RESULTS OF PRAKASH MANEUVER IN REDUCTION OF ANTERIOR SHOULDER DISLOCATION

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ABSTRACT

Objective: To evaluate the effectiveness of Prakash's maneuver in the reduction of anterior shoulder dislocation without sedation and anesthesia in an emergency setting.

Material and methods: A prospective study was conducted in the Orthopaedic Department Qazi Hussain Ahmad Medical Complex Nowshera department on 177 patients from 1st January 2020 to 30th June 2023. Shoulder dislocation presenting within 72 hours was included. Associated spine trauma, fractures, metabolic bone disease, and metastatic bone disease were excluded. The reduction was executed using Prakash's maneuver. Failure to get a reduction in the first attempt and or the need for reduction under general anesthesia was regarded as treatment failure. Notes were made about the time to reduce pain experienced by the patient and complications like fractures and nerve injuries.

Results: Out of 177 patients 122(68.83%) were male and 55 (31.17%) were female with a mean age of (33.51 ± 11.86) years. Reduction was achieved in 160 of the 177 shoulders (90.40%). The same method reduced 9 out of the remaining on the second attempt. For the shoulder reduction, the average time was 120.73s ± 18.13 seconds. However, there was no other associated complication seen with this method.

Conclusion: This method of shoulder relocation is very safe, reliable, pain-free, easy to learn, and has easy applicability in the emergency department. Its inherent safety and easy mastery will attract orthopedic surgeons to have this method as their preferred method of reduction for anterior shoulder dislocations.

Keywords: Shoulder dislocation, External rotation maneuver, shoulder relocation.

INTRODUCTION

The shoulder is a synovial joint of ball and socket type.[1]. It has an outstanding range of motion but at the cost of stability.[2] Because of this, the shoulder joint ranks among the major joints with the highest incidence of dislocation—11.2/100,000 annually—and the highest estimated prevalence—2% to 8% in the general population.[3] The anterior shoulder dislocation is the commonest type constituting about 96% of all glenohumeral dislocations.[3] Shoulder dislocation has a bimodal representation of the distribution of age.

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Firstly, young men in their twenties and thirties that are young population sustain this injury due to high-energy trauma, and then the elderly population sustains such injury due to low-velocity injuries in their sixties and seventies.[4,5] The shoulder gets dislocated anteriorly when the arm rotates outward and is abducted. Due to such a mechanism of injury, the primary stabilizer of the shoulder gets injured and the joint becomes unstable.[3]

Shoulder dislocation in young and elderly populations dislocates at the same incidence but more attention is given to the young population due to their involvement in highly demanding tasks however the complication related to elderly patients is more severe and equally important in terms of fractures and rotator cuff injuries with poor prognosis.[6] Therefore it is of paramount importance to carefully evaluate and choose the best treatment option for young as well as old population segments. If the treatment option is not planned carefully it can lead to permanent disability due to fracture, nerve injury, and fractures associated with dislocation as well as

recurrent shoulder dislocation/instability needing arthroscopic or open surgery.[7]

Many techniques available for the reduction of anterior shoulder dislocation itself signify that there is not a single method with perfection or on which there is agreement.[8] Different techniques with different rates of success are quoted in the literature. Kocher's method, Spaso method, Chair method, and Matsen's traction-counter traction method are common methods among many other methods.[8] Recently arthroscopic surgery for Bankart lesion in primary shoulder dislocation has shown good results, especially in young people involved in contact sports.[9]

A perfect method of reduction for anterior shoulder dislocation would be one that is simple, reproducible, relatively pain-free, performed without anesthesia, with less or no complications rate and assistance. The surgeon's experience and working environment dictate the choice of reduction method. There is no agreement on the duration and position in which the arm is kept in a sling.[6,10,11]

We were using Kocher's method, Spaso method, Chair method, and Matsen's traction-counter traction method in our institute in most cases. However, in June 2016, a new relatively simple, and pain-free method of shoulder relocation came into light through social media claiming outstanding functional results coupled with no risks from either maneuver itself and anesthesia, sedation, and pre-medications.[12] This study was later published in a journal.[12] This method does not need traction, counter traction, couch, equipment or any medication with only a single person can perform it easily.[12] The pioneer author believed it to be an injury with rotational and translational components so all those methods which included traction for relocation of the joint were disregarded as they did not address the cause of the injury unnecessarily putting patients in danger of complication. Although the exact mechanism of this method is not known completely. As reduction of the shoulder joint is done in this method in standing or sitting position there might be some role of gravity which is still not understood.

The purpose of this study was to verify the reproducibility of a novel anterior shoulder reduction strategy that has been recently reported in the literature and that supposedly satisfies the majority of the requirements for an optimum approach across all age groups.

MATERIALS AND METHODS

This prospective study was conducted in department of Orthopedic and Trauma department Qazi Hussain Ahmad Medical Complex Nowshera on 177 pts from 1st January 2020 to 30th June 2023. Ethical approval was taken from Ethical committee on 1st of January 2020. Convenience sampling technique was used to collect data. With prevalence of shoulder dislocation at **8%** in general population[3] the sample size with **95% confidence** interval and **5% margin** of error comes out to be **114"**. We had data of more subjects than this i.e.177 so rather reducing it to minimum required we went with same number which makes our data more accurate. The diagnosis of anterior shoulder dislocation was made on a plain radiograph of the involved joint/side in an anteroposterior plane (Fig. 01). A proforma was developed consisting of demographic information, such as age, gender, laterality, history of prior dislocation, duration since dislocation, and related larger tuberosity fracture. The study included all cases that had been diagnosed.

However, unconscious individuals, who have a history of prior dislocations or may have a related or suspected spine injury, polytrauma patients, patients with metastatic bone diseases, metabolic bone disease, dislocation presenting after 72 hours, hemodynamically unstable individuals and fracture-dislocations other than larger tuberosity fractures were not included in the study. After explaining the procedure to the patient, written consent was taken from all patients. A total of 177 patients with anterior shoulder dislocation who met the inclusion criteria were treated during the study period. The factors that were evaluated and analyzed were any iatrogenic consequences, as well as the time to reduce any pain experienced throughout the reduction, as recorded on the visual analog scale. The reduction was done by an Orthopaedic consultant in all the patients. Treatment failure is defined as the need for anesthesia or sedatives for reduction or inability to reduce joints by this method.

The patients were then consoled and made to sit on a bed or chair with a backrest or requested to stand against the wall. Then the scapula was fixed. The surgeon then explained the procedure and approached the patients. The orthopedic consultant then holds the elbow of the patient with one hand and the wrist with the other hand. No attempt should be made to do adduction or abduction of the shoulder initially. Gradual, gentle, and

sustained external rotation is applied in the position of deformity until it becomes parallel to the coronal plane. The patient was actively engaged in conversation during the whole maneuver to divert the attention of the patient and reduce his apprehension. For over a minute, the external rotation force is maintained. Following a prolonged external rotation, the arm is progressively brought inside the body by the elbow, and then it is internally rotated until the hand meets the shoulder across from it. The shoulder reduces without any clunk or sound.

The relocation is confirmed clinically by checking the contour of the shoulder for the disappearance of the emptiness of the shoulder socket and the ability of the patient to touch the opposite shoulder and to range the shoulder movements. The arm is then put in a sling and swathe to immobilize the shoulder joint. For radiological confirmation, the patient is sent to the X-rays department to get post-reduction X-rays for documentation (Fig. 02). Those patients whose joints were unable to get reduced in the first attempt were again put in the same exercise after a brief interval to tackle the apprehension of the patients. Those whose shoulders were not reduced even after the second attempt were made nil by mouth after doing viral serology. The intravenous line was passed and the patient was taken to theatre for reduction under sedation or general anesthesia.

Figure 1: (Shoulder Dislocation)

Figure 2: (Post Reduction X-Ray Shoulder)

RESULTS

There were 122 (68.83%) males and 55 (31.17%) females with a mean age of (33.51 ± 11.86) years. The age varied between 18 and 70 years. The complete demographic profile of patients is presented in Table 1. The greater tuberosity was fractured in nine patients and the regimental badge sign was positive in one patient at presentation. We observed a proclivity of the right shoulder to dislocate ($n = 124$) compared with the left (n=53), yielding a ratio of 2.34:1. The new technique (Prakash's Maneuver) was effective in locating a shoulder dislocation on the first attempt in 160 (90.40%) of the 177 dislocated shoulders (Table 2). Out of the remaining seventeen shoulders, nine were reduced on the second attempt by the same surgeon and technique. Although we were able to reduce all shoulders, the patients (n=8) requiring sedation, premedication, or general anesthesia were considered treatment failures. Radiographs and a clinical examination verified that there were no iatrogenic problems following the reduction maneuver. The fractures of the greater tuberosity ($n = 9$) were found to be reduced to within acceptable limits post-reduction. The pain experienced during the reduction maneuver as noted on the VAS scale ranged from 2 to 7 with a mean of 3.93± 1.44. Nine patients in our series had a pain score of seven on VAS. At no time did any of the patients in our series object to continuing the reduction procedure. There was no link seen in the time taken for reduction with age according to linear regression analysis. With a range of 98–196 s, the shoulder reduction took an average of 120.73 s. The standard deviation (SD) was ± 18.13s (Table -03).

Table 1: (n=177) Demographic data of patients with primary anterior shoulder dislocation.

Parameter	Number (percentage)
Gender	
Males	122 (68.83%)
Females	55 (31.17%)
Age (years)	
Mean	33.51 ± 11.86
Range	18–70
Laterality	
Right	124 (70.05)
Left	53 (29.95)
Presentation	
Within 24 h	158 (89.26)
1–3 days	19 (10.74)
Greater tuberosity fracture	9 (5.08)

Table 2: (n=177)

Reduced in first attempt	160	90.39%
Reduced in second attempt	09	5.09%
Needed sedation/ anesthesia	08	4.52%
Total	177	100%

Table 3: (n=160)

Average time taken in seconds	Range of time taken in seconds	Standard deviation (SD)
120.73 s	98-196 s	± 18.13s

DISCUSSION

The shoulder joint dislocates most commonly among all the major joints of the body. The Anterior shoulder dislocation is the commonest major joint dislocation accounting for more than 95% of the reported cases.[2,3]

There are many methods of reducing the shoulder joints. Hippocrates is probably the first man in history who described a method of reducing shoulder joints. His method of reduction included traction applied by the primary surgeon and counter-traction applied by the assistant.[13]

Later on, more methods of shoulder relocation were introduced like Kocher's, Spaso's method, Chair method, and Matsen's traction-counter traction, each of them having its peculiar safety features and complications.[8] Most of them use some sort of analgesia, sedation, anesthesia, or traction, and need assistance. Calvert et al did work on the classification of complications associated with traction executed by different reduction maneuvers.[14] With the introduction of safer reduction methods more serious complications are rare in modern days however, still there are reported cases of neurological injuries and iatrogenic fractures, especially in geriatric age groups.[15]

An ideal method will be easily reproducible, pain-free, simple, does not need sedation or anesthesia, special instruments and assistants, and traction. One such method of shoulder reduction claimed all these characteristics and came into practice in 2016 with a mixed response of acceptability by doctors. In our study, the success rate was more than 90% and if we add a second attempt by the same person using the same method to success rate, then it is up to 96%. LP Prakash in this original study of 147 shoulders has claimed a 100% success rate and no complications[12]. Around 4% of our patients needed anesthesia. This slightly lower success rate than the LP Prakash might be due to the lesser expertise level of our consultants than the original pioneer of this shoulder reduction method. Hayashi M et al claimed a success rate of around 92%[16], which is slightly lower than our success rate of 96%. Also, in their study, they reduced the shoulder using multiple methods and also lavishly used different medications to reduce pain like intra-articular lidocaine injection and intra-muscular injections.[16]

Multiple factors like simplicity, reproducibility, need for sedation or anesthesia, number of assistants required, and time taken for reduction dictate which method to use.[17,18] The literature review cites the rate of success for a first-time anterior shoulder dislocation range from 70% to 90% in different studies.[18,19]

Sometimes in difficult dislocations, more than one technique may be required, whereas 5%–10% of cases cannot be reduced straight away in the first attempt and such cases require sedation or anesthesia[18,19] and these findings again in line with our findings of needing anesthesia in up to 4 % of cases. There are other studies in which the success rate is far lower than our findings like Mirick et al achieved reduction in 69 of 85 (81%) patients.[20]

In our study, we measured the time taken by the Prakash maneuver to reduce shoulder and it on average took 120.73$\pm$18.13 seconds with a range from 98 seconds to 196 seconds. This is better than what Anjum R et al achieved in their study using the same method of reduction.[21] Their time was 130.5s ± 25.8.

Shoulder dislocation itself is a very painful condition and while attempting to reduce shoulder the pain is exaggerated and also patient is now anxious as well. Most of the shoulder dislocation techniques require some sort of pain management in the form of oral or injectables.[18,19] In our study we used no medication for pain and after shoulder reduction, the patient pain score was 3.93$\pm$1.44. This score was far better than the pain score recorded after shoulder reduction by other techniques who even used some sort of medication for pain relief.[22]

This new technique also has limitations as it is performed when the patient is either sitting or standing making it unsuitable for those who cannot stand or sit.

AUTHOR CONTRIBUTIONS

Author 1: Collection, Analysis, interpretation of data and drafting of work.

Author 2: Concept of design, Critical analysis and final approval.

CONCLUSIONS

Prakash method of shoulder dislocation although is a relatively new technique yet is easy to acquire and practice in any setting as it does not require additional human resources and/or equipment/instruments. The advantages of this maneuver and its concomitant safety may justly lead surgeons to select it as their primary method for the reduction of anterior shoulder dislocations. However, RCTs are needed to actualize the benefits of this technique over other techniques.

CONFLICTS OF INTEREST: None

ETHICAL BOARD APPROVAL: This study was conducted after approval was taken from the ethical board of the hospital.

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