

Original Article

Reduction of Shoulder Dislocation: a New Manoeuvre

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ABSTRACT

INTRODUCTION: Shoulder dislocation comprises 60% of all major joint dislocations worldwide and a number of reduction techniques are described in the literature with varying degrees of success. An ideal method of reduction should be simple, easily reproducible, relatively painless that can be performed unassisted without sedation or anaesthesia with minimal or no further complications. We report our results of using a novel method of anterior shoulder reduction described recently in the literature that claims to fulfill most of the characteristics of an ideal method if not all. **OBJECTIVE:** We aimed to evaluate the results of this new method of shoulder joint reduction (Prakash's manoeuvre) in acute primary anterior dislocations of shoulder. **METHODS:** This prospective study was conducted in Inpatient and Outpatient department of orthopaedics in North Bengal Medical Hospital, Sirajgonj and different personal chamber from June 2017 and July 2019. All the cases of primary anterior shoulder dislocation presenting within three days of injury without any associated fracture or spine trauma with or without greater tuberosity fracture were included. The reduction was done using a novel method by Orthopaedic consultants in all cases. The need for a second reduction attempt or anaesthesia was considered a treatment failure. Time taken for reduction, pain felt during reduction and complications if any were recorded. **RESULTS:** There were 42 (73.68%) males and 15 (26.32%) females with a mean age of (37.05 ± 12.63) years. The new technique was effective in reducing a shoulder dislocation on the first attempt in 54 of the 57 dislocated shoulders (94.74%). The remaining three shoulders were reduced on second attempt by the same technique. Sedative, pre-medication or anaesthesia was not used in any case. The average time taken for the shoulder reduction was four and half minutes with a range of three to six minutes. **CONCLUSION:** This relatively painless technique of shoulder reduction is easy to acquire and practice in emergency department and surgeons may select it as their primary method for reduction of anterior shoulder dislocations.

Keywords: Shoulder dislocation, External rotation manoeuvre, Prakash's manoeuvre.

INTRODUCTION

The geometry of glenohumeral articulation permits great flexibility at the expense of intrinsic stability. This inherent instability

makes the shoulder the most commonly dislocated joint in the body, which can lead to recurrent dislocations or subluxations.¹ The restraints of the glenohumeral joint are divided into static stabilizers and dynamic stabilizers. The static stabilizers consist of the glenoid fossa, the labrum, the joint capsule and glenohumeral ligaments. The dynamic stabilizers consist of the rotator cuff muscles and their tendons, the long head of the biceps and the scapular stabilizing muscles. The cartilaginous labrum circumferentially surrounds the glenoid, providing increased depth to the fossa and increasing the contact area of the glenohumeral articulation. The glenohumeral ligaments are specific thickening of joint capsule specially anterior band of the

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inferior glenohumeral ligament which is the most important soft tissue restraint to anterior dislocations.^{2,3} In emergency trauma room worldwide comprising more than half of all dislocations with anterior dislocation being the commonest subvariety.⁴⁻⁹ A number of reduction techniques are in vogue with varying degree of results and reproducibility; however, most of these techniques require some sort of premedication, sedation or anaesthesia.⁹⁻¹² The choice of reduction manoeuvre depends upon the surgeon or treating physicians and the environment or place of work. However, in general a manoeuvre which is relatively painless, does not require sedation or anaesthesia, without the need of an assistant, with no or minimal complications that can be easily reproducible is preferred. We were using Kocher's reduction manoeuvre for reducing anterior shoulder dislocations in our institute in most of the cases and Spaso's manoeuvre in some. However, in June 2016 we came across a relatively simple technique of shoulder reduction that was described in a journal.¹³ The original author propagated it as a painless (relatively) method of reducing anterior shoulder dislocation which can be performed by a single surgeon without traction and need for sedation or anaesthesia.¹³ We conducted this prospective study with an intention to evaluate the results of this new method of shoulder joint reduction (Prakash's manoeuvre) in acute primary anterior dislocations of shoulder .

METHODS

This prospective study was conducted in Inpatient and Outpatient department of orthopaedics in North Bengal Medical Hospital, Sirajgonj from June 2017 and July 2019. Data recorded included duration since dislocation, mode of injury, the time needed to complete the reduction from the start of the procedure and the number of attempts at reduction. All the demographic data including age, sex, laterality, history of previous

dislocation, time since dislocation and associated fracture of greater tuberosity were noted in patient case sheet. We excluded the patients with a history of previous dislocation, associated or suspected spine injury, unconscious patients, those presenting later than a week since dislocation, fracture dislocations except for greater tuberosity fractures and hemodynamic unstable patients. Consent was taken from all the patients after explaining the new procedure. 61 patients with anterior shoulder dislocation were treated during the study period, out of which 57 patients met the inclusion criteria that constituted the study group. The results were analyzed in terms of time to reduction, pain felt during the reduction manoeuvre as noted on visual analog scale (VAS) and any iatrogenic complication. The reduction manoeuvre was done by orthopaedic practitioners in all the patients. A single attempt was allowed if more than one attempt or anaesthesia or sedative were needed that was considered as treatment failure. The principle of this method is that traction has no role in reduction of shoulder dislocations. These are purely rotational and lateral translation injuries and the reduction too is performed by rotations and lateral translations. No assistant is needed and the surgeon easily and single handedly performs this procedure. The patients are made to sit on a bed with back rest or on a chair with back rest or stand against a wall to fix the scapula.

The forearm is held by the elbow and wrist and the following sequence is deployed.

a. Slow gentle external rotation until the arm is fully externally rotated. There should be no attempt at abduction or adduction. The external rotation should be done with the arm in its original position. This step is performed very gently and slowly, often taking up to a minute. The forearm acts as a long lever arm to achieve the external rotation.

b. The limb is kept in external rotation for two to three minutes by the clock. The patient is engaged in conversation so that his attention is diverted during this step, as this is the painful part. This is the most important step and performing it properly is essential for this method.

c. The limb is now slowly adducted in external rotation till the elbow comes over the body.

d. The limb is now slowly internally rotated so that the fingers touch the opposite shoulder.

The shoulder glides in majestically without any audible clicks, clunks or sounds. The average time taken for the procedure is three to four minutes (Figure 1).



Figure 1: (A) Hold elbow with one hand and forearm with the other in the position of deformity without adducting or abducting. (B) Gently externally rotate the arm until it becomes near parallel to body, this position is maintained for a minute or so. (C) Gradually adduct the limb until the point of elbow comes over the body. (D) The arm is internally rotated so that the hand touches the opposite shoulder which confirms reduction. (E) After reduction regain normal contour of deltoid.

RESULTS

Of the 57 patients 42 (73.68%) were male 15 (26.32%) were female and age was between 18 to 62 years with a mean age of (37.04 ± 12.63) years. The complete demographic profile of patients is presented in Table I. The greater tuberosity was fractured in four patients and regimental badge sign was positive in two patients at presentation. We had observed a proclivity of right shoulder (n =35) to dislocate compared with left (n =22), yielding a ratio of 1.59:1. The new technique (Prakash's Manoeuvre) was effective in locating a shoulder dislocation on the first attempt in 54 of the 57 dislocated shoulders (94.74%). The remaining three shoulders were reduced on second attempt by the same technique. Although we were able to reduce all shoulders

(100%), the patients requiring a second attempt (n=3) were considered as treatment failures (5.26%). There were no iatrogenic complications as a result of reduction manoeuvre as confirmed on clinical examination and radiographs (Figure. 2). The fractures of the greater tuberosity (n=4) were found to be reduced to within acceptable limits post reduction (Figure. 3). The pain experienced during the reduction manoeuvre as noted on VAS scale ranged from 0 to 7 with a mean of 2.22 ± 1.25. Only one patient in our series had a pain score of seven on VAS. None of the patients in our series refused to continue the reduction procedure at any point. The average time taken for the shoulder reduction was four and half minutes with a range of three to six minutes.

Table I : Demographic data of patients with primary anterior shoulder dislocation

Parameter	Number (%)
Gender	
Males	42 (73.68%)
Females	15 (26.32%)
Age (years)	
Mean	37.04 ± 12.63
Range	18-62
Laterality	
Right	35 (61.40%)
Left	22 (38.60%)
Presentation	
Within 24 h	52 (91.23%)
1-3 days	05(8.77%)
Greater tuberosity fracture	04 (7.02%)

Table II: Reduction results

	Reduction Number	Percentage (%)	Consideration
First attempt	54	94.74%	Successful
Second attempt	03	05.26%	Failure
Total	57		



Figure 2. Pre-reduction radiograph (A) and post-reduction radiograph (B) of a patient with anterior shoulder dislocation, showing an uncomplicated reduction.



Figure 3. Pre-reduction (A) and post-reduction radiograph (B) of anterior shoulder dislocation with greater tuberosity fracture, showing greater tuberosity in acceptable reduction.

DISCUSSION

More than 50-60% of dislocations of large joints involve the shoulder (glenohumeral). Up to 90-96% of shoulder dislocations are anteroinferior.¹⁴⁻²⁰ Most dislocations can be reduced in the emergency department using simple methods. Numerous methods and procedures have been described.^{15-19,21-25} and most of these require a general anaesthesia, muscle relaxation, pre medication or sedatives. The oldest known method for reduction was described by Hippocrates using traction & counter traction manoeuvres.²⁶ Modern variations of these traction techniques are widely used today and most of these techniques if not all are performed using analgesia and/or sedation and most require an assistant. The ideal method should be simple, easy, quick, effective, atraumatic, pain-free, require little assistance or medication, and cause no additional injury to the shoulder joint, musculoskeletal or neurovascular structures.^{27,28} Till date there is no standard procedure for reduction of shoulder dislocation. The complications associated with different traction methods using excessive traction were classified by Calvert et al²⁹ and included upper extremity dysfunction, amputations and

mortalities. The more severe iatrogenic injuries are rarely seen in clinical practice nowadays; however, neurovascular affliction is a recognized complication of contemporary traction techniques.³⁰ We came across a novel method of shoulder reduction claimed to be painless that can be performed single handedly without sedation or anaesthesia. The original author published the results of 147 shoulder dislocations reduced by this new technique, over a period of eleven years, achieving a success rate of 100%.¹³ The exact mechanism of reduction is not fully understood. The original author believed shoulder dislocations to be rotational and translational injuries with little role of traction for reduction.¹³ However, since this manoeuvre is performed in sitting position, how much and what is the role of gravity is still not known. We believe it is a novel method and a broader acceptability will generate more interest in research which will further help in delineating the exact mechanism of reduction.

It is wrongly mentioned that traction is the first and most important step of reduction. Shoulder dislocations are primarily rotation/lateral shift injuries and there is no role or traction, push, pull, counter traction, tapes or heel in the axilla,

in their reduction.³¹ It is often erroneously stated that some shoulders are tricky and the practitioner must be familiar with more than one method so that if one fails, the other can be deployed.²⁸ All methods deploy traction in some form or the other and this is combined with rotations, translations, scapular movements, counter tractions, direct pushing in of the head etc.^{32,33}

A complete review of all the methods of shoulder reduction is beyond the scope of this research article. The choice of selection of a method depends upon such factors as its simplicity, reproducibility, need for sedation or anaesthesia, number of assistant required and time taken for reduction.^{11,34} Success rates for the various described procedures varies between 70-90% regardless of technique.²⁸ Many a times more than one technique may be required in some cases, where as 5% to 10% of cases cannot be reduced in the emergency room.^{12,34} Mirick et al³⁵ evaluated the external rotation method and reported it to be successful in 69 of 85 (81%) patients. They found traction-counter traction method to be most frequently effective when external rotation failed. In another study evaluating Spaso's technique successful reduction could be achieved in 87.5% of patients.³⁶ Kuhn³⁷ compared the best existing evidence regarding the treatment of patients with a primary anterior shoulder dislocation and reported that little data exist to ascertain the best method and that premedication with intra-articular lidocaine has fewer complications and needs a shorter time in the emergency room than intravenous sedation with no obvious variances in success rates. The reported success rate of different reduction manoeuvres for anterior shoulder dislocation in the literature ranged from 70% to 100%.^{11,36,38-41}

However, most of these studies represented the results of experienced surgeons or physicians

performing the reduction manoeuvre. There is paucity of data on success rate in the relatively inexperienced hands of junior residents. In a study depicting results of scapular manipulation technique, the residents were only able to reduce 63% cases. The success rate of 100% (94.74% on first attempt) in this series was analogous to other series performed by experienced orthopaedic surgeons and emergency physicians. The high success rate in this study reflects the simplicity and reproducibility of this procedure. Though the initial results of this technique seem promising, however, there is a need to conduct randomized controlled trial to prove its effectiveness compared with other manoeuvres & whether it can become the primary method of anterior shoulder reduction.

CONCLUSION

This relatively painless technique of shoulder reduction (Prakash's manoeuvre) is easy to acquire and practice in emergency department. The method is effective in achieving reduction of acute anterior shoulder dislocations (95.08%) on first attempt in the hands of orthopaedic surgeon. The advantages of this manoeuvre and its concomitant safety may justly lead surgeons to select it as their primary method for reduction of anterior shoulder dislocations. The drawbacks of this study includes it cannot be performed in unconscious, polytrauma and spine injury patients because the reduction procedure performed with the patient on sitting or standing position, a smaller sample size and no direct comparison with other techniques. However, further studies are needed to see the results and reproducibility of this technique.

Conflicts of Interest: None

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