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A COHORT STUDY COMPARING SHOULDER PRIMARY ADHESIVE CAPSULITIS TREATMENT WITH ARTHROSCOPIC CAPSULAR RELEASE, SUBACROMIAL DECOMPRESSION, ROTATOR INTERVAL RELEASE AND MANIPULATION UNDER GENERAL ANESTHESIA

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Abstract

Background

In 90% of cases, adhesive capsulitis is manageable using conservative management strategies but it requires optimum surgical intervention if it is not cured with conservative strategies. This study aims to compare the combination of arthroscopic capsular release and rotator interval release and manipulation under general anesthesia.

Method

A total of 120 patients who did not respond to conservative management strategies were included in this study. They were divided into two groups: 60 patients underwent manipulation under general anesthesia (GA) alone, and the other 60 patients received a combination of arthroscopic capsular release, rotator interval release, and manipulation under GA. Visual Analog Scale (VAS) and the Oxford Shoulder Score (OSS)were recorded before surgery and at follow-ups after one week, one month, three months, and six months.

Results

Both VAS and OSS declined significantly in both groups. For the manipulation under the GA group, the OSS decreased from 49.8±3.3 to 30±4.4 after six months, while the combination group saw a reduction from 50.1±4.4 to 17.4±3.0 after six months. Similarly, the VAS decreased from 6.65±0.93 to 1.47±0.8 in the manipulation group, and from 7.6±1.0 to 0.29±0.47 in the combination group after six months. The combination procedure showed significantly better outcomes in terms of both pain reduction and improved shoulder function ($p<0.001$).

Conclusion

The combination of arthroscopic capsular release, rotator interval release, and manipulation under general anesthesia provides significantly better outcomes than manipulation under general anesthesia alone for adhesive capsulitis, as evidenced by improvements in VAS and OSS over six months.

Recommendation

Symptoms and stages of adhesive capsulitis should be taken into consideration while selecting the best possible conservative management strategy and surgical intervention.

Keywords: *Adhesive capsulitis, Visual Analog Scale (VAS), Oxford Shoulder Score (OSS), surgical intervention.*
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Introduction

Adhesive capsulitis also termed a frozen shoulder is a progressive illness that restricts the mobility of shoulders. Adhesive capsulitis is an idiopathic disorder for which the pathophysiology and the cause are not clear yet. It has been found that individuals suffering from various lifestyle disorders such as diabetes mellitus, hypertension, hypothyroidism, and osteoporosis are prone to adhesive capsulitis. However, a study found that lack of physical activity in people above the age of 40 years leads to restricted motion of the shoulder rotation [1].

Symptoms of adhesive capsulitis might vary depending on the stage of the disease but the common symptoms include pain and partial to no movements in the shoulder. Although the management guidelines for adhesive capsulitis are not clear yet the conservative treatment includes the use of analgesics, corticosteroids, and physiotherapy. In 90% of the cases, there is improvement observed in the patients with

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conservative management strategies [2]. Nevertheless, the cause of the disease and its progression also influences the outcomes. In the case of primary adhesive capsulitis for which the cause is generally known can be improved with conservative strategies however, secondary adhesive capsulitis that occurs due to surgery, trauma, and fracture cannot be improved without surgical intervention. Especially in cases of the geriatric population as for them, the bones are deficient in calcium and degenerating [3].

The three stages of frozen shoulder are namely freezing, frozen, and thawing. Around 6 months to 12 months are required for adhesive capsulitis to complete the three stages and recover completely from a frozen shoulder with conservative management. Freezing is the initial period when there is mild pain along with reduced movements. The frozen stage causes extremely painful shoulders and the day-to-day activities cannot be performed in this stage. The recovery phase is the thawing phase in which the movements start improving and the pain subsides [4]. In those individuals who cannot recover within this period, they are recommended to undergo manipulation under general anesthesia. The procedure involves varying movements of the shoulder performed by surgeons under the influence of general anesthesia. This helps in breaking the capsular fibrosis without actually determining its location and how it is affecting the movements [5].

Advanced surgical techniques involve a combination of certain invasive procedures wherein the exact location of the capsular fibrosis is determined and the outcome is improved with breaking of the specific fibrosis in the capsule [6]. The combination of such procedures includes the arthroscopic release of the capsule along with decompression and manipulation under general anesthesia with rotator interval release. The efficacy of the procedure can be determined by evaluating the shoulder before and after surgical intervention. Oxford shoulder score measures the movements of the shoulder as well visual analysis score is required to determine the outcome of the surgical intervention [7]. This study aims to compare the combination of arthroscopic capsular release and rotator interval release and manipulation under general anesthesia. The effectiveness and outcomes of the procedures are analyzed in detail.

Method

Study Design

This was a comparative cohort interventional study conducted prospectively.

Study Setting

The study was conducted at the Indira Gandhi Institute of Medical Science, Patna Bihar, India. Data collection occurred between February 2024 to July 2024.

Participants

A total of **120 patients** diagnosed with adhesive capsulitis, who did not respond to conservative management, were included in the study. Participants were randomly assigned into two groups:

- **Group 1** (Manipulation under GA): 60 participants
- **Group 2** (Combination of arthroscopic capsular release, rotator interval release, and manipulation under GA): 60 participants

Inclusion Criteria

1. Patients diagnosed with adhesive capsulitis based on clinical and radiological findings.
2. Patients who did not respond to conservative management (e.g., physiotherapy, corticosteroids) for at least six months.
3. Patients aged 40 years and above with restricted shoulder mobility and severe pain.

Exclusion Criteria

1. Patients with cardiovascular or inflammatory conditions.
2. Patients with a history of recent trauma or fractures around the shoulder joint.
3. Patients with systemic conditions like rheumatoid arthritis or systemic lupus erythematosus.
4. Pregnant women and patients are unable to undergo general anesthesia.
5. Patients who had complete recovery after the treatment were excluded from the study.

Bias

There were potential biases in the study, including selection bias, as patients were only those who did not respond to conservative management. Moreover, observer bias could occur since the same orthopedic surgeon evaluated outcomes post-surgery, potentially influencing the assessment.

Data Collection and Procedure

The patients with adhesive capsulitis were treated with conservative management strategies for six months. The conservative management procedure was according to the standard protocol for treatment. Those patients who underwent surgical intervention were further divided into two groups. In total 120 patients required surgical intervention. The first group underwent surgery by arthroscopic capsular release and rotator interval release with manipulation under general anesthesia. The other group underwent surgery by manipulation under general anesthesia. The groups were randomly assigned, and both groups had an equal number of participants.

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The visual analog score and Oxford shoulder score were used as a criterion to evaluate the condition and the movements of the shoulder. The scores were recorded before the surgical intervention after the surgical intervention, during a week's follow-up, during a month's follow-up, 3 months' follow-up, and 6 months' follow-up were recorded. The patients were also asked about their day-to-day activities concerning the motion of the shoulder. For the second group, the adhesiolysis procedure was cold shoulder was used, arthroscopic picture was taken and a rasp was used to carry out the procedure.

Ethical Consideration

Ethical approval was obtained from the Institutional Ethics Committee of Indira Gandhi Institute of Medical Sciences (IGIMS), Patna, India.

The information consent was obtained from the patients and the institutional ethics committee approved the conduction of this study.

Statistical Analysis

The data obtained from both groups were arranged in a tabular format. The data was subjected to statistical analysis. The data was compared statistically to determine the significance of the difference. For statistical comparison, SPSS software was used.

Result

The participants in the study were mostly above the age of 40 years the average age of the participants was 48±6.7 years. Considering the gender of the patients it was found that numerically there were more females compared to males. Among the 120 participants, there were 72 females and there were 48 males in the study. The association of gender with the occurrence of adhesive capsulitis was not found to be significant statistically. It was found that the right side shoulder was more dominant in the occurrence of adhesive capsulitis compared to the left side. There were 57 patients with left shoulder capsulitis and 63 patients with right shoulder capsulitis. The patients who underwent arthroscopic release with decompression, rotator interval release, and manipulation under general anesthesia had major right shoulder capsulitis. Table no. 1 presents the demographic and clinical data.

Table No. 1: Demographic Profile

Demographic Characteristics	**Values**
Mean Age (years)	48±6.7
Gender	
Females	72
Males	48
Dominant Shoulder Affected	
Left	57
Right	63

Table No.2: Comparison of The Oxford Shoulder Score of The Patients

Period	Manipulation under general anesthesia	Arthroscopic release, rotator interval release, and manipulation under general anesthesia	P- value	Significance
Before the procedure	49.8±3.3	50.1±4.4	0.75	Not significant
A week after the procedure	44.4±2.4	40.5±2.3	0.001	Significant
A month after the procedure	39.1±2.1	31.6±1.3	0.001	Significant
3 months after the procedure	34.8±4.3	24.5±3.1	0.0011	Significant
6 months after the procedure	30±4.4	17.4±3.0	0.0011	Significant

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The Oxford shoulder score for the patients before the surgical procedure for patients undergoing manipulation under general anesthesia was found to be 49.8±3.3, after a week it was 44.4±2.4, after a month it was 39.1±2.1, during 3rdmonth follow-up, it was 34.8±4.3, and during 6th-month follow-up it was 30±4.4. A decrease in the Oxford shoulder score was observed during each follow-up for the patients who underwent manipulation under general anesthesia. Similarly, for the patients who underwent a combination of arthroscopic release, rotator interval release, and manipulation under general anesthesia, the Oxford shoulder score before the surgery was 50.1±4.4, after 1 week of the procedure it was 40.5±2.3, after a month follow-up it was 31.6±1.3, after 3 month's follow-up it was 24.5±3.1, and after 6 month's follow-up, it was 17.4±3.0. It was observed the difference in the score was not significant before the surgery but after the conduction of the respective procedures for each group, it was found that there was a significant difference in the decrease observed among the patients who underwent combination procedures compared to those who underwent only manipulation under general anesthesia. Table no. 2 gives the details of the OSS of the patients and it illustrates the comparison between both the groups.

Table No.3: Comparison of The Visual Analog Score of The Patients

Period	Manipulation under general anesthesia	Arthroscopic release, rotator interval release, and manipulation under general anesthesia	P- value	Significance
Before the procedure	6.65±0.93	7.6±1.0	0.005	Not significant
A week after the procedure	3.3±1.2	2.3±1.1	0.001	Significant
A month after the procedure	2.6±1.3	1±0.3	0.001	Significant
3 months after the procedure	1.94±0.8	0.47±0.5	0.00	Significant
6 months after the procedure	1.47±0.8	0.29±0.47	0.00	Significant

The visual analog score of the patients before the surgical procedure for patients undergoing manipulation under general anesthesia was found to be 6.65±0.93, after a week it was 3.3±1.2, after a month it was 32.6±1.3, during 3rdmonth follow-up it was 1.94±0.8, and during 6th-month follow-up it was 1.47±0.8. A decrease in the visual analog score was observed during each follow-up for the patients who underwent manipulation under general anesthesia. Similarly, for the patients who underwent a combination of arthroscopic release, rotator interval release, and manipulation under general anesthesia, the visual analog score before the surgery was 7.6±1.0, after 1 week of the procedure it was 2.3±1.1, after the month follow-up it was 1±0.3, after 3 month's follow-up it was 0.47±0.5, and after 6 month's follow-up it was 0.29±0.47. It was observed the difference in the score was not significant before the surgery. Still, after the conduction of the respective procedures for each group, it was found that there was a considerable difference in the decrease observed among the patients who underwent combination procedures compared to those who underwent only manipulation under general anesthesia. Table no. 2 gives the details of the VAS of the patients and it illustrates the comparison between both the groups.

Discussion

The study included 120 participants, predominantly above the age of 40, with an average age of 48±6.7 years. There were more females (72) than males (48) in the study population, although gender was not statistically associated with the occurrence of adhesive capsulitis. In terms of shoulder dominance, the right shoulder was more commonly affected (63 participants), compared to the left shoulder (57 participants). This distribution aligns with common findings in shoulder pathologies, where right-hand dominance is prevalent, leading to more frequent use and potential overuse of the right shoulder.

The Oxford Shoulder Score (OSS) was used to assess shoulder function before and after surgery. For patients undergoing manipulation under general anesthesia (GA) alone, the OSS decreased from 49.8±3.3 before surgery to 30±4.4 at the six-month follow-up. For patients treated with a combination of arthroscopic capsular release, rotator interval release, and manipulation under GA, the OSS showed a more significant improvement, declining from

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50.1±4.4 to 17.4±3.0 after six months. The significant p-values ($p<0.001$) indicate that the combination procedure provided a more substantial improvement in shoulder function compared to manipulation alone at every follow-up stage (week 1, month 1, month 3, and month 6).

This suggests that arthroscopic release procedures, when combined with manipulation under GA, are more effective in restoring shoulder mobility and reducing functional limitations, likely due to the targeted release of capsular adhesions.

The Visual Analog Scale (VAS), which measured pain levels, showed a similar pattern. Patients undergoing manipulation under GA alone experienced a reduction in pain from 6.65±0.93 before surgery to 1.47±0.8 at six months. In contrast, those treated with the combination procedure had a more pronounced pain reduction, with VAS scores dropping from 7.6±1.0 to 0.29±0.47 over the same period. The p-values ($p<0.001$) again showed significant differences in favor of the combination procedure at all follow-up points, highlighting its superior efficacy in relieving pain.

These findings reinforce the clinical benefits of combining arthroscopic capsular release with manipulation under GA in patients with adhesive capsulitis, particularly in cases where conservative management has failed. The significant reduction in both OSS and VAS scores suggests that the combination procedure is not only more effective in restoring function but also in providing faster and more substantial pain relief.

In conclusion, the results indicate that for patients who do not respond to conservative treatment, the combination of arthroscopic capsular release, rotator interval release, and manipulation under general anesthesia offers significantly better outcomes in terms of both pain reduction and improved shoulder function compared to manipulation under GA alone. This approach should be considered a preferred surgical intervention for advanced cases of adhesive capsulitis.

The conservative management of the adhesive capsulitis is often found to be useful in 90% of the cases but if there is no improvement observed within 6 to 12 months of the conservative management then there is a requirement for surgical intervention [8,9]. The conventional procedure of manipulation under general anaesthesia is widely used this procedure is less time-consuming but the outcome depends on the experience of the surgeon as this is a manual procedure it is not recommended during the painful phase when the symptoms are quite prevalent. However, the combination of various procedures such as arthroscopic release, rotator interval release, and manipulation under general anesthesia has its consequences as well [10,11]. Altogether manipulation under general anesthesia along with other procedures for adhesive capsulitis has its advantages and disadvantages.

Studies regarding specific indications for utilizing a particular combination are not carried out exclusively. Since the pathophysiology of adhesive capsulitis is not clear yet it is difficult to determine the outcome of a combination of procedures. Since there are myriads of symptoms it is difficult to choose an optimum combination of procedures [12]. The study conducted can serve as a reference for selecting the best possible combination. In this study, it was observed that arthroscopic release, and rotator release along with manipulation under general anesthesia significantly improve the visual analog score and the Oxford shoulder score.

However, in both the groups that is with the combination of procedures and also those with manipulation under general anaesthesia there was a substantial decline in the visual analogue scale and Oxford shoulder score. The patients reported that their day-to-day activities improved in both types of procedures, this finding has been reported in various studies [13,14. Adhesive capsulitis should be treated with optimum use of conservative management strategies and surgical intervention to a certain extent.

Conclusion

The patients who did not respond to conservative management therapy had improved outcomes with manipulation under general anesthesia and a combination of rotator interval release, arthroscopic release with subacromial decompression, and manipulation under general anesthesia. However, the improvement was substantial when the patients were treated with a combination of the procedures.

Limitation

This study had a small cohort compared to an existing number of cases of adhesive capsulitis also the adverse effects of the surgical intervention were not studied in detail. Further studies are required to confirm the findings of this study.

Recommendation

Symptoms and stages of adhesive capsulitis should be taken into consideration while selecting the best possible conservative management strategy and surgical intervention.

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List of Abbreviation

OSS- Oxford shoulder score
VAS-Visual analog score

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Conflict of Interest
The authors declare no conflict of interest.

References
1. J N. Adhesive shoulder capsulitis. A review of the pathologic observations of shoulder periarthritis. *J Bone Surg Joint Am*.1945;27:211–22.
2. Codman EA. The shoulder. Boston: Thomas Todd; 1934.
3. Diercks RL, Stevens M. 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. *J Shoulder Elbow Surg*. 2004;13(5):499–502.
4. Doner G, Guven Z, Atalay A, Celiker R. Evaluation of MulliganâCTMstechnique for adhesive capsulitis of the shoulder. *J Rehabil Med*.2013;45(1):87–91.
5. Russell S, AJariwala, Conlon R, Selfe J, Richards, MWalton, et al. A blinded, randomized, controlled trial assessing conservative management strategies for frozen shoulder. *J Shoulder Elbow Surg*.2014;23(4):500–7.
6. Carette S, Moffet H, Tardif J, Bessette L, Morin F, Frémont P, et al. Intraarticular corticosteroids, supervised physiotherapy, or a combination of the two in the treatment of adhesive capsulitis of the shoulder: A placebo-controlled trial. *Arthritis Rheum*. 2003;48(3):829–38.
7. Ryans I. A randomized controlled trial of intra-articular triamcinolone and/or physiotherapy in shoulder capsulitis. *Rheumatol*. 2005;44(4):529–35.
8. Kivimäki J, Pohjolainen T, Malmivaara A, Kannisto M, Guillaume J, Seitsalo S, et al. Manipulation under anesthesia with home exercises versus home exercises alone in the treatment of frozen shoulder: A randomized, controlled trial with 125 patients. *J Shoulder Elbow Surg*. 2007;16(6):722–6.
9. Beimers L, Murell GAC. Arthroscopic capsular release for idiopathic adhesive capsulitis. *J Bone Joint Surg Am*. 2013;94:1208–16.
10. Buchbinder R, Green S, Youd JM, Johnston RV, Cumpston M. Arthrographic distension for adhesive capsulitis (frozen shoulder). *Cochrane Database Syst Rev*. 2008;007005(1):32–9.
11. Ibrahim M, Donatelli R, Hellman M, Echternach J. Efficacy of a static progressive stretch device as an adjunct to physical therapy in treating adhesive capsulitis of the shoulder: a prospective, randomized study.*Physiother*. 2014;100(3):228–34.
12. Kelley MJ, Shaffer MA, Kuhn JE, Michener LA, Seitz AL, Uhl TL, et al. Shoulder Pain and Mobility Deficits: Adhesive Capsulitis. *J Orthop Sports Phys Ther*. 2013;43(5):1–31.
13. Robinson CM, Seah KTM, Chee YH, Hindle P, Murray IR. Frozen shoulder. *J Bone Joint Surg Br*. 2012;94(1):1–9.
14. Harris DJO, Biggs DJ, Fitsialos DP, Mackay M. The resistant frozen shoulder. Manipulation versus arthroscopic release. *Clin Orthop Relat*

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