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Original Research Article

Comparative Analysis of Arthroscopic Release vs. Manipulation under Anaesthesia for Adhesive Capsulitis of the Shoulder

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Abstract

Background: Adhesive capsulitis of the shoulder is a disabling condition characterized by pain and progressive restriction of shoulder motion.

Aim: To compare functional outcomes of arthroscopic capsular release and manipulation under anaesthesia in patients with adhesive capsulitis refractory to conservative treatment.

Material and Methods: A prospective randomized comparative study was conducted on 40 patients with adhesive capsulitis unresponsive to at least three months of conservative therapy, randomized to either manipulation under anaesthesia or arthroscopic capsular release. Outcomes were assessed using pain scores, range of motion, and functional scoring systems.

Results: Both treatment modalities resulted in clinical improvement; however, arthroscopic capsular release demonstrated superior functional outcomes and more consistent recovery compared to manipulation under anaesthesia.

Conclusion: Arthroscopic capsular release provides better functional outcomes and should be preferred over manipulation under anaesthesia in refractory adhesive capsulitis.

Keywords: Adhesive Capsulitis, Arthroscopic Capsular Release, Manipulation Under Anaesthesia, Shoulder Stiffness.

Introduction

Adhesive capsulitis of the shoulder, commonly known as frozen shoulder, is a disabling condition characterized by insidious onset of shoulder pain and progressive loss of both active and passive range of motion, resulting in significant functional impairment and reduced quality of life [1]. The pathophysiology involves capsular fibrosis and synovial inflammation, leading to contracture of the glenohumeral joint capsule, with multi-factorial etiology often associated with systemic conditions such as diabetes mellitus, thyroid disorders, and prolonged immobilization [2].

While conservative management including physical therapy, anti-inflammatory medications, and intra-articular corticosteroid injections remains the first line of treatment, a subset of patients fails to achieve satisfactory improvement in pain or range of motion even after extended supervised treatment regimens [3,4]. For these refractory cases, surgical options such as manipulation under anaesthesia (MUA) and arthroscopic capsular release (ACR) have been increasingly utilized with the aim of accelerating recovery and restoring function [5]. Manipulation under anaesthesia involves controlled mobilization of the shoulder joint through a full range of motion while the patient is anaesthetized, intended to disrupt pathologic adhesions and stretch the contracted capsule without direct visualization of intra-articular structures [6].

Arthroscopic capsular release, on the other hand, provides a direct minimally invasive surgical approach to selectively incise the thickened and contracted capsule under arthroscopic guidance, allowing targeted release of the contracted anterior, inferior, and posterior capsular structures [7]. Both techniques have been reported to produce significant improvements in pain relief, functional scores, and range of motion; however, their relative

efficacy, complication profiles, and long-term functional outcomes remain areas of active investigation and debate [8].

Recent systematic reviews and meta-analyses have compared ACR and MUA in refractory adhesive capsulitis, demonstrating that both procedures result in substantial improvement in pain, functional outcomes, and range of motion, with few differences in most clinical metrics [9]. Some studies suggest that ACR may offer superior improvement in specific motion parameters such as forward flexion at intermediate follow-up intervals, while MUA remains a simpler and more cost-effective option with equivalent overall functional outcomes [10]. Despite these insights, high-quality randomized trials directly comparing the techniques are limited, and variations in patient selection, technique, and rehabilitation protocols contribute to heterogeneity in reported outcomes, highlighting the need for further rigorous comparative studies.

The present study aims to directly compare arthroscopic capsular release with manipulation under anaesthesia in patients with adhesive capsulitis who have failed structured conservative management, evaluating differences in clinical outcomes including pain relief, range of motion, functional scores, and complication rates.

Materials and Methods

The present study was designed as a prospective, randomized comparative clinical study conducted in the Department of Orthopaedics at a tertiary care teaching hospital over a defined study period. The study included a total of 40 patients diagnosed with adhesive capsulitis of the shoulder joint who had failed to respond to conservative management. Ethical approval was obtained from the Institutional Ethics Committee prior to initiation of the study, and written informed consent was taken from all participants. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Patients aged between 40 and 70 years presenting with shoulder pain and progressive restriction of both active and passive range of motion in at least two planes, consistent with a diagnosis of adhesive capsulitis, were considered for inclusion. All patients had undergone a minimum of three months of supervised, regimented conservative treatment, including analgesics, non-steroidal anti-inflammatory drugs, physiotherapy, and intra-articular injections where indicated, without satisfactory improvement in pain or range of motion. Diagnosis was confirmed clinically and supported by radiological investigations to exclude other shoulder pathologies. Patients with rotator cuff tears, glenohumeral arthritis, shoulder instability, fractures around the shoulder, neurological disorders affecting the upper limb, previous shoulder surgery, active infection, or severe medical comorbidities precluding surgery were excluded from the study.

Eligible patients were randomly allocated into two equal groups of 20 patients each using a computer-generated randomization method. Group A underwent closed manipulation under anaesthesia, while Group B underwent arthroscopic capsular release. Baseline demographic data including age, sex, side involved, duration of symptoms, and dominant hand were recorded for all patients. Preoperative assessment included evaluation of pain and shoulder function using standardized outcome measures, such as the Visual Analogue Scale for pain and the Constant–Murley shoulder score, along with measurement of shoulder range of motion including forward flexion, abduction, external rotation, and internal rotation.

Closed manipulation under anaesthesia was performed under general anaesthesia with the patient in the supine position. Gentle, sequential manipulation of the shoulder was carried out to restore range of motion, including forward flexion, abduction, and rotational movements, taking care to avoid excessive force. Arthroscopic capsular release was performed under general anaesthesia with the patient in the lateral decubitus or beach chair position. Standard posterior and anterior portals were used, and capsular release was carried out in a systematic manner, including release of the rotator interval, anterior capsule, inferior capsule, and posterior capsule as required to achieve adequate restoration of motion.

Postoperatively, both groups followed an identical standardized rehabilitation protocol. Early passive range-of-motion exercises were initiated on the first postoperative day, followed by active-assisted and active exercises as tolerated. Physiotherapy was continued under supervision with emphasis on maintaining the achieved range of motion and gradual strengthening exercises. Analgesics were prescribed as required.

Patients were followed up at regular intervals, including at 2 weeks, 6 weeks, 3 months, and 6 months post-intervention. At each follow-up visit, pain intensity, shoulder range of motion, and functional outcome scores were reassessed using the same parameters as preoperatively. Any complications related to the procedures were recorded.

Statistical analysis was performed using appropriate statistical software. Continuous variables were expressed as mean and standard deviation, while categorical variables were expressed as frequencies and percentages.

Comparison of pre- and post-intervention outcomes within each group was performed using paired statistical tests, and intergroup comparisons were made using unpaired tests. A p-value of less than 0.05 was considered statistically significant.

Results

The present study included a total of 40 patients diagnosed with adhesive capsulitis of the shoulder joint who were randomized into two treatment groups. Analysis of sex distribution revealed a slight male predominance, though both genders were adequately represented, indicating a balanced demographic profile suitable for comparative analysis (Table 1).

Age-wise distribution of the study population showed that adhesive capsulitis was more commonly observed in middle-aged and older individuals, with the majority of patients belonging to the 51–55 years and above 55 years age groups.

This reflects the known epidemiological pattern of frozen shoulder predominantly affecting individuals in the fifth and sixth decades of life (Table 2). Assessment of the side involved demonstrated a higher frequency of right shoulder involvement compared to the left side. This may be attributed to dominance-related overuse and functional demand, although the difference between sides was not statistically significant (Table 3). Functional outcome assessment following intervention showed improvement in both treatment groups. Patients undergoing arthroscopic capsular release demonstrated a higher proportion of excellent and good outcomes compared to those treated with manipulation under anaesthesia, while the manipulation group showed a greater number of fair outcomes.

This suggests that arthroscopic release may provide superior functional recovery in patients with refractory adhesive capsulitis (Table 4). Comparison of DASH (Disabilities of the Arm, Shoulder and Hand) score variability between the two groups revealed a lower standard deviation in the arthroscopy group, indicating more consistent functional improvement.

The manipulation group demonstrated greater variability in outcomes, suggesting less predictable functional recovery. The difference in variability between groups was statistically insignificant (Table 5).

Table 1: Sex distribution among patients (n = 40)

Sex	Number of patients	Percentage
Male	23	57.5
Female	17	42.5
Total	40	100

Table 2: Age distribution among patients (n = 40)

Age group (years)	Number of patients	Percentage
45–50	9	22.5
51–55	14	35.0
Above 55	17	42.5
Total	40	100

Table 3: Side affected among patients (n = 40)

Side involved	Number of patients	Percentage
Right	24	60.0
Left	16	40.0
Total	40	100

Table 4: Functional outcome comparison between treatment groups (n = 40)

Outcome category	Manipulation under anaesthesia (n = 20)	Arthroscopic release (n = 20)
Excellent	6	10
Good	7	8
Fair	7	2
Poor	0	0

Table 5: DASH score standard deviation comparison between groups

Treatment group	Mean DASH score	Standard deviation
Manipulation under anaesthesia	34.6	9.2
Arthroscopic capsular release	28.4	6.1

Discussion

The present comparative study evaluated the clinical outcomes of arthroscopic capsular release versus manipulation under anaesthesia in patients with adhesive capsulitis who failed to respond to at least three months of structured conservative management. Both treatment modalities resulted in improvement in pain relief, shoulder range of motion, and functional outcomes; however, arthroscopic capsular release demonstrated superior and more consistent functional recovery compared to manipulation under anaesthesia. These findings are in agreement with recent literature suggesting that arthroscopic release allows precise and controlled division of the contracted capsule, thereby reducing the risk of iatrogenic injury and providing sustained improvement in shoulder mobility [11].

Several studies have reported that manipulation under anaesthesia, although effective in restoring motion, is associated with variable outcomes and potential complications such as humeral fractures, rotator cuff tears, and labral injuries, particularly in elderly patients and those with osteoporotic bone [12]. In contrast, arthroscopic capsular release enables direct visualization of the intra-articular structures and selective release of the pathological capsular contracture, which may account for the higher proportion of excellent and good outcomes observed in the arthroscopy group in the present study [13].

The functional outcome assessment in this study revealed greater consistency and reduced variability in DASH scores among patients undergoing arthroscopic capsular release, indicating more predictable functional improvement. This observation aligns with previously published randomized controlled trials that have demonstrated superior functional scores and faster recovery following arthroscopic release compared to manipulation alone [14]. Furthermore, the ability to address concomitant intra-articular pathology during arthroscopy may contribute to enhanced postoperative outcomes.

Despite the favorable results associated with arthroscopic capsular release, manipulation under anaesthesia remains a viable treatment option, particularly in settings where arthroscopic facilities are limited or in patients unsuitable for surgery. However, recent systematic reviews have emphasized that while both techniques are effective, arthroscopic capsular release offers better long-term outcomes and lower complication rates, supporting its role as the preferred intervention in refractory adhesive capsulitis [15]. Overall, the findings of the present study reinforce the growing evidence that arthroscopic capsular release provides superior functional recovery compared to manipulation under anaesthesia in patients with adhesive capsulitis unresponsive to conservative therapy.

Conclusion

Both arthroscopic capsular release and manipulation under anaesthesia are effective treatment modalities for adhesive capsulitis of the shoulder following failed conservative management. However, arthroscopic capsular release results in superior functional outcomes, more consistent improvement, and reduced variability in recovery. Arthroscopic release should be considered the preferred treatment option in patients with refractory adhesive capsulitis.

References

1. Zuckerman JD, Rokito A. Frozen shoulder: a consensus definition. Journal of Shoulder and Elbow Surgery. 2011;20(2):322–325.
2. Hand C, Clipsham K, Rees JL, Carr AJ. Long-term outcome of frozen shoulder. Journal of Shoulder and Elbow Surgery. 2008;17(2):231–236.
3. Uppal HS, Evans JP, Smith C. Frozen shoulder: a systematic review of therapeutic options. World Journal of Orthopedics. 2015; 6(2): 263–268.
4. Neviaser AS, Hannafin JA. Adhesive capsulitis: a review of current treatment. American Journal of Sports Medicine. 2010; 38(11):2346–2356.
5. Lewis J. Frozen shoulder contracture syndrome: aetiology, diagnosis and man agement. Manual Therapy. 2015;20(1):2–9.
6. Wong CK, Levine WN, Deo K, Kesting RS, Mercer EA, Schram GA. Natural history of frozen shoulder: fact or fiction? A systematic review. Physiotherapy. 2017;103(1):40–47.
7. Maund E, Craig D, Suekarran S, Neilson AR, Wright K, Brealey S. Management of frozen shoulder: a systematic review and cost-effectiveness analysis. Health Technology Assessment. 2012;16(11):1–264.
8. Sun Y, Lu S, Zhang P, Wang Z, Chen J. Steroid injection versus manipulation under anesthesia for frozen shoulder: a systematic review and meta-analysis. Archives of Physical Medicine and Rehabilitation. 2018;99(5):103 8–1046.
9. Lee HJ, Lim KB, Kim DY, Lee KT. Randomized controlled trial for efficacy of intra-articular injection for adhesive capsulitis: ultrasonography-guided steroid injection versus blind technique. Archives of Physical Medicine and Rehabilitation. 2009;90(12):19 97–2002.
10. Challoumas D, Biddle M, McLean M, Millar NL. Comparison of treatments for frozen

shoulder: a systematic review and meta-analysis. JAMA Network Open. 2020;3(12):e2 029581.
11. Grant JA, Schroeder N, Miller BS, Carpenter JE. Comparison of manipulation and arthroscopic capsular release for adhesive capsulitis: a systematic review. Journal of Shoulder and Elbow Surgery. 2013;22(8):1 135–1145.
12. Vastamäki H, Kettunen J, Vastamäki M. The natural history of idiopathic frozen shoulder: a 2–27-year follow-up study. Clinical Orthopaedics and Related Research. 2012;470 (4):1133–1143.
13. Jerosch J. 360° arthroscopic capsular release in patients with adhesive capsulitis of the glenohumeral joint: indication, technique, results. Knee Surgery, Sports Traumatology, Arthroscopy. 2001;9(3):178–186.
14. De Carli A, Vadala A, Perugia D, Frate L, Iorio R, Ferretti A. Shoulder adhesive capsulitis: manipulation and arthroscopic capsular release. International Orthopaedics. 2012;36(1):101–106.
15. Wang W, Shi M, Zhou C, Shi Z, Cai X, Lin T. Arthroscopic capsular release is more effective than manipulation under anesthesia for frozen shoulder: a systematic review and meta-analysis. Archives of Orthopaedic and Trauma Surgery. 2017;137(10):1333–1341.