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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Determination of Emergency Physicians' Level of Knowledge about Shoulder Dislocation and Reduction

Acil Servis Hekimlerinin Omuz Dislokasyonu ve Redüksiyonu Hakkındaki Bilgi Düzeylerinin Belirlenmesi

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ABSTRACT

Aim: Since the shoulder joint is the most active, mobile, and dislocated joint in the body, shoulder dislocations are one of the common admitting diagnoses in emergency departments. Our study aimed to determine the level of knowledge of emergency physicians about recognizing shoulder dislocation, shoulder reduction, the technique of choice, and the treatment process of shoulder dislocation.

Material and Methods: This is a questionnaire-based study in which it was aimed to enroll emergency residents, specialists, and academicians working in emergency departments between September 2021 and December 2021. The participants were surveyed with a multiple-choice questionnaire to determine their demographic characteristics and educational state as well as to rate their theoretical and practical knowledge of shoulder dislocation and reduction. The statistical analyses were performed using IBM SPSS for Windows 16.0 software package, and p<0.05 was accepted as statistically significant.

Results: A total of 205 physicians participated in our study. The participants consisted of 133 residents, 66 specialists, and 6 academicians. According to the answers to the questionnaire, it was found that a majority of the participants had training on shoulder dislocation and reduction. It was found that those who received training, who had worked in emergency department for a longer time, and additionally, as compared with the residents, the specialists and academicians were more successful with and had a greater knowledge of shoulder dislocation and reduction.

Conclusion: It was found that, as compared with the specialists and academicians, the residents working in emergency department had an insufficient level of theoretical knowledge of shoulder dislocation and reduction. This fact about emergency department residents, who are likely to encounter shoulder dislocation, should be taken into consideration in their future training processes, and theoretical and practical trainings and courses should be planned.

Keywords: Shoulder dislocation, reduction, emergency department, level of knowledge

ÖZ

Amaç: Omuz eklemi vücudun en aktif, hareketli ve en fazla çıkıkla karşılaşılan eklemi olması nedeniyle omuz dislokasyonları, acil servislere sık başvuru tanılarından biridir. Çalışmamızda; acil servis hekimlerinin omuz dislokasyonunu tanıma, omuz redüksiyonu, hangi tekniği tercih ettikleri ve omuz dislokasyonunun tedavi süreci hakkındaki bilgi düzeylerinin belirlenmesi amaçlanmıştır.

Gereç ve Yöntemler: Çalışmamız Eylül 2021-Aralık 2021 tarihleri arasında acil servislerde çalışan asistan hekim, uzman hekim ve eğitim görevlilerinin katılması amaçlanan bir anket çalışmasıdır. Demografik özellikler, eğitim durumlarını sorgulayıcı ve omuz dislokasyonu ve redüksiyonu ile ilgili teorik ve pratik bilgilerini ölçen çoktan seçmeli anket yöneltilmiştir. İstatistiksel analizler IBM SPSS for Windows 16.0 programı ile gerçekleştirilmiştir ve istatistiksel anlamlılık için p <0,05 düzeyi kullanılmıştır.

Bulgular: Çalışmamıza toplam 205 hekim katıldı. Katılımcı dağılımı 133 asistan hekim, 66 uzman hekim ve 6 eğitim görevlisi şeklindedir. Verilen yanıtlara göre katılımcıların çoğunluğunun omuz dislokasyonu ve redüksiyonu ile ilgili eğitim aldıkları görülmüştür. Eğitim alanların, acil serviste çalışma süresi daha uzun olanların ayrıca uzman hekim ve eğitim görevlilerinin asistan hekimlere göre omuz dislokasyonu ve redüksiyonu konusunda daha başarılı ve bilgili oldukları görüldü.

Sonuç: Acil serviste çalışan asistan hekimlerin; uzman hekim ve eğitim görevlilerine kıyasla omuz dislokasyonu ve redüksiyonu hakkında teorik bilgi düzeylerinin yeterli düzeyde olmadığı tespit edildi. Omuz dislokasyonu ile karşılaşmaları muhtemel acil servis asistan hekimlerinin bu durumu, gelecek eğitim süreçlerinde göz önünde bulundurulmalı; teorik ve pratik eğitimler, kurslar planlanmalıdır.

Anahtar kelimeler: Omuz dislokasyonu, redüksiyon, acil servis, bilgi düzeyi

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Introduction

The most common form of joint dislocation in the human body is the glenohumeral joint dislocation, which is the most important cause of shoulder instability (1). The incidence of shoulder trauma is high because it is the most mobile, active, and dislocated joint and involved in the self-defense reflex of the body. The shoulder joint's stability is dependent on dynamic and static soft tissue structures such as the glenohumeral ligaments, labrum and rotator cuff (2). Shoulder dislocations constitute approximately 45% of all joint dislocations and 85% of shoulder dislocations are the anterior glenohumeral dislocations (3). When it comes to prognosis, the main factor affecting treatment success is the development of a recurrent dislocation after reduction. Considering that it affects a patient's quality of life, its negative effects on sport activities and its painful nature, glenohumeral joint dislocation is a condition that requires a definitive and urgent treatment (4).

Shoulder dislocation is one of the common causes of emergency department admissions and emergency physicians are usually the first to encounter and manage the condition (5). It is also known that a consultation for reduction is mostly requested in emergency departments. However, there is a very limited body of scientific evidence about optimal shoulder dislocation reduction techniques and the use of medications during them. More than 50 shoulder dislocation reduction techniques have been described. This complicates the determination of 'the best" technique or approach for each dislocation encountered (4,6,7).

Therefore, we designed a questionnaire study to determine the level of knowledge of academicians, specialists and residents working in emergency department of shoulder dislocation and reduction, how they recognize shoulder dislocation and which methods they prefer and their level of knowledge in the treatment process. Our aim was to determine the level of knowledge of emergency department physicians of shoulder reduction, so as to reveal the necessity of training and work plans for this condition to prevent unnecessary consultations and to speed up the workflow of the emergency department.

Material and Methods

After its approval by Ankara City Hospital No 1 Clinical Research Ethics Committee Directorate on 23/06/2021 with the approval number E1-21-1892, this study was applied to residents, specialists, and academicians working in emergency departments. The questions to determine the demographic characteristics, educational level and the level of knowledge of the participants were designed as a questionnaire form using Google Questionnaires based on Baden et al.'s survey on Dutch emergency medicine physicians and Chong et al.'s survey among trauma clinicians in the UK (6,8), which was then delivered in digital medium.

The inclusion criteria were determined as working an emergency resident or specialist; the exclusion criteria included the failure to answer all of the questions, failure to include an e-mail address on the questionnaire form, and giving multiple answers in a single answer field.

Statistical analysis

Statistical analyses were performed using IBM SPSS for Windows 16.0 software package. First of all, categorical demographic data were presented as the number of cases and percentage and continuous numerical demographic data as mean, standard deviation, median, minimum, maximum, and 25-75% quartiles. The frequency distribution of ordinal variables were analyzed using Pearson Chi-Square and Fisher's Exact tests. The distribution analysis of continuous variables were performed with Shapiro-Wilk test. Mann Whitney-U test was used for the comparison of the median values of non-normally distributed variables between two groups and Kruskal-Wallis test for the comparison of the median values between more than two groups. The data were expressed as median, IQR, minimum, and maximum values. Statistical significance was set at $p < 0.05$.

Results

Of a total of 205 physicians who participated in our study, 63.4% were male (n=130) and 35.6% were female (n=75); 64.9% were residents (n=133), 32.2% were specialists (n=66), and 2.9% were academicians (n=6). The mean age of the participants was 32 years with a standard deviation of 6 years; with the youngest participant being 24 years old and the oldest one 56 years old. The median age was found to be 30 years with an interquartile range of 28-34 years. An analysis of the age groups and emergency department experience of the participants showed that the number of participants aged 30 years or above (n=114, 55.6%) and those with an emergency department experience of 1-5 years (n=93, 45.4%) was higher than those of other participants.

The question whether the participants previously received training on shoulder dislocation and reduction was answered as "yes" by 136 participants; the question whether the participants performed shoulder reduction in the last 1 year was answered as "yes" by 193 participants; the question about the success of shoulder reduction that the participants attempted in the last 1 year was answered as "successful" by 43 participants, "mostly successful " by 95 participants, "mostly unsuccessful " by 36 participants, and "unsuccessful " by 19 participants; and the question about the frequency of consultation requests from the department of orthopedics for shoulder dislocations the participants encounter was answered as "always" by 55 participants, "mostly " by 55 participants, "rarely" by 81 participants, and "never" by 13 participants. (Table 1).

When the distribution of the participants who performed reduction in the last 1 year was analyzed by academic title, it was found that all of the academicians and emergency specialists performed reductions whereas 9% of the residents never performed it (p=0.021). The analysis of the distribution of reduction success by academic title revealed that the most successful group was the academicians; with 66.7% of the academicians being mostly successful and 33.3% being successful. Of the specialists, 65.2% answered that they are mostly successful, 30.3% successful, and 4.5%

		n (%)
Have you ever had any training on shoulder dislocation and reduction?	No	69 (33.7)
	Yes	136 (66.3)
Have you had a shoulder reduction in the last 1 year?	No	12 (5.9)
	Yes	193 (94.1)
How would you describe the success of shoulder reductions for dilocations you encountered and attempted to reduce in the last 1 year?	Unsuccessful	19 (9.8)
	Mostly unsuccessful	36 (18.7)
	Mostly successful	95 (49.2)
	Successful	43 (22.3)
How would you describe your state of requesting orthopedics consultation for shoulder dislocations you encountered in the last 1 year?	Never	13 (6.4)
	Rarely	81 (39.7)
	Mostly	55 (27)
	Always	55 (27)

Table 1. The participants' training state for shoulder dislocation, The participants' training state for shoulder dislocation, whether they performed reduction in the last 1 year, reduction success, and state of consultation of shoulder dislocation with the department of orthopedics

mostly unsuccessful. The residents were the least successful group, with 17.4% answering that they are successful, 39.7%whether they performed reduction in the last 1 year, reduction success, and state of consultation of shoulder dislocation with the department of orthopedics mostly successful, 27.3% mostly unsuccessful, and 15.7% unsuccessful (p<0.001). Although the analysis of the consultation requests from the department of orthopedics by academic title showed that the academicians requested less consultation than the specialists and residents, 27% of all participants answered that they always requested consultation; 27% of them mostly requested consultation; 39.7% rarely requested consultation; and 6.4% never requested consultation.

The question asking the participants which reduction technique they primarily preferred for reduction of anterior shoulder dislocation was answered as the traction counter-traction technique by 81 participants (39.5%), and this technique was the most preferred one. The second most commonly preferred technique was external rotation stated by 61 (29.8%) participants, which was followed by the Cunningham technique stated by 55 (26.8%) participants (Table 2).

One hundred and fifty-nine (77.6%) participants used procedural sedation before shoulder reduction while 46 (22.4%) stated that they did not use procedural sedation. Two hundred and four participants (99.5%) preferred physical examination and plain radiogram in the diagnostic process while 1 participant (4.5%) stated that he/she preferred computerized tomography. No participant used ultrasonography in the diagnostic process. An analysis of the rates of requesting a control x-ray after shoulder reduction

		n	%
1(Traction Counter-traction)	No	124	60.5%
	Yes	81	39.5%
2(Scapular Manipulation)	No	169	82.4%
	Yes	36	17.6%
3(Kocher)	No	183	89.3%
	Yes	22	10.7%
4(External Rotation)	No	144	70.2%
	Yes	61	29.8%
5(Stimson)	No	192	93.7%
	Yes	13	6.3%
6(FARES)	No	203	99.0%
	Yes	2	1.0%
7(Milch)	No	202	98.5%
	Yes	3	1.5%
8(Spasso)	No	204	99.5%
	Yes	1	0,5%
9(BOB (Best-of-Bob))	No	204	99,5%
	Yes	1	0,5%
10(Cunningham)	No	150	73,2%
	Yes	55	26,8%
11(Other...)	No	185	90,2%
	Yes	20	9.8%

Table 2. Distribution of which reduction technique or techniques the participants primarily preferred for anterior shoulder dislocation

by academic title showed that all of the academicians and specialists requested a control x-ray; while 2 (1.5%) of the residents did not request it while the rest of them (n=131, 98.5%) requested a control x-ray. All participants preferred the velpau bandage prepared in the emergency department for immobilization after reduction; in addition, there was no participant who did not recommend shoulder immobilization. Comparison of the participants 'previous training on shoulder dislocation and reduction with the success rates of shoulder dislocations they encountered and attempted to reduce in the last 1 year showed that the failure rates of those who did not have any training were higher (p<0.001) (Table 3).

Comparison of the participants 'previous training on shoulder dislocation and reduction with their rate of requesting consultation from the department of orthopedics for shoulder dislocations they encountered in the last 1 year showed that those who had no training had a higher rate of requesting consultation from the department of orthopedics (p<0.001) (Table 4).

			Unsuccessful	Successful	Total
Have you ever had any training on shoulder dislocation and reduction?	No	n(%)	31(52.5)	28(47.5)	59(100)
	Yes	n (%)	24(17.9)	110(82.1)	134(100)

Pearson Chi-Square test; p<0.001

Table 3. Comparison of the participants' previous training on shoulder dislocation and reduction with the success rates of shoulder dislocations they encountered and attempted to reduce in the last 1 year

			How would you describe your state of requesting a consultation from the deaprtment of orthopedics for shoulder dislocations you encountered in the last 1 year?				Total
			Never	Rarely	Mostly	Always	
Have you ever had any training on shoulder dislocation and reduction?	No	n(%)	2(2,9)	9(13,2)	21(30,9)	36(52,9)	68(100)
	Yes	n(%)	11(8,1)	72(52,9)	34(25)	19(14)	136(100)

Pearson Chi-Square test; p<0.001

Table 4. Comparison of the participants' previous training on shoulder dislocation and reduction with the their rate of requesting consultation from the department of orthopedics for shoulder dislocations they encountered in the last 1 year

Comparison of the participants 'previous training on shoulder dislocation and reduction with their rate of using procedural sedation before shoulder reduction showed that those who had no training used a lesser rate of procedural sedation (p=0.213) (Table 5).

Discussion

Since the specialty of emergency medicine in our country is a relatively young branch and thus emergency medicine specialists are young and since a greater number of residents participated in our study, the median age of the study participants was 32 years, with the oldest participant being 56 years old. Considering that 64.9% of the study participants were residents and the rest were specialists and academicians, the average working duration was calculated as 5 years.

The participants were asked if they have previously had any training on shoulder dislocation and reduction and 66.3% of them answered this question as "yes". When the trained participants were asked from which source they received training, those who received in-clinic training ranked first with 52 participants (25.4%). The percentage of those who received training by attending a trauma course or by their own efforts was lower. It is thought that this is due to the fact that the participant group consists of residents, specialists and academicians and that these groups received such training during their residency program.

When the distribution of the shoulder reduction success of the participants in the last 1 year and the rate of requesting consultation from the department of orthopedics were analyzed by academic title, it was found that the academicians were the most successful group and had the lowest consultation request rate (66.7%). When the shoulder reduction success of the participants in the last 1 year and the rate of requesting for orthopedic consultation were analyzed by emergency department experience, we found that those with more than 10 years of emergency department experience were more successful and requested less consultation than the other groups. This indicates that increased clinical experience and training increases the success rate. It can be hypothesized that physicians with less clinical experience seek consultation due to the fear of failure in reduction or causing complications. In a questionnaire study that was conducted by Baden et al. among emergency department staff, the question asking the most commonly preferred method for the reduction of Anterior Shoulder Dislocation was answered as the Traction Counter-traction technique (6). A study by T.D. Berends et al. reported that the most commonly preferred techniques for anterior shoulder dislocation were the Hippocrates

			Do you use procedural sedation before reducing shoulder dislocations?		
			No	Yes	Total
Have you ever had any training on shoulder dislocation and reduction?	No	n(%)	19(27,5)	50(72,5)	69(100)
	Yes	n(%)	27(19,9)	109(80,1)	136(100)
Pearson Chi-Square test; p=0.213					

Table 5. Comparison of the participants' previous training on shoulder dislocation and reduction with their rate of using procedural sedation before shoulder reduction

technique (17%), Kocher technique (14%), Stimson technique (12%), and Milch technique (5%) (9). In line with the literature data, our study also found that the most commonly preferred technique was the Traction Counter-traction technique which was preferred by 81 (39.5%) participants. Although the guidelines do not mention any superiority of the available techniques to one another, it is recommended that each practitioner use the method that is most suitable for him/her and that he/she is most familiar with. In a study by Ron L. te Slaa et al., it was reported that 83% of orthopedic surgeons in the Netherlands performed procedural sedation before shoulder reduction. Systemic sedation was performed most commonly as the procedural sedation and intraarticular analgesia to a lesser extent.(10) Hayashi et al. reported that 6 of 19 patients with failed shoulder reduction attempt in the emergency department received no intravenous analgesics; 10 received no intraarticular lidocaine; 4 received no peripheral nerve block; 4 received no sedatives; and 2 received no medication (4). While 159 (77.6%) of our participants administered procedural sedation before shoulder reduction, 46 (22.4%) of them stated that they did not use procedural sedation before shoulder reduction. One can think that reduction without sedation is performed less due to overcrowding and time constraints in the emergency department.

According to Michael Gottlieb et al., although radiograms are still routinely used for making the diagnosis of shoulder dislocation in the emergency department, bedside focused ultrasonography (FOCUS) has been introduced into clinical practice and become useful due to various reasons such as radiation exposure, difficulties in noticing some posterior dislocations, difficult and delayed patient transport to the x-ray room, and the need for repeat imaging (11). Almost all participants stated that they preferred physical examination and x-ray for making diagnosis, with no participant having opted for USG as a diagnostic tool. We believe that as the use of USG becomes common and emergency department overcrowding is overcome, evaluation with USG will become more common.

In a study by Michael Shuster et al., the rate of requesting a control x-ray was remarkably high among physicians (12). In a study by T. D. Berendes et al., the rate of requesting an x-ray before and after reduction were also considerably high (9). Roberts and Hedges explained this finding by relating it to the traditional teaching-based education in the specialties of orthopedics and emergency medicine (13). Among the physicians that participated in our study, the rate of requesting a control x-ray after shoulder reduction is 99%. It can be argued that traditional education-based education and malpractice concerns have a large share in such a high rate in our country. In a study by Ron L. te Slaa et all. orthopedists recommend immobilization after reduction (10). As for the duration of immobilization, Kiviluoto et al. showed that the rate of recurrent dislocation was higher in patients younger than 30 years than older patients, and that it was higher in patients younger than 30 years than those with an immobilization duration of 1 week (14). In our study, on the other hand, 160 participants (78%) stated that they recommend velpau bandage for immobilization after performing reduction in the emergency department while 45 participants (22%) stated that they recommend the purchase of readymade shoulder fixation velpau bandage. There was no participant who does not recommend immobilization. Literature data indicate that 3-week immobilization prevents recurrence.

Limitations

The limitations of our study include the failure to enroll equal and adequate number of participants in the groups, with the numbers of the academicians and specialists being less than that of residents, which reduced the power of some statistical data. No solution was found to prevent individuals from filling the questionnaire multiple times using different e-mails or fake accounts, but it was thought that the participating physicians would not attempt such fabrication because of their sociocultural level. In our study, only theoretical knowledge could be measured and a comparison was made accordingly. No measurement was made of how much theoretical knowledge is applied in practice. These points should be taken into consideration in future studies.

Conclusion

Glenohumeral joint dislocation is the most frequent joint dislocation in the body and the most common cause of shoulder instability.

Our study revealed that most physicians receive particularly in-clinic training on shoulder dislocation and reduction, and the reduction success of the emergency physicians who received training is higher than those who did not; furthermore, the reduction success rates of the academicians and specialists are higher than that of the residents. Emergency physicians with less clinical experience

consult the department of orthopedics for most shoulder dislocations they encounter.

Traction Counter-traction (Hippocrates) method is used more frequently among the available reduction techniques; sedation is mostly performed before reduction; physical examination and x-ray are the most frequently used tools for putting the diagnosis; most participants request control x-rays after reduction; all participants recommend immobilization after reduction; and Velpau bandage is applied for immobilization in the emergency room instead of using a readymade bandage.

When our study results and literature data were evaluated together, it was evident that emergency physicians need further and qualified training on shoulder dislocation and reduction, and their level of knowledge and skills in this condition should be increased.

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