Original Article

A Comparative Analysis of Kocher's Method And Scapular Manipulation In Reducing Shoulder Dislocation: A Quasi-Experimental Study

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Abstract

Objective: Anterior shoulder dislocation is a common orthopaedic emergency that requires prompt reduction. This study aimed to compare the mean reduction times of the scapular manipulation technique and Kocher's method using a quasi-experimental design.

Methods: This quasi-experimental study was conducted in the Department of Orthopedics at the Rawalpindi Teaching Hospital from September 2021 to March 2022. Patients aged 16–60 years presenting with acute anterior shoulder dislocation within 24 hours of injury were included. Participants were alternately allocated to either the Smith and Maas technique without sedation (Group A) or Kocher's method under intravenous sedation and analgesia (Group B). Reduction time was recorded from the initiation of the manoeuvre to clinical confirmation. Data were analysed using SPSS version 22. Independent t-tests were used, and statistical significance was set at $P < 0.05$.

Results: A total of 60 patients were included, with 30 in each group. The mean reduction time was significantly shorter in group A (2.7 ± 0.46 min) than in group B (4.13 ± 0.6 min; p = 0.000). Both techniques achieved a 100% success rate, with no complications observed.

Conclusion: Both the SMT and Kocher's methods are effective for reducing anterior shoulder dislocations. However, SMT was associated with significantly shorter reduction times and avoidance of the need for sedation, making it a practical option in emergency and resource-limited settings.

Keywords: Shoulder Dislocation; Scapular Manipulation; Kocher's Method; Quasi-Experimental Study; Reduction Techniques.

Introduction

The glenohumeral joint is the most mobile articulation in the body, allowing movement in multiple planes but making it inherently unstable and more prone to dislocation than other joints. 1 [The global incidence of primary shoulder dislocation is estimated to be 15.3–56.3 per 100,000 person-years. 2 [Most cases occur in young males and are often associated with high-energy trauma or sports injuries.[3]

Anterior shoulder dislocation is by far the most common type, accounting for approximately 95–97% of cases worldwide.[4] It typically results from a fall on an outstretched hand, especially when the arm is abducted and externally rotated.[5] Posterior, inferior, and superior dislocations are far less frequent.[6] In Pakistan, shoulder dislocations are a frequent cause of orthopaedic emergency visits, with studies reporting a predominance of anterior dislocations and an increasing incidence among young adults involved in road traffic accidents and sports.[7,19]

Various closed-reduction techniques have been described. The Scapular Manipulation Technique (SMT) is minimally invasive, often performed without sedation, and relies on gentle scapular rotation with downward traction to relocate the humeral head.[8] Kocher's Method, one of the oldest maneuvers, involves sequential flexion, adduction, external rotation, and internal rotation of the shoulder, but carries a risk of complications if performed incorrectly.[9]

Although both techniques are widely practiced, literature directly comparing them is limited, particularly in low-resource settings such as Pakistan. Recent advances in understanding shoulder instability have improved diagnostic and management approaches.[16] Therefore, this study was designed to compare the mean reduction times of SMT and Kocher's method in the management of acute anterior shoulder dislocation.

Materials And Methods

This was a single-center quasi-experimental study conducted in the Department of Orthopedics, Rawalpindi Teaching Hospital, from September 2021 to March 2022. Approval was obtained from the Institutional Review Board of Rawalpindi Medical University. Written informed consent was obtained from all participants. Patients aged 16–60 years presenting within 24 hours of acute anterior shoulder dislocation were included. The exclusion criteria were posterior dislocation, associated fractures (except minimally displaced greater tubercle fractures <5 mm), neurovascular injury, polytrauma, inability to assume the prone position, or contraindications to sedation. Participants were alternately allocated to the two study groups as they presented to the emergency department. Group A underwent reduction using the scapular manipulation technique without sedation. Group B underwent reduction using Kocher's method under intravenous sedation and analgesia. All reductions were performed by senior orthopaedic surgeons. The primary outcome was reduction time, measured from the start of the manoeuvre to clinical confirmation of reduction. Data were analysed using SPSS version 22. Means and standard deviations were calculated for quantitative variables. Independent t-tests were used to compare mean

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reduction times between groups. Baseline characteristics were compared to assess group comparability. A p-value < 0.05 was considered statistically significant.

Results

Demographics

A total of 60 patients were included, with 30 in each group. The mean age was 38.8 ± 9.7 years; 41.7% were men and 58.3% were women. Most dislocations (96.6%) were unilateral.

Reduction Time

The Mean reduction time in group A (SMT) was 2.7 ± 0.46 min, whereas group B (Kocher's method) had a mean of 4.13 ± 0.6 min. The difference was statistically significant (p = 0.000).

Subgroup Analysis

Reduction times stratified by sex and age groups consistently favoured SMT, although the differences were not statistically significant in the subgroup comparisons.

Table 1: Demographic characteristics

Demographic characteristics	Frequency (N=60)	Percentage (100%)
Gender		
Male	25	25
Female	35	35
Group		
Group A (SMT)	30	30
Group B (Kocher's method)	30	30
Laterality		
Unilateral	58	58
Bilateral	2	2
Clinical confirmation		
No	0	0
Yes	60	60

Table 2: Comparison of reduction achieved at minutes in both interventional groups

Interventional group	N=60	Reduction achieved at (Minutes) Mean±SD	P-Value
Group A (SMT)	30	2.7±0.46	0
Group B (Kocher's method)	30	4.13±0.6	

Table 3: Stratification of reduction achieved in both groups with respect to gender

Gender			N=60	Reduction achieved at (minutes) Mean±SD	P value
Male	Group (SMT)	A	30	2.3±0.1	0.143
	Group (Kocher's method)	B	30	3.2±0.4	
Female	Group (SMT)	A	30	2.1±0.1	0.176
	Group (Kocher's method)	B	30	3.5±0.3	

Table 4: Stratification of reduction achieved in both groups with respect to age

Age			N=60	Reduction achieved at (minutes) Mean±SD	P-Value
16-35 years	Group (SMT)	A	30	2.0±0.1	
	Group (Kocher's method)	B	30	3.9±0.4	0.156
36-60 years	Group (SMT)	A	30	2.2±0.1	
	Group (Kocher's method)	B	30	3.8±0.3	0.166

Complications

No complications, such as iatrogenic fractures or neurovascular injuries, were observed in either group.

Discussion

Anterior shoulder dislocation is one of the most frequent musculoskeletal emergencies encountered in clinical practice. Multiple reduction techniques are available and generally fall into four broad categories: traction-based, leverage-based, scapular manipulation, and combined manoeuvres.[8,20] The absence of a single universally superior technique emphasises the importance of clinical judgment, patient comfort, and institutional resources in determining the best approach for each case.

Sedation and analgesia are traditionally used to facilitate patient cooperation during reductions, but these carry inherent risks such as airway obstruction, aspiration, cardiovascular compromise, or prolonged recovery periods[9]. In busy emergency departments, particularly those in low-resource environments, avoiding sedation can significantly reduce both staff burden and hospital stay duration. SMT is particularly advantageous in this respect, as it can be performed safely without anesthesia, requires minimal equipment, and is generally well tolerated by patients.[17]

Our findings demonstrated that SMT achieved significantly shorter reduction times compared to Kocher's method, echoing the results of earlier studies. Alkaduhimi, 10, in a systematic review, noted that SMT was consistently among the fastest and least painful methods, while Adhikari,[11] reported that SMT not only required less sedation but also had higher first-attempt success rates than external rotation techniques. Similarly, Sahin,[12] directly compared SMT with Kocher's method and found SMT to be quicker and safer. The alignment of our data with these studies

strengthens the case for SMT as a first-line technique, which is consistent with the principles of conservative management of primary anterior shoulder dislocation.[15]

An additional advantage of SMT is its biomechanical rationale. The technique relies on repositioning the scapula rather than exerting force on the humerus, thereby reducing stress on the joint capsule and surrounding structures. This likely accounts for the lower complication rates reported with SMT compared to those with leverage-based manoeuvres. Kocher's method, although historically popular, applies torsional force to the humerus and has been linked to iatrogenic fractures and neurovascular compromise.[14] Although no complications were observed in our cohort, this may be attributable to the experience of the surgeons involved. Nevertheless, the potential risks highlight the need for caution when employing Kocher's method, especially in less experienced hands, with current ideas in management focusing on the correct methods to stop ongoing instability.[18]

Another factor to consider is patient experience. Faster reduction with minimal force not only lowers the risk of complications but may also improve patient satisfaction and reduce the need for extended monitoring in the emergency department. SMT has been shown in several studies to achieve successful reductions without significant discomfort, with many patients reporting little to no pain during the maneuver.[13] This is in contrast to Kocher's method, which, even when performed under sedation, may be perceived as more painful.

From a systems perspective, widespread adoption of SMT could reduce reliance on sedatives and associated monitoring equipment, shorten treatment times, and facilitate faster patient turnover in overcrowded emergency departments. In resource-limited settings, where access to anaesthetic support may be inconsistent, SMT represents a practical, cost-effective, and safe alternative.

Despite these advantages, certain limitations must be acknowledged. Our study had a relatively small sample size, and given that it was single-centered, the results may not be generalizable to all populations. Additionally, only short-term outcomes, such as reduction time and immediate complications, were assessed. Future multicentre trials with larger sample sizes and studies that incorporate patient-reported outcomes, such as pain scores and satisfaction levels, would help to further validate our findings.

Overall, our data support SMT as an effective, safe, and time-efficient method for reducing anterior shoulder dislocation, with distinct advantages over Kocher's method. The adoption of SMT as the preferred first-line technique could contribute to improved patient outcomes and reduced strain on emergency services.

Conclusions

Both the SMT and Kocher's methods are effective in achieving successful reduction of anterior shoulder dislocations. However, the present study demonstrated that SMT is significantly faster, does not require sedation, and can be performed safely with minimal resources. These advantages make it especially valuable in busy emergency departments and low-resource settings, where efficiency and safety are crucial. In addition to being time-efficient, SMT avoids the risks associated with sedative agents and reduces the need for specialised monitoring, thereby facilitating rapid patient turnover. Its biomechanical basis—focusing on scapular repositioning rather than forceful leverage on the humerus—may also explain its lower complication profile compared to Kocher's method. Although no adverse events occurred in our study, the existing literature suggests that Kocher's manoeuvre may be associated with humeral fractures and neurovascular injury when not performed with great care. Given these findings, SMT should be considered the preferred first-line technique for anterior shoulder dislocation, particularly in resource-limited or high-volume emergency departments. Larger multicentre studies incorporating patient-reported outcomes, such as pain scores and satisfaction levels, are recommended to further validate its superiority and guide standardised clinical protocols.

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