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Simple self-reduction method for anterior shoulder dislocation

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ABSTRACT

Objective: To demonstrate and evaluate a modified simple method about self-reduction of anterior shoulder dislocation for significance in the emergency room.
Methods: The Boss-Holzach-Matter method for self-reduction of anterior shoulder disloaction is described. Patients with an anterior shoulder dislocation were retrospectively analysed concerning age, gender, type of anterior shoulder dislocation, occurrence of associated fractures, time between injury and reduction, reduction time, and method of reduction with its respective success rate.
Results: Eighty-six patients (52 men, 34 women, mean age 49 years) were treated from January 2010 to June 2014. The reduction time ranged between 20 seconds and 6 min (mean 1.5 min). Subcoracoid type of shoulder dislocation was seen in 72 cases (84%), subglenoid type in 14 cases (16%). Associated factures were seen in 20 cases, proportionally more often in subgleboid dislocations, 12 at the greater tuberosity, 6 at the inferior rim of the glenoid fossa and 2 at both localizations. The Boss-Holzach-Matter method was used in 35 cases with a success rate of 71.5%; die Kocher method and traction/countertraction method with premedication were used in 14 cases and 17 cases with success rates of 64% and 70%, respectively. All other cases and the failed primary attempts required hyponotic medication. All patients older than 70 (n=16) were not able to perform the self reducing procedure.
Conclusion: The presented Boss-Holzach-Matter method for reduction of anterior shoulder dislocation is a simple method without the need of anaesthesia, but cooperation from patients is crucial. The successful rate is comparable with other established methods.

1. Introduction

Shoulder dislocations represent more than 50% of all major joint dislocations and the most frequent type (>90%) of this injury is anterior shoulder dislocation[1-3]. Acute anterior shoulder dislocations usually are orthopaedic emergency cases, where reduction as the most effective pain relief therapy should be performed as soon as possible. The injury mechanisms responsible for anterior shoulder dislocations include axial stress on the arm in a position of forced abduction and external rotation, all on the arm in retroversion, or direct force injuries.

Most of the reduction techniques are based on the principle of traction and countertraction[3-7]. These techniques, such as Hippocrates method or the methods described by Matsen or Mane[3,4], usually require adequate analgesia for muscle relaxation. They are tainted with possible iatrogenic complications by the damage of the neurovascular brachial structures[8,9].

The Stimson's method utilizes the force of the gravidity[10]. In a prone position, traction of the affected arm hanging down in forward flexion was carried out using a weight applied to the wrist. Other techniques require manipulation of the affected shoulder using external rotation abduction and traction, such as the technique described by Kocher in supine position[7] as

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well as more cautious and gentle technique described by Milch in prone position[10,11]. Scapular manipulation in prone position is a further method for careful reduction[12,13]. All of these methods need adequate sedation, analgesia or experienced staff.

An easy and reproducible method for reduction of anterior shoulder dislocations has been extensively described by Boss *et al*[14,15]. Further studies about the same principle are reported by Parwin in 1957[16], the same with technique of Aronen and Chronister[17]. The common principle of these methods comprises the use of the patient's own weight without involvement of potentially traumatic manipulations.

We would like to report our experiences with this slightly modified method for anterior shoulder dislocation.

2. Material and Methods

2.1. Technique

The clinical examination of patient has to exclude possible neurovascular deficiencies. X-rays in anteroposterior and axial, Y-view are taken so that associated fractures of the proximal humerus could be visible (Figure 1). The patient has to sit on the examination table; the knee of affected site is flexed at 90°. Both wrists are bound together around the knee (Figure 2). The patient is asked for leaning his or her upper body and neck backwards. To counterbalance the surgeon`s hand embraces the patient's knee. The patient has also to push the shoulders anteriorly (shrug) creating an anterior rotational movement of the scapula resulting in spontaneous reduction.

2.2. Patients

Ninety-one patients with dislocations of the shoulder joint were seen in our emergency department between January 2010 and June 2014. Two patients had posterior dislocations as a result of a convulsion. Dislocation fractures of the proximal humerus requiring open reduction and internal fixation were seen in three cases. Thus, 86 patients with anterior shoulder dislocation could be analyzed retrospectively.

2.3. Methods

The following data were recorded: patient's gender and age, cause of injury, history of previous dislocations, interval between the injury and reduction, and the duration of reduction. The type of anterior dislocation and associated fractures of humeral head or glenoid cavity were determined by radiological examination.

The emergency room doctor was free to decide and chose the method for reducing shoulder dislocation. The frequency of practicing the Boss-Holzach-Matter method was recorded. The Kocher-method or tarction-countertraction method described by Matson and Rockwood were used alternatively[3]. The need for premedication, sedation or analgesic drugs in these cases was also registered. The success rates of all methods were noted. All patients gave their informed consent for the procedure and the publication of their data. No statistical methods were needed for the current study.

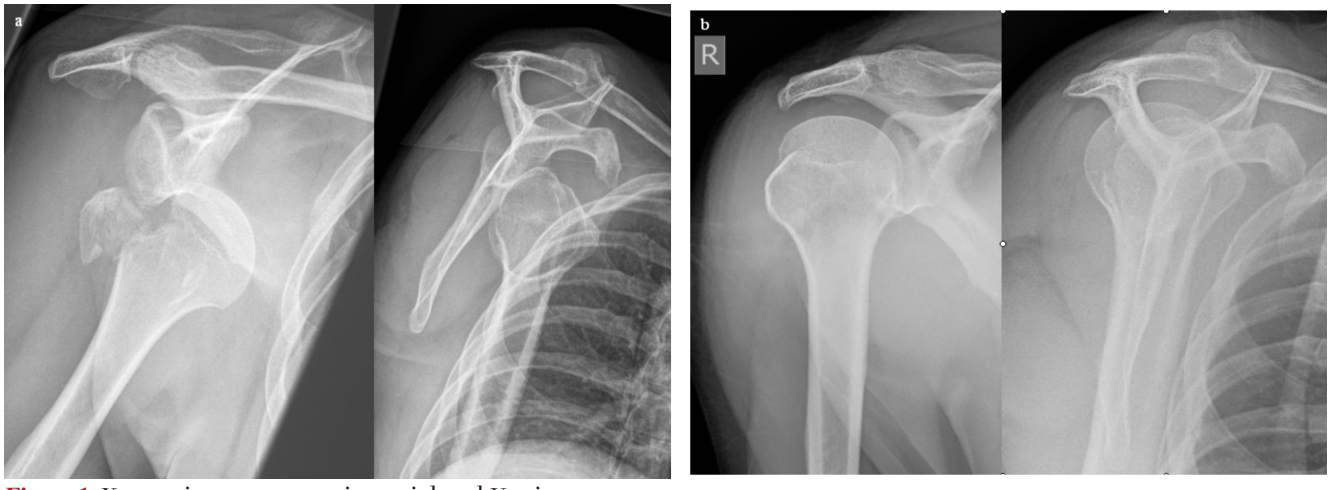

Figure 1. X-rays in anteroposterior, axial and Y-view.

3. Results

There were 52 men and 34 women with a mean age of 49 years (range from 17 to 87 years). In 18 cases out of 86 shoulder dislocations (21%) there was a recurrent dislocation. The right dominant side was involved in 54 cases while the left side in 32 cases. The interval between injury and reduction was less than one hour in 25 cases, 1–2 h in 42 cases, 2–4 h in 17 cases and more than 24 h in 2 cases. The time of reduction ranged between 20 seconds and 6 min with an average time of 1.5 min. The cause of the injury was a fall on the affected arm in 58 cases, a traffic accident in 16 cases, and a fall during sports activities in 12 cases.

The subcoracoid type of anterior shoulder dislocation appeared in 72 cases (84%), whereas subglenoid dislocations were observed in 14 cases (16%). Subclavicular dislocations were not noticed.

Fractures of the greater tuberosity were seen in 12 cases (14%), fractures of the inferior rim of the glenoid fossa in 6 cases (7%), and both in 2 cases (2.3%). The fractures were seen more often in subglenoid dislocations. In these dislocations fractures of the greater tuberosity were seen in 4/14 (28%) cases, inferior rim fractures in 3/14 (21%) cases, and both fracture types in 1/14 cases (7%) (Figure 1).

The described Boss–Holzach–Matter method was used in 35 cases. All other patients required premedication using 10 mg midazolam. The Kocher method was used in 14 cases while the traction/contertraction procedure was performed in 37 cases, in 20 of these cases primarily with hypnotic medication of protocol (1 mg/kg). The Boss–Holzach–Matter method was successful in 25 out of the 35 cases (71.4). The Kocher procedure (n=14) and the traction/countertraction methods without analgesia (n=17) were succeeded in 9 cases (64%) and in 12 cases (70%), respectively. Thus, 46 patients required hypnotic medication by protocol, 20 patients primarily and 26 patients secondary as a result of a failed attempt for reducing the shoulder dislocation using one of the described different methods.

There was no correlation of the used reduction method with its success rate concerning to the patients' age or gender, the interval between injury and reduction, the reduction time, and the localization (*i.e.* subcoracoid, subglenoid) of anterior shoulder dislocation.

The choice of emergency room doctor for the reduction method was influenced by the physician`s experience and the patient's condition with the meaning of pain level and the ability to sit. Therefore, statistical evaluation and comparisons of the different groups of reduction methods were not suitable. Concerning on the patients' age it was noticeable that all patients older than 70 years (n=16) were not able to perform the described self-reducing procedure, but reliable statistical statements were not possible.

Figure 2. Patient sits on the examination table.

4. Discussion

Muscle spasms due to patient`s pain and fear represent the main problem for easy and successful reduction of anterior shoulder dislocations. Therefore, administration of a premedication, local or general anesthesia is necessary in most cases. The presented auto-reduction method of Boss–Holzach–Matter is reported to be successful in about 60%–70% without the need for premedication or anesthesia[14,15]. These reports could be confirmed by our observations with similar or even better results compared with the other reduction methods. Ceroni *et al.* reported a dependency of the success rate on the localization of anterior shoulder dislocation, presenting a success rate of >80% in subcoracoid dislocations and a low success rate of <20% in subglenoid dislocations[15]. We could not confirm these findings due to the small number of cases in our series.

But the presented method on auto-reduction of anterior shoulder dislocations requires an active role of patients during the reduction procedure with crucial cooperation. Therefore, this method is not applicable for all patients, mostly because of patient's disability to sit. In our series, all patients older than 70 years (n=16) were not able to

perform the self-reducing procedure. But this observation does not justify any reliable statistical statement; it was not confirmed by other studies[14,15].

The anterior shoulder dislocations are basically approachable for reduction methods that avoid general anesthesia and the use of sedative or analgesic drugs[1,2,10,11]. Most of the reported methods are focused on the principle of axial traction[3-6]. Because of their risk of iatrogenic complications, such as the damage of brachial neurovascular structure or fractures of humeral head, these methods should not longer be recommended as primary methods without anesthesia[8,9]. Extensive axial traction should be avoided especially elder patients possible with fragile vessels and under anticoagulation therapy. More protective methods which performed in prone position like the technique described by Milch[6,7,10,11] or scapular manipulation techniques[12,13] became more and more accepted and established. In cases of anesthesia the consequent decrease of muscle spasm usually allows the reduction of the dislocation using only minimal axial traction. A further and essential advantage of the presented self-reducing method includes its financial benefits. Since general anesthesia or premedication are usually not required, the patient can leave the hospital soon after the reduction, thus diminishing the treatment costs.

The presented self reducing Boss-Holzach-Matter technique for anterior shoulder dislocations is a simple, safe, and economical method. The success rate is comparable with other techniques. The patient`s cooperation crucial.

Conflict of interest statement

The authors report no conflict of interest.

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