direct radiography: Yes / No
b. Any imaging method other
than direct radiography : Yes / No

13.If yes, how long after the reduction do you want to see the results……

Thank you for taking the time to answer the questions.