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Chair method: a simple and effective method for reduction of anterior shoulder dislocation

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Objective: The ideal reduction method for anterior shoulder dislocation is defined as a practical technique applied without any assistance and minimizing patient interference. The aim of this study was to evaluate the outcomes of patients with shoulder dislocations reduced using the chair method in the emergency department and show that the chair method is one of the ideal methods.

Methods: Seventy-four patients with anterior shoulder dislocation were treated using the chair method. Data from patients were recorded and analyzed.

Results: All dislocated shoulders were successfully reduced using the chair method without any complication or difficulty. Thirty patients had first time dislocation and 44 patients had previous dislocation. Mean duration between dislocation and reduction was 3 (range: 1 to 6) hours. Mean duration of reduction was 13.9 (range: 3 to 45) seconds.

Conclusion: The chair method is an effective and successful reduction method for shoulder dislocation. We believe that orthopedists and emergency department physicians should be familiar with this simple technique which does not have to be performed under general anesthesia.

Key words: Chair method; dislocation; reduction; shoulder.

Shoulder dislocation is one of the most frequent pathologies encountered in the emergency department. Several methods have been described for the reduction of shoulder dislocations. It is recommended that these techniques should be performed under different anesthesia protocols.[1,2] However, it is not always possible to administer anesthesia in every location or every patient. Simple reduction methods that do not require anesthesia and have a low probability of causing additional pathology have also been defined.[3,4] It is recommended that every orthopedist or emergency physician know how to perform at least one of these methods. The chair method is defined as a practical technique applied without any assistance and minimizing patient interference.[5]

The present study aimed to evaluate the outcomes of patients with shoulder dislocations reduced using the chair method in the emergency department.

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Patients and methods

This study included a total of 74 patients with anterior shoulder dislocation who were treated using the chair method in our hospital's emergency ward between 2007 and 2010. Data regarding demographic features of the patients, number of previous dislocations, side of the dislocation, time interval between dislocation and reduction, neurovascular examination findings, and duration of the reduction were prospectively recorded. Patients with accompanying fractures or other injuries, unconscious patients, those with previous shoulder procedures, and those who were unable to sit due to their advanced age or feeble patients were excluded.

Orthopedic residents were trained to perform the chair method. All patients signed an informed consent form. The patient was asked to sit in a stable chair sideways, using the backrest of the chair as a fulcrum in the axilla. The backrest was supported by a folded bed sheet or small, stiff pillow, if not well-padded, thus minimizing the risks of an axillary nerve injury or iatrogenic fracture. The dislocated arm was allowed to hang over the backrest of the chair and passively flexed at the elbow. The patient was encouraged to relax and traction was applied slowly with the physician positioned behind the chair using his left hand (for right shoulder dislocations) (Figs. 1 and 2). In cases where the humeral head was trapped below the inferior margin of the glenoid, a slight amount of external rotation could be applied to dislodge it. Another method (Kocher, Matsen's traction-countertraction, or Spaso, etc.) was to be applied if the chair method was not successful in producing reduction.

Anteroposterior and axillary radiographs were obtained from all patients before and after the reduction and neurovascular status was reassessed. The duration of reduction was accepted as the time between the patient being placed in reduction position and completion of reduction.

Following reduction, the upper extremity was positioned in 45 degrees of external rotation and immobilized using a shoulder/arm sling. Patient satisfaction was determined by asking if they would prefer the same reduction method in the event of a recurrent dislocation. Rehabilitation was initiated 3 weeks following reduction.

The t-test was used to compare the duration of reduction time for primary dislocation and recurrent dislocations and the Pearson correlation coefficient to evaluate the duration of dislocation and reduction time. Statistical analyses were performed using SPSS software, version 13.0 for Windows (SPSS Inc., Chicago, IL, USA). P values of <0.05 were considered statistically significant.

Fig. 1. The position of the patient and the physician. The arrow shows the direction of traction. Note the pillow under patient's armpit.

Results

Mean age of the 71 male and 3 female patients was 25.4 (range: 19 to 42) years. Thirty-seven patients had right and 37 had left shoulder anterior dislocations. Thirty patients had a first time dislocation and 44 had previous dislocations. The mean time between the dislocation and the reduction was 3 (range: 1 to 6) hours. Mean duration of reduction was 13.9 (range: 3 to 45) seconds. Reduction was achieved with the first attempt by traction alone in 62 patients. Additional minimal external rotation was required in the other 12. Alternative reduction methods were not necessary. No

Fig. 2. Position of the patient and the physician.

statistically significant difference was found between patients with a primary dislocation and those with recurrent dislocations, regarding the duration of reduction time (p=0.874). No statistically significant difference was found between the duration of dislocation time and the duration of reduction time (r=0.12; p=0.28). All patients answered the question "*Would you like your shoulder to be relocated using this method if it dislocates again?*" as "*Yes*." No iatrogenic fractures or neurovascular injuries were observed in any of the cases.

Discussion

Several different reduction methods have been described for anterior shoulder dislocation.[6,7] It is generally recommended that reduction be performed under anesthesia.[1,2] An ideal reduction method may be defined as effective, rapid and practical, as well as lead to minimal pain, require minimal analgesia, muscle relaxant and assistance, and not cause any additional injury.[4,7-9] The chair method has long been used since it was first defined by Parisien.[5,10] It is effective, rapid and practical and requires no analgesia, muscle relaxant or assistance. In this study, our aim was to evaluate the effectiveness of this method in order to reemphasize and re-popularize it.

Traction and minimal external rotation is recommended in almost all methods of reduction. During traction the humeral head slides from the anteroinferior glenoid rim, perches on the edge of the glenoid and then rolls on the glenoid rim with external rotation.[9] Local or general anesthesia is often recommended as reduction is impossible if the patient is not sufficiently relaxed to avoid complications such as fractures or excessive pain. Certain circumstances, such as the lack of anesthetic materials, insufficient location (operation field etc.), or time for anesthesia, or unsuitable patient clinical conditions, necessitate reduction without anesthesia. Such methods are favored, especially during military operations. The present study was conducted in a military hospital and reduction methods without anesthesia were taught.

The Kocher method, including traction and external rotation, is a classical shoulder reduction method.[11] The original technique includes only external rotation without traction[12] and has the most frequently reported complications.

Patient relaxation is also essential in Matsen's method of traction-countertraction which requires assistance.[2] Reduction is accomplished in a relatively long period of time. In contrast, the main advantages of the chair method are that it does not require assistance and the backrest of the chair prevents the patients from contracting their muscles and hindering the reduction.

The Milch method is an efficient technique with satisfactory results and can be performed without anesthesia.[13] In this method, counter-traction force of the muscles are eliminated by positioning the extremity axis parallel to the muscles' traction axis and the reduction is provided by finger support on the humeral head. The most distressed part of this technique is pain occurred during the positioning of the arm into the overhead position. When performed without anesthesia, the pain occurring during the positioning of the arm into the overhead position may cause the patient to contract their muscles, further increasing the severity of pain. Additionally, the humeral head can become stuck under the glenoid and cause pain and cartilage damage.[3] With the Milch method, the patient is positioned by the physician while in the chair method the patient is asked to sit sideways on the chair and move into the reduction position, thus allowing the patient to self-control his/her pain without any external forces.

The Stimson method and scapular manipulation are relatively pain-free techniques with minimal risks of injury.[14,15] Nevertheless, it is inconvenient for the patient and anesthetist to receive or give anesthesia in the prone position. However, unlike these methods, in the chair method, reduction is accomplished within seconds after the patient is in position and there is no need for weight application to demonstrate effectiveness.

The Spaso technique has been described as a simple technique that can be performed in every setting without the need for anesthesia or specific equipment.[16,17] Similar to the Kocher or Matsen traction-countertraction techniques, this technique does not provide any mechanism preventing the patients from contract their muscles and complicating the procedure. We believe that our 100% success rate using the chair method mostly resulted from the inability of the patient to contract their muscles due to the backrest of the chair.

Modified chair method techniques have also been described, including; positioning of the patient on the chair, securing of the patient's arm on the chair and asking the patient to stand or taping the forearm of the patient sitting on the chair with a wide bandage, fixation of one end of the bandage under the physician's foot and application of traction by pressing on the

bandage by the physician.[18,19] A similar method is the Oxford chair technique. The technique works by placing the arm in abduction and forward flexion with an external fulcrum in which patients sit on the table with their chest against the backrest of the chair. In a retrospective chart analysis study, Smith reported a 62% success rate in 61 patients using the Oxford chair technique and concluded that the lower success rate resulted from a bad modification of the original technique and the inexperience of practitioners.[20] In our series, we had a 100% success rate with patients treated by 6 orthopedics and traumatology residents. As stated by Smith, we agree that success rates depend on physician experience.

The main disadvantage of the chair method is the need for an appropriate chair which may not always be available in certain circumstances. A second disadvantage is the need for the patient to be conscious and alert. Moreover, this method cannot be used in non-cooperative patients or those with concurrent injuries that prevent the patient from sitting comfortably on a chair. Reduction methods without anesthesia should not be performed in elderly or frail patients to avoid medical problems or fractures in already fragile bones. We believe that an elaborate patient selection can provide 100% success rate.

In our study, patients with shoulder fractures were excluded to provide homogeneity. However, we believe that the technique may also be used effectively in patients with fractures of greater tuberosity. In these cases, the backrest of the chair should be expanded with a pillow-like support, if not sufficiently well-padded, to prevent humeral head fractures or iatrogenic auxiliary nerve injury. Although no such complication occurred in our series, the potential risk of humeral head fractures should be considered.

Outcomes may differ with patients with longer periods of dislocation. Anesthesia or assistance was not required in any of our cases and reduction was established in a mean time of 13.9 seconds. All patients were evaluated using radiographs after reduction and discharged following bandaging. Residents were trained prior to application and all were successful, even in their first attempts of reduction. Age and gender did not affect the reduction, and the duration of reduction was similar in all patients. No significant difference was found between the primary dislocation and recurrent dislocations in terms of the duration or outcome of reduction. No significant relation was found between the duration of dislocation and the outcome of reduction. In our series, however, the maximum waiting time to reduction was 6 hours after the occurrence of dislocation.

In conclusion, the chair method is an effective reduction method for shoulder dislocations that can be performed without anesthesia or complications, even under difficult circumstances. Orthopedists and emergency department physicians should be familiar with this simple technique. We believe that the chair method should be the preferred reduction method if anesthesia cannot be performed.

Conflicts of Interest: No conflicts declared.

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