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Anterior Shoulder Dislocations in Busy Emergency Departments

The External Rotation Without Sedation and Analgesia (ERWOSA) Method May Be the First Choice for Reduction

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Abstract

Shoulder joint is the most common joint requiring reduction by emergency physicians. Successful reduction is based on the overcoming of resistance of the shoulder muscles. Pain is the most important factor in resistance increase and sedation; analgesia and, in certain cases, intra-articular anesthesia are preferred for reduction. The external rotation (ER) method can provide successful reduction without causing an increase in muscle resistance if applied slowly and gently. The aim of this study was, therefore, to determine the usefulness of the ERWOSA method in the reduction of acute anterior shoulder dislocations (AASDs).

This was a retrospective descriptive study. The records of patients admitted to the emergency department with anterior shoulder dislocation between 2009 and 2011 were reviewed for demographic data, sedation, analgesia, and discharge times. Patients were then divided into ERWOSA (n=80) and external rotation and sedation-analgesia (ERASA, n=59) groups, with regard to the application of SA (sedation-analgesia). The study data were analyzed using SPSS version 22.0 software for Windows. Numerical data were presented as mean±standard deviation and categorical data as rates.

A total of 139 patients were included in the study. The patients' average age was 35±14 years, 108 (77.7%) were male. Successful reduction rates for 59 male and 21 female patients in the ERWOSA group were 83% and 66.7% (78.7% total success), respectively. Successful reduction rates for 49 male and 10 female patients in the ERASA group were 87.7% and 90% (88.1% total success), respectively.

The length of stay of the ERWOSA and ERASA groups in emergency services were found to be significantly different, with 55±17 and 118±23 minutes for each group, respectively. There were no complications.

The ER method can be used in reduction of anterior shoulder dislocations without sedation and analgesia, if applied slowly enough to overcome the resistance of shoulder muscles. The ERWOSA method causes both a significant decrease in the length of stay of patients in the emergency department results in negating the possibility of adverse drug effects. In busy emergency departments, male patients with anterior shoulder dislocation are particularly suitable candidates for ERWOSA.

INTRODUCTION

Shoulder dislocations account for 50% of all major joint dislocations.[1,2] Anterior dislocations account for as many as 95% of cases, so anterior displacement of the humeral head is consequently the most common dislocation seen by emergency physicians.[3] Different reduction techniques have been described in the literature, but no clear evidence exists supporting the superiority of any one of the many methods used to reduce anterior shoulder dislocations.[4] The main categories to reduce acute anterior shoulder dislocations (AASDs) are traction, leverage, and scapular manipulation.[5] Success rates vary between 70% and 98.2%, regardless of technique. Considerations in selection of a technique consequently also vary, but include ease of performance, effectiveness, as little resultant trauma and pain as possible, the requirement for medication, the number of assistants needed, and the duration of the procedure.[3]

The most well-known performed reduction techniques are scapular manipulation (success rates range from 80% to 98.2%),[6–9] the external rotation (ER) technique (success rates range from 80% to 90%),[10–12] and the Milch technique (success rates range from 86% to 100%).[13–16]

The selected technique for reduction will fail if spasm develops in the muscles around the shoulder. A moderate relaxation in this area will increase the success. The use of sedation-analgesia (SA) and intra-articular anesthesia is therefore frequent, as pain triggers such spasms.[2]

The ER technique reduces anterior glenohumeral dislocation by overcoming spasm of the internal rotators of the humerus, unwinding the joint capsule, and enabling the external rotators of the rotator cuff to pull the humerus posteriorly.[17,18] This method is safe, easy to both understand and teach, has no reported complications, and requires only 1 clinician, for these reasons the ER is the chosen method for our busy emergency department.

In the ER technique, the patient is in the supine position, with the arm adducted to the side of the chest. With the elbow at 90° flexion, the arm is slowly, externally rotated. The elbow is grasped with 1 hand to maintain the adducted position of the arm; with the other hand, the patient's wrist is held. Slowly, the patient is asked to allow their arm to fall to their side (externally rotate) as the clinician guides the hand. No longitudinal traction is applied.[4] A particular focus is the gentleness of the clinician's actions while performing the technique, whenever pain or spasm is felt, stopping the action to allow the muscles to relax. It is of paramount importance to perform the movement slowly to allow time for spasm and pain to resolve. To reiterate, whenever pain or spasm is felt, the movement is stopped and the muscles are allowed to relax. Reduction generally happens with the arm externally rotated to an angle between 70° and 110°.[19] Reduction is usually complete prior to reaching the coronal plane and is often not noticed either by the patient or by the physician.[3,20] In the same way, external reduction can be conducted in sitting position.

The aim of this study was to determine the usefulness of the external rotation method without

sedoanalgesia in the reduction of AASD, as well as its effects on hospital stay times at the emergency department.

STUDY DESIGN

Data for this retrospective study were collected in the Emergency Department of a Training and Research Hospital between 2009 and 2011. After obtaining approval from the local ethics committee, the records of patients admitted to the emergency department with anterior shoulder dislocation were reviewed for demographic data, sedation, and analgesia and discharge times. Standard practice was to obtain pre- and postreduction X-rays in order to confirm diagnosis, to exclude fractures, and to document successful reduction.

Patients who had initially undergone ER with pre- and postreduction X-rays were included in the study.

Among those excluded were patients who underwent another method rather than ER, patients with fractures, and patients who were under 18 years of age.

Patients were divided into external rotation without sedation and analgesia (ERWOSA, n=80) and external rotation and sedation-analgesia (ERASA, n=59) groups according to the application of SA. The study data were analyzed using SPSS version 22.0 software for Windows. Numerical data were presented as mean±standard deviation and categorical data as rates. The difference between discharge times of the groups analyzed using independent T test.

RESULTS

A total of 176 patients were admitted to the emergency room with anterior dislocation of the shoulder during the study period. Thirty seven patients were excluded from the study due to concomitant fracture, reduction methods different from ER, being under 18 years of age, and lack of data. Consequently, 139 patients to whom ER was first applied for shoulder dislocation reduction were included in the study (Fig. 1).

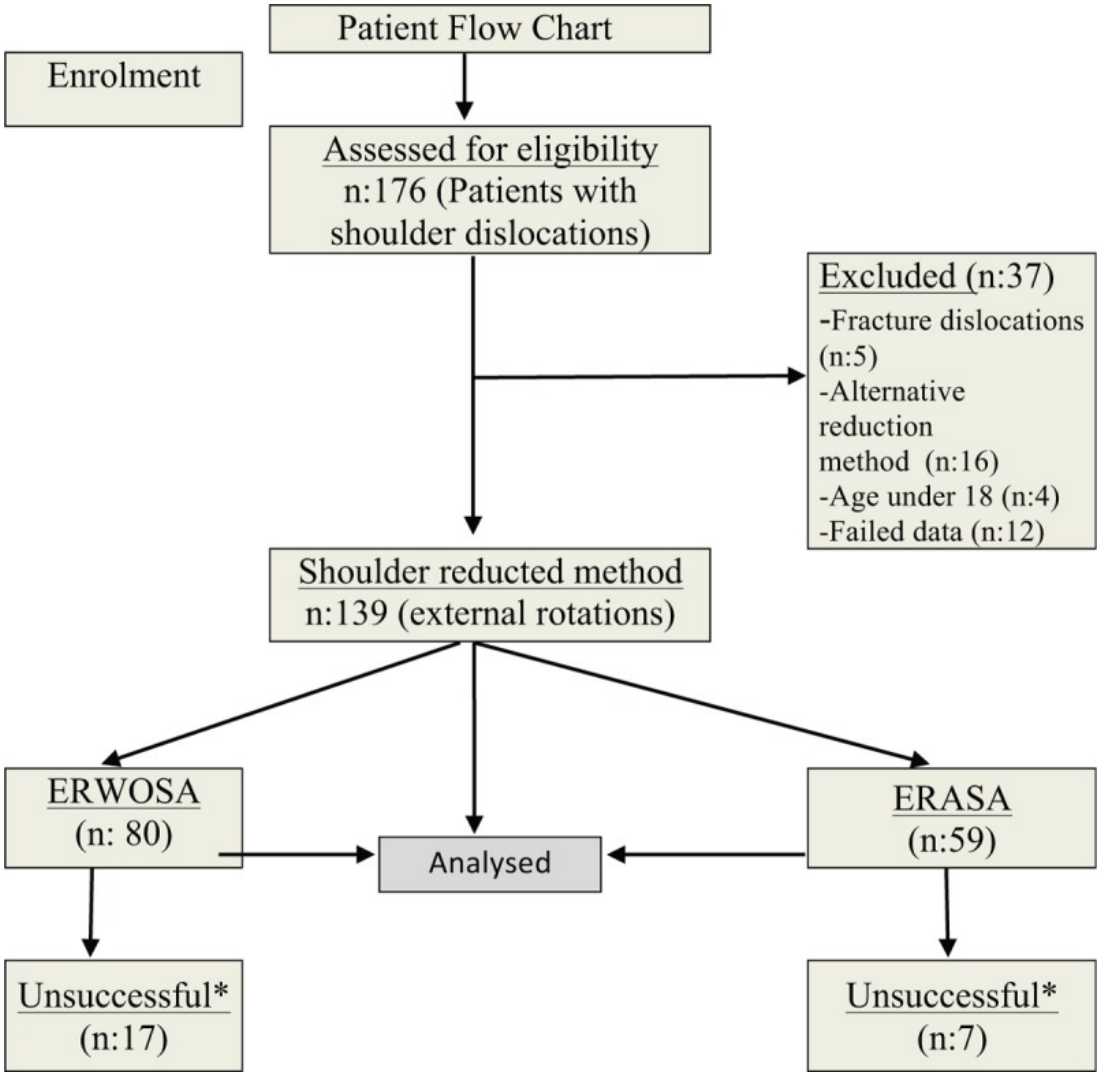

FIGURE 1

∗SA was performed to 17(22.3%) patients in ERWOSA group in whom the first reduction method failed and reduction was achieved in 15 patients, while orthopedic consultation was asked for the remaining 2 patients. Methods other than ER were performed to 7 (11.7%) patients in ERASA group in whom ER failed and reduction was achieved in 4 patients, while orthopedic consultation was asked for the remaining 3 patients. By this way, reduction was achieved in a total of 139 (100%) patients. ER=external rotation, ERASA=external rotation and sedation-analgesia, ERWOSA=external rotation without sedation and analgesia, SA=sedation-analgesia.

The patients' average age was 35±14 years (ranging between 18 and 83). A total of 108 (77.7%) patients were male, while 31 (22.3%) were female. The patients were divided into ERWOSA and ERASA groups according to the application of SA. The distribution of age, gender, and number of patients according to these groups is indicated in Table 1.

TABLE 1

Age, Gender, and Discharge Times for Successful Reductions

Ages and Discharge Times for Successful Reductions

	Mean Age, years	ERWOSA Discharge Time, minutes	Total Patients (n)	Mean Age, years	ERASA Discharge Time, minutes	Total Patients (n)
Male	31 ± 12	51 ± 14	59	37 ± 15	114 ± 20	49
Female	41 ± 9	68 ± 28	21	41 ± 22	135 ± 27	10
Total	34 ± 12	55 ± 17*	80†	38 ± 17	118 ± 23*	59‡

ERASA = external rotation and sedation-analgesia, ERWOSA = external rotation without sedation and analgesia.
* Independent T test; calculated $P < 0.05$ between the groups for discharge time.
† A total of 31 of the patients were with 2 or more dislocation history.
‡ A total of 21 of the patients were with 2 or more dislocations in their medical history.

The ERWOSA method was the initially performed reduction technique for 80 patients. The mean patient age was 34±12 years. Twenty one of these patients were female (22.3%). The mean patient age of the ERASA group was 38±17 years. Of the 59 patients, 10 were female (16%) (Table 1).

Forty nine (83.0%) of the 59 male patients and 14 (66.7%) of the 21 female patients with anteriorly dislocated shoulders were successfully managed in the ERWOSA group. The ERWOSA method was totally successful in 63 patients (78.7%) from both genders. Forty three (87.7%) of 49 male patients and 9 (90%) of 10 female patients were successfully managed by the ER method and the ER technique achieved reduction with a rate of 88.1% in the ERASA group. The most preferred medications for SA were phentanyl, midazolame, and propophol. Of 139 patients in the ERWOSA and ERASA groups, reduction was achieved with ER in a total of 115 (82.2%) patients (Table 2).

TABLE 2

ERWOSA and ERASA Successful Reductions Grouped According to Gender

ERWOSA/ERASA Success Rates

	ERWOSA Group		ERASA Group		ER (Both Groups)	
	Successful n, %	Unsuccessful n, %	Successful n, %	Unsuccessful n, %	Successful n, %	Unsuccessful n, %
Male	49 (% 83)	10 (% 17)	43 (% 87.7)	6 (% 12.3)	92 (% 85.2)	16 (% 14.8)
Female	14 (% 66.7)	7 (% 33.3)	9 (% 90)	1 (% 10)	23 (% 74)	8 (% 26)
Total	63 (% 78.7)	17 (% 22.3)	52 (% 88.1)	7 (% 11.9)	115 (% 82.7)	24 (% 17.3)

ER = external rotation, ERASA = external rotation and sedation-analgesia, ERWOSA = external rotation without sedation and analgesia.

SA was performed to 17 (22.3%) patients in ERWOSA group in whom the first reduction method failed and reduction was achieved in 15 patients, while orthopedic consultation was asked for the remaining 2 patients. Methods other than ER were performed to 7 (11.7%) patients in ERASA group in whom ER failed and reduction was achieved in 4 patients, while orthopedic consultation was asked for the remaining 3 patients. By this way, reduction was achieved in a total of 139 (100%) patients.

The hospital discharge times of the ERWOSA and ERASA groups were 55.01±17.01 and 118.14±23.05 minutes, respectively; patients in the ERWOSA group were found to have been discharged significantly faster (Table 2).

DISCUSSION

Although all reduction methods have its own advantages and disadvantages, no evidence exists supporting the superiority of any one of the many methods used to reduce anterior shoulder dislocations.[4] Emergency physicians should therefore be familiar with all methods. A safe method, performed consistently by any given physician, seems the more suitable approach for emergency departments. Success rates of some methods are listed in Table 3. Considerations in selection of a particular technique include ease of performance, effectiveness, as little resultant trauma and pain as possible, the requirement for medication, the number of assistants required, and the duration of the procedure.[3]

TABLE 3

Success Rates of the Well-Known AASD Reduction Methods as They Appear in Our Study

Methods	Success Rates, %	References
Scapular manipulation	80–100	6–9,20
External rotation	80–90	10–12
Milch technique	86–100	13–16
ERWOSA	78.7	Our Study
ERASA	88.1	Our Study

AASD = acute anterior shoulder dislocation, ERASA = external rotation and sedation-analgesia, ERWOSA = external rotation without sedation and analgesia.

The most important factor in shoulder reduction is the relaxation of the muscles around the shoulder joint. As this situation can be medically achieved with patient's analgesia, sedation, or intra-articular anesthesia,[2] it can also be achieved without SA or intra-articular anesthesia if the chosen method of reduction does not cause extreme pain and/or increase muscle resistance. The ER method can be applied without SA if applied slowly and gently, that is, without increasing the patient's current pain and muscle resistance. Likewise, the Stimpson method and scapular manipulation[20] can be applied without SA, although the unpredictable prolongation of reduction time in the Stimpson method mean this is somewhat inappropriate in emergency conditions. Scapular manipulation may also be applied with an even higher success rate without SA,[20] although the physician being able to feel the relocation at the same time with the patient, and the need for a single practitioner remains advantages of ER over this technique. In a study by Eachempati et al[10] on reduction of anterior shoulder dislocations and fracture-dislocations with ER, they demonstrated that ER is a reliable method in both subcoracoid and subglenoid anterior shoulder dislocations. In this respect, the ER technique is slightly more effective

compared to other painless methods of reduction.

The ERWOSA method is safe, easy to perform, and requires only 1 clinician. Especially when looking to avoid the adverse effects of SA, the ERWOSA method is a reasonable option. The ERSOWA method should be considered as the first choice for AASD reduction, especially for busy emergency departments, because it requires only 1 physician, the duration of reduction time is not longer than 5 minutes, and patients may be safely discharged without monitorization and/or long follow-up times in the emergency department following successful reduction. One may ask about the degree pain and the comfort of the patient during ERSOWA method, but this is really not a reason for avoiding its use. It is clear that if much pain occurs, the ER method fails. In this way, we can say that the ERSOWA method is successful if the patient is relaxed and painless. In their study, Pishbin et al declared 100% success rates for scapular manipulation in the reduction of AASD. They started the reduction without SA and, in instances where the reduction was not achieved, SA was delivered and they continued with scapular manipulation. They reported no complications, although giving the SA in the prone position is not preferable. Both ER and scapular manipulation can be conducted in the sitting position, but scapular manipulation often required another person to restrain the patient while stabilizing the shoulder.

CONCLUSION

The ER method can be performed without sedation and analgesia in the reduction of anterior shoulder dislocations, if applied slowly enough to overcome shoulder muscle resistance. The ERWOSA significantly decreases the length of stay in emergency departments, and this method also negates the possibility of adverse drug effects in patients. Male patients with anterior shoulder dislocations are particularly suitable candidates for ERWOSA in busy emergency rooms.

LIMITATIONS

In our study, when comparing emergency discharge times, patients with successful ER method applied both with and without sedoanalgesia were considered. It is clear that emergency department stay will extend when the first method is unsuccessful in both groups. But as different reduction methods other than ER were used in the second reduction trial, and we did not have such a goal to compare the methods in our study, emergency stays of the patients requiring a second attempt were not considered.

As resident training activities have been given priority and additional procedures such as use of ultrasound in shoulder dislocations after 2011, patients who underwent standard applications most intensely between 2009 and 2011 were studied. However, as reduction of shoulder without sedoanalgesia has not been discussed clearly and studies comparing 2 homogeneous groups are inadequate, our study will contribute to the literature despite handicaps.

Footnotes

Abbreviations: AASD = acute anterior shoulder dislocation, ER = external rotation, ERASA = external rotation and sedation-analgesia, ERWOSA = external rotation without sedation and analgesia, SA = sedation-analgesia.

Ethical Committee Approval: Local ethical committee of Antalya Training and Research Hospital (10/2014).

The design of the study, the statistical analysis and software, AAJ, CA; Patient admission and literature review; AI, OH, MK, CA, FG, and AJ.

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