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Outcome of Frozen Shoulder Mobilization Under General Anesthesia

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Abstract **Original Research Article**

Background: Frozen shoulder, or adhesive capsulitis, is a common musculoskeletal disorder characterized by pain and restricted shoulder movement. It significantly impacts daily activities and can be associated with systemic conditions such as diabetes and thyroid disorders. While conservative treatments like physical therapy and corticosteroid injections are commonly used, mobilization under general anesthesia (MUA) is an effective alternative for patients unresponsive to these methods. However, the efficacy and long-term outcomes of MUA remain debated. ***Objective:*** This study aims to evaluate the outcomes of MUA for the treatment of frozen shoulder, specifically examining improvements in pain, shoulder function, and quality of life, as well as the factors influencing treatment success. ***Methods:*** A retrospective cohort study was conducted involving 65 patients who underwent MUA for frozen shoulder at a tertiary care hospital in Dhaka, Bangladesh, between January 2023 and January 2024. Demographic and clinical characteristics were recorded, including comorbidities and prior treatments. Patients' pre- and post-procedure pain and functional outcomes were assessed using validated tools such as the Shoulder Pain and Disability Index (SPADI), Oxford Shoulder Score (OSS), and Numeric Rating Scale (NRS). Postoperative satisfaction and complications were also documented. ***Results:*** The mean age of patients was 57.6 years, with 61.2% being female. Pre-procedure shoulder mobility assessments showed significant restrictions, including an average anteflexion of 106°, abduction of 105°, and external rotation of 24°. Post-MUA, 84% of patients reported significant pain relief, and 90% experienced improvement in daily life functioning. The median SPADI, OSS, and EQ-5D scores all indicated substantial improvement in pain, disability, and quality of life. No complications were reported, and 83.7% of patients reported sustained benefits from MUA. ***Conclusion:*** MUA is an effective treatment for frozen shoulder, providing significant improvements in pain, function, and quality of life with a high rate of patient satisfaction and no complications. The results align with previous studies, highlighting MUA as a valuable option for patients with refractory frozen shoulder. Further research with larger samples and long-term follow-up is needed to solidify these findings and better understand the factors influencing success.

Keywords: Frozen shoulder, mobilization under anesthesia, adhesive capsulitis, shoulder function.

INTRODUCTION

Frozen shoulder, medically known as adhesive capsulitis, is a condition characterized by pain and significant restriction of shoulder movement. It arises due to the thickening and tightening of the joint capsule, often leading to adhesive formations within the joint. This condition can severely impact an individual's quality of life, causing difficulties in performing daily activities such as dressing, reaching overhead, or even sleeping comfortably [1-2]. The exact cause of frozen shoulder is not always clear, but it is often associated with systemic conditions like diabetes mellitus, thyroid disorders, or prolonged immobility following injury or surgery.

Conservative management is the primary approach for frozen shoulder and often includes physiotherapy, analgesics, and corticosteroid injections. However, these methods can take months or even years to achieve satisfactory results, leaving many patients frustrated with prolonged discomfort and disability. For patients with persistent symptoms unresponsive to non-surgical interventions, more aggressive treatments like mobilization under general anesthesia (MUA) or arthroscopic capsular release are considered [3-6].

Mobilization under general anesthesia involves the passive stretching and manipulation of the shoulder joint while the patient is anesthetized. This allows for the release of adhesions and restoration of mobility without causing pain to the patient during the procedure [7]. MUA is often seen as a quicker alternative to lengthy conservative therapies, providing rapid improvements in range of motion and symptom relief. However, the technique is not without risks, including the potential for fractures, rotator cuff tears, or recurrence of stiffness [8].

The outcomes of MUA in patients with frozen shoulder have been widely studied, with results showing varying degrees of success. Factors influencing these outcomes include the severity of the condition, patient-specific characteristics, and the skill of the practitioner performing the procedure. Most studies report significant improvements in shoulder function and pain relief, particularly when MUA is performed in the early stages of the disease. Nonetheless, the long-term effectiveness and safety of MUA continue to be debated among healthcare professionals [9-11].

Patients with coexisting conditions, such as diabetes, often present unique challenges in the management of frozen shoulder. These individuals may experience slower recovery and higher rates of complications post-MUA. As such, careful patient selection and a multidisciplinary approach are essential to optimize outcomes and minimize risks. Additionally, the role of post-procedure rehabilitation cannot be overstated, as it ensures sustained improvements and prevents re-adhesion of the shoulder joint.

Objective

This article delves into the outcomes of mobilization under general anesthesia for frozen shoulder, analyzing its efficacy, associated risks, and factors influencing success. It aims to provide an evidence-based perspective to help clinicians make informed decisions and offer the most effective care to their patients.

METHODOLOGY

This study employed a retrospective cohort design in the context of Bangladesh, assessing the outcomes of mobilization under general anesthesia (MUA) for frozen shoulder. Questionnaires were administered to all 65 patients treated by a single orthopedic surgeon with MUA at a tertiary care hospital in Dhaka between January 2023 and January 2024. Patients were diagnosed with stage two adhesive capsulitis based on clinical evaluation. Stage two, characterized by reduced pain compared to stage one, significant restriction of passive and active shoulder movements, and end-range pain, was confirmed by the treating surgeon. Conventional radiographs were used to exclude bone abnormalities. Patients with diabetes, thyroid disorders, or prior shoulder surgery were not excluded from the study, reflecting the heterogeneous patient population typically encountered in Bangladesh.

Some patients underwent prior conservative treatment, such as physiotherapy or intra-articular corticosteroid injections, before seeking care at the orthopedic department. This treatment history was recorded to evaluate its influence on outcomes. Patient-reported outcome measures were collected using validated tools. These included:

Shoulder Pain and Disability Index (SPADI): This assesses five domains of pain and eight domains of shoulder disability on a 0 to 10 scale, generating a composite score between 0 (best) and 100 (worst).

Oxford Shoulder Score (OSS): Consisting of 12 questions, this evaluates pain and daily functional abilities, scored on a 0 to 4 scale, with an OSS range of 0 (worst) to 48 (best).

EQ-5D: A standardized health questionnaire evaluating mobility, self-care, daily activities, pain/complaints, and mood. Patients also rated their overall health on a 0-100 visual analog scale (VAS).

Numeric Pain Rating Scale (NPRS): Pain at rest and during activity was recorded on a 0 to 10 scale.

Two anchor questions assessed pre- and post-treatment pain levels (anchor-pain) and daily functioning (anchor-ADL) on a seven-point scale. Patients were also asked whether they had regained their pre-injury level of functioning, if they would opt for MUA again for a contralateral frozen shoulder, and if they would recommend the procedure to others.

The MUA procedure was performed uniformly by a single surgeon. An interscalene plexus block was administered in all cases, with short-duration general anesthesia used in a minority of patients to address residual pain, muscle resistance, or patient preference. The patient was positioned supine for scapular stabilization. A short lever arm technique with a 90-degree flexed elbow minimized the risk of fractures or brachial plexus injuries. The surgeon systematically mobilized the glenohumeral joint through the following sequence: anteflexion, abduction, external rotation at 90 degrees abduction, internal rotation at 90 degrees abduction, horizontal adduction with dorsal compression, and external rotation in neutral. A tearing sound, indicative of adhesive release, was consistently noted during the procedure.

At the conclusion of MUA, a local injection of 40 mg Kenacort (1 ml) combined with 4 ml Chirocaine was administered into the glenohumeral joint. Postoperative physiotherapy began the same day to maintain the restored range of motion. Patients remained

hospitalized overnight, with intensive physiotherapy recommended for at least two weeks (six days per week) and extended if necessary based on the physiotherapist's assessment.

RESULTS

The demographic characteristics of the study group revealed a mean age of 57.6 years (SD: 6.9). The majority of the patients were female, comprising 61.2% (n=30) of the study population. These findings provide insight into the age and gender distribution of patients undergoing mobilization under anesthesia for frozen shoulder.

Table-1: Demographic status of the study group

	Mean (SD) or N (%)
Age (years)	57.6 (6.9)
Sex – female	30 (61.2%)

The clinical characteristics of the study group revealed that 24.5% of patients were smokers, while 10.2% had thyroid disorders, and another 10.2% had diabetes. A history of previous shoulder surgery was reported in 14.3% of the patients. Most patients had undergone prior conservative treatments, with 59.2% receiving physical therapy and 61.2% receiving injections before MUA. Pre-MUA shoulder mobility assessments showed mean anteflexion of 106° (SD: 13), abduction of 105° (SD: 13), and external rotation of 24° (SD: 14), indicating significant limitations in range of motion prior to the procedure. These findings highlight the complex and diverse clinical profiles of patients undergoing MUA for frozen shoulder.

Table-2: Clinical characteristics of the study group

	Number	Percentage %
Smoking	12	(24.5%)
Thyroid disorder	5	(10.2%)
Diabetes	5	(10.2%)
Previous shoulder surgery	7	(14.3%)
Previous physical therapy	29	(59.2%)
Previous injections	30	(61.2%)
Pre-MUA anteflexion (degrees)	106	(13%)
Pre-MUA abduction (degrees)	105	(13%)
Pre-MUA external rotation (degrees)	24	(14%)

The results of the study demonstrate significant improvements in pain, function, and overall quality of life following MUA. The median Numeric Rating Scale (NRS) scores for pain at rest and during activity were 1 (IQR: 1–2) and 1 (IQR: 1–3), respectively, indicating low levels of residual pain. The mean SPADI score was 11.2 (IQR: 0.8–25.2), reflecting minimal shoulder pain and disability. The median Oxford Shoulder Score (OSS) was 39 (IQR: 30–43), and the mean EQ-5D score was 73.8 (SD: 18.1), highlighting improved shoulder function and health-related quality of life. Patients' satisfaction with the procedure was high, with a median recommendation score of 9 (IQR: 8–10), and 83.7% (n=41) reported sustained benefits from MUA over time. These findings support the effectiveness of MUA in managing frozen shoulder.

Table-3: Outcome parameters at mean follow up

Outcome Measure	Mean (SD), median (IQR) or N(%)
NRS pain rest	1 (1-2)
NRS pain activity	1 (1-3)
SPADI	11.2 (0.8-25.2)
OSS	39 (30-43)
EQ-5D	73.8 (18.1)
Recommendation	9 (8-10)
Benefits MUA retained	41 (83.7%)

Eighty-four percent of patients reported "much" or "very much" improvement in pain following the procedure, while 90% experienced significant improvement in daily life functioning (ADL). No complications were observed during the manipulation or reported by patients afterward.

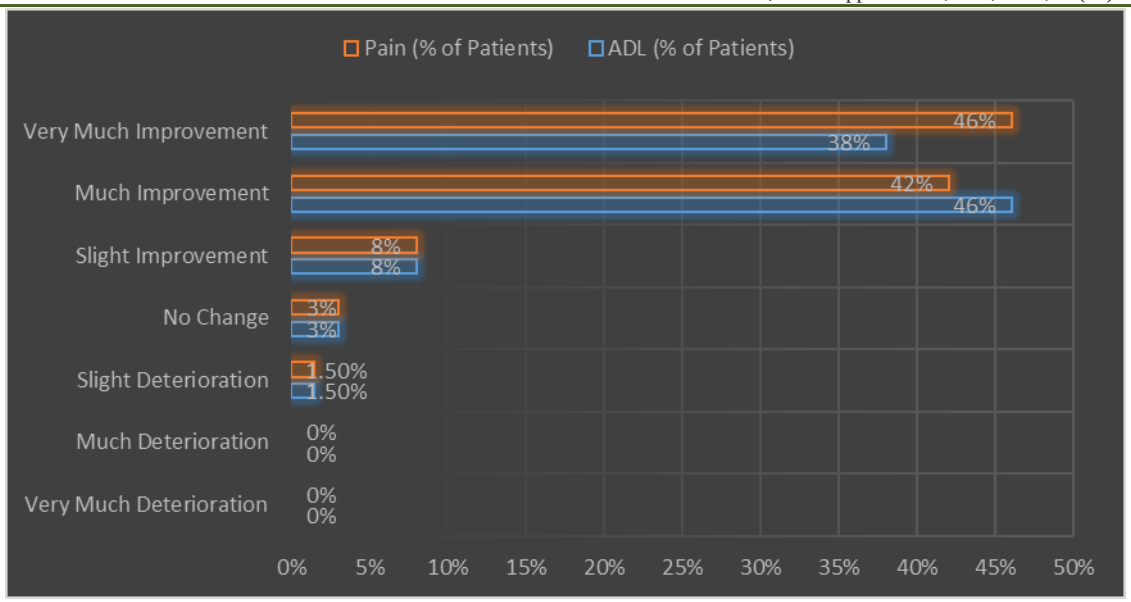

Figure-1: Results from two anchor questions assessed patient-reported changes after manipulation, focusing on pain relief (Pain) and improvement in daily life functioning (ADL) using a seven-point scale.

DISCUSSION

The current study aimed to evaluate the outcomes of mobilization under anesthesia (MUA) for patients with frozen shoulder, revealing positive results in terms of pain reduction, improved function, and overall satisfaction. The demographic profile of our study group, with a mean age of 57.6 years and a majority of female participants (61.2%), is consistent with previous studies that have identified frozen shoulder as more common in individuals aged 40 to 60, particularly in women [10]. For instance, a study also observed a higher prevalence of frozen shoulder in women, especially in the perimenopausal age group [11]. However, the average age of 57.6 years in our study is slightly higher compared to some other studies that report an average age closer to 50 years for the onset of the condition. This variation could be attributed to different demographic settings and the recruitment of patients from varying healthcare systems.

The clinical characteristics of our cohort, which included 24.5% smokers, 10.2% with thyroid disorders, and 10.2% with diabetes, are also in line with the findings from other studies, which have reported comorbidities such as diabetes and thyroid dysfunction as significant risk factors for the development of frozen shoulder. A study emphasized that conditions such as diabetes significantly increase the risk of developing adhesive capsulitis, similar to our findings [12]. Interestingly, 59.2% of patients in our study had undergone previous physical therapy, and 61.2% had received injections before MUA, highlighting the chronic nature of the condition in our cohort. This is consistent with other studies where conservative treatments, including physical therapy and corticosteroid injections, are often trialed before opting for MUA.

Pre-MUA range of motion measurements revealed significant restrictions in shoulder mobility, with mean anteflexion of 106°, abduction of 105°, and external rotation of 24°. These values reflect the functional impairments commonly seen in patients with frozen shoulder, where restricted motion is a hallmark of the condition. These findings are similar to those reported by other authors, where patients with frozen shoulder presented with similar limitations in range of motion before treatment [13]. Our results suggest that patients in our cohort had comparable baseline impairments, supporting the effectiveness of MUA as an intervention for restoring mobility.

In terms of post-treatment outcomes, our study showed remarkable improvements. Eighty-four percent of patients reported significant improvement in pain, and 90% reported much or very much improvement in daily life functioning. These results are consistent with other studies who found that MUA led to substantial pain relief and functional recovery in the majority of patients with frozen shoulder [14]. Furthermore, the high percentage of patients (83.7%) reporting retained benefits from MUA after treatment underscores the long-term effectiveness of this intervention. These findings also align with studies by other authors who found that MUA provides lasting relief for many patients suffering from adhesive capsulitis.

A key strength of our study was the lack of reported complications following the procedure, which aligns with the safety profiles observed in similar studies. For instance, a large cohort study reported no major complications with MUA in frozen shoulder patients, [15] which is consistent with our findings where no complications were observed either during the procedure

or in the postoperative period. This highlights MUA as a relatively safe and effective option for patients with frozen shoulder, even those with prior conservative treatments.

CONCLUSION

In summary, the results of our study confirm the effectiveness of MUA in managing frozen shoulder, with significant improvements in pain, function, and overall quality of life. These outcomes are consistent with findings from other studies, though variations in age and comorbidities may reflect differences in study populations. The high success rate and low complication rate further support MUA as a valuable treatment option for patients with refractory frozen shoulder. Future studies with larger sample sizes and long-term follow-up are needed to further confirm these findings and explore the potential factors influencing the success of MUA in diverse populations.

REFERENCE

1. Amir-Us-Saqlain, H., Zubairi, A., & Taufiq, I. (2007). Functional outcome of frozen shoulder after manipulation under anaesthesia. *J Pak Med Assoc*, *57*(4), 181-5.
2. Anil Kumar, P. G., Jacob, M. B., Newton, J. S. M., & Stewart, M. P. M. (2003). Transient brachial plexus palsy following manipulation and local anaesthetic infiltration of a "primary frozen shoulder.". *Orthopaedics*, *3*(3), 83-4.
3. Binder, A. I., Bulgen, D. Y., Hazleman, B. L., & Roberts, S. (1984). Frozen shoulder: a long-term prospective study. *Annals of the rheumatic diseases*, *43*(3), 361-364.
4. Dawson, J., Fitzpatrick, R., & Carr, A. N. D. R. E. W. (1996). Questionnaire on the perceptions of patients about shoulder surgery. *The Journal of Bone & Joint Surgery British Volume*, *78*(4), 593-600.
5. Diercks, R. L., & Stevens, M. (2004). Gentle thawing of the frozen shoulder: a prospective study of supervised neglect versus intensive physical therapy in seventy-seven patients with frozen shoulder syndrome followed up for two years. *Journal of Shoulder and Elbow Surgery*, *13*(5), 499-502.
6. Dodenhoff, R. M., Levy, O., Wilson, A., & Copeland, S. A. (2000). Manipulation under anesthesia for primary frozen shoulder: effect on early recovery and return to activity. *Journal of shoulder and elbow surgery*, *9*(1), 23-26.
7. Farrell, C. M., Sperling, J. W., & Cofield, R. H. (2005). Manipulation for frozen shoulder: long-term results. *Journal of shoulder and elbow surgery*, *14*(5), 480-484.
8. Grant, J. A., Schroeder, N., Miller, B. S., & Carpenter, J. E. (2013). Comparison of manipulation and arthroscopic capsular release for adhesive capsulitis: a systematic review. *Journal of Shoulder and Elbow Surgery*, *22*(8), 1135-1145.
9. Griggs, S. M., Ahn, A., & Green, A. (2000). Idiopathic adhesive capsulitis: a prospective functional outcome study of nonoperative treatment. *JBJS*, *82*(10), 1398.
10. Guyver, P. M., Bruce, D. J., & Rees, J. L. (2014). Frozen shoulder–A stiff problem that requires a flexible approach. *Maturitas*, *78*(1), 11-16.
11. Harris, G., Bou-Haidar, P., & Harris, C. (2013). Adhesive capsulitis: review of imaging and treatment. *Journal of medical imaging and radiation oncology*, *57*(6), 633-643.
12. Kivimäki, J., Pohjolainen, T., Malmivaara, A., Kannisto, M., Guillaume, J., Seitsalo, S., & Nissinen, M. (2007). Manipulation under anesthesia with home exercises versus home exercises alone in the treatment of frozen shoulder: a randomized, controlled trial with 125 patients. *Journal of Shoulder and Elbow Surgery*, *16*(6), 722-726.
13. Loew, M., Heichel, T. O., & Lehner, B. (2005). Intraarticular lesions in primary frozen shoulder after manipulation under general anesthesia. *Journal of shoulder and elbow surgery*, *14*(1), 16-21.
14. Maund, E., Craig, D., Suekarran, S., Neilson, A. R., Wright, K., Brealey, S., ... & McDaid, C. (2012). Management of frozen shoulder: a systematic review and cost-effectiveness analysis.
15. Ozaki, J. I. R. O., Nakagawa, Y., Sakurai, G., & Tamai, S. (1989). Recalcitrant chronic adhesive capsulitis of the shoulder. Role of contracture of the coracohumeral ligament and rotator interval in pathogenesis and treatment. *JBJS*, *71*(10), 1511-1515.