

Comparison of Corticosteroids vs Conventional Physical Therapy for Management of Adhesive Capsulitis

ZIAUDDIN KHAN¹, BRIG. ADNAN ANWAR², M. SHOAB ZARDAD³, ADNAN AFSAR⁴, AWAIS JAMEEL⁵, TAHIR NAWAZ⁶

¹PGR Orthopedics, CMH Abbottabad.

²FCPS Orthopedics, Assistant Professor CMH Abbottabad.

³FCPS Orthopedics, Assistant Professor Ayub Medical Complex Abbottabad.

^{4,5,6}PGR Orthopedics, CMH Abbottabad.

Correspondence to: Dr. Ziauddin Khan, Email: hiddenspy01@gmail.com, Cell: 03335757549

ABSTRACT

Objective: To compare the role of corticosteroids and conventional physical therapy for management of adhesive capsulitis

Methodology: This comparative study was conducted in Orthopedic Department, Combined Military Hospital Abbottabad. March 2022 to February 2023. Patient of active adhesive capsulitis of shoulder joint diagnosed by orthopedic surgeon were recruited. Patients in group A received single shot of methylprednisolone with local anesthesia with in the joint cavity while group B received conventional physical therapy at rehab department of our hospital. Pain scores via visual analogue scale and range of motion via goniometer was compared in both groups at baseline and at 8 weeks of treatment.

Results: A total of 160 patients of adhesive capsulitis were recruited. Mean age was 42.55±10.96 years. 70 (43.7%) patients were female while 90 (56.3%) were male. Baseline pain scores and range of motion parameters were not statistically significant between the two comparison groups. At the end of 8 weeks mean pain scores were statistically significantly low in patients who took intra-articular corticosteroids as compared to those who underwent physiotherapy sessions (p-value<0.001). Range of motion parameters were also statistically significantly better in patients who took corticosteroids as compared to those who underwent physiotherapy (p-value<0.001).

Conclusion: Use of corticosteroids emerged as a better option for treatment of pain and restricted range of motion in patients of adhesive capsulitis when compared to routine physiotherapy offered in our clinical settings.

Keywords: Adhesive Capsulitis; Corticosteroids; Efficacy; Physiotherapy

INTRODUCTION

Pain medicine is an evolving field and goes in hand to hand with other specialties like rheumatology, orthopedics, oncology, rehabilitation and sports medicine.¹ When pain involves any specific joint, in most cases it also restricts the movement and creates a negative impact on overall health related quality of life.² Frozen shoulder or adhesive capsulitis is one of the commonly prevalent joint disorder in both developing and developed countries.³ Usually a team effort is required to help these patients to get rid of various symptoms of this painful health condition.

Number of methods have been in clinical practice for long term to manage patients suffering from adhesive capsulitis. Medical methods include local and systemic use of pain killers and anti-inflammatory medication or nerve blocks.⁴ Surgical methods are rarely used these days but still can be opted for patients not responding to medications.⁵ Advancement in fields of rehabilitation and sports medicine have introduced multiple physiotherapeutic techniques. These may help patients with minimum systemic intervention by pharmacological agents.⁶

Number of studies and trials have been conducted to look for best management for patients suffering from adhesive capsulitis. A recent umbrella review of systematic reviews analyzed 14 systemic reviews and concluded that non-surgical methods were as effective as surgical methods of treatment for adhesive capsulitis. They were unable to find any individual non-surgical method superior to any other one.⁷ A PRIMSA systematic review and meta-analysis of randomized controlled trials evaluated the difference in efficacy of steroids vs physiotherapy for patients of adhesive capsulitis. It was revealed that both the options were equally effective in management of adhesive capsulitis but still heterogeneity of results in their analysis was slight hindrance in generalization of results.⁸ Blanchard et al. published a paper with the findings that corticosteroid injection was superior in efficacy to physiotherapy in patients managed for adhesive capsulitis.⁹

Pain medicine is a growing speciality in Pakistan and usually speciality doctors cater for this aspect of illness. Adhesive capsulitis of shoulder joint is not an uncommon condition in Pakistan. A recent local study published in Pakistan Armed Forces Medical Journal studied population of Bahawalpur to compare effect of corticosteroids and physiotherapy on pain among patients of adhesive capsulitis. It was revealed that corticosteroids were

better option among the two. Limited local data has been available in this regard. This study therefore was planned with the rationale to compare the role of corticosteroids and conventional physical therapy for management of adhesive capsulitis.

PATIENTS AND METHODS

This comparative cross-sectional study was conducted at orthopedic outpatient department of Combined Military Hospital Abbottabad from March 2022 to February 2023.¹¹ Sample size was calculated by using the WHO sample size calculator and two groups were made. Group-I had bilateral shoulder involvement and used corticosteroids 6.6%. Group-II had bilateral shoulder involvement and used physiotherapy 5%.¹⁰

Inclusion criteria: Patients of both genders between the age of 18 and 60 years diagnosed with adhesive capsulitis by orthopedic surgeon were recruited in this study.

Exclusion criteria: Patients who did not have clear diagnosis of adhesive capsulitis of shoulder but symptoms were due to other pathology were excluded. Patients not willing for physiotherapy or had any contraindication to steroids were also not recruited. Patients with any autoimmune or malignant medical conditions were also made part of exclusion criteria. Patients who at the start of study refused to come after eight weeks were also not made part of this analysis.

Permission from hospital ethics committee was sought. All patients signed informed consent. Patients were diagnosed with adhesive capsulitis on the basis of clinical¹¹ and radiological findings by orthopedic surgeon.¹² Patients were divided into two groups randomly via block randomization. Group A received the intra-articular steroid injection while group B received the conventional physiotherapy from rehabilitation department of our own hospital.

Methylprednisolone 40mg¹³ was given with local anesthetic agent inside joint cavity at the time of diagnosis after written informed consent by the patient and ruling out allergy to this agent. This medication was given as a single dose.

Gentle stretching exercises were provided by a trained professional at rehabilitation department of our hospital as part of physiotherapeutic technique. These exercises included pendulum exercises, active assisted shoulder external rotation with stick, active assisted shoulder forward flexion, posterior capsular stretch,

scapular retraction, and isometric shoulder external rotation.¹⁴ These exercises were first provided by trained therapist at hospital and later patient performed them at home. They were reminded via SMS from the department.

Baseline pain scores were assessed by visual analogue score scale at the time of diagnosis. Baseline range of motion was also assessed by trained professional by goniometer at the time of diagnosis. Those who took methylprednisolone injection or completed physiotherapy protocol and followed up at eighth week of diagnosis were evaluated via visual analogue score scale for pain and goniometer for range of motion (elevation range of motion, external rotation, internal rotation). Those who did not show up after eight weeks of treatment were excluded from final data analysis.

Statistical analysis was performed using the SPSS 23.0. Mean and standard deviation was calculated for the age of the patients, VAS scores at baseline and after 8 weeks for both the groups were calculated. Goniometer readings were also represented as mean and standard deviation both at baseline and after 8 weeks. Comparison in both variables in both the groups was done by paired t-test. The p-value ≤ 0.05 was considered as significant.

RESULTS

A total of 160 patients of adhesive capsulitis were recruited. Mean age was 42.55 ± 10.96 years. 70 (43.7%) patients were female while 90 (56.3%) were male. Table-I showed the basic characteristics of patients managed for adhesive capsulitis and recruited in our study. Both groups had 80 (50%) patients as randomization was blocked. Most 99 (61.8%) of the patients had involvement of right shoulder joint. Diabetes mellitus 38 (23.7%) was the commonest comorbid condition found in our study participants with adhesive capsulitis.

Table I: Characteristics of patients with adhesive capsulitis

Study parameters	n (%)
Age (years) Mean + SD	42.55±10.96 years
Mean duration of Symptoms (months)	1.4±3.212 months
Gender	
Male	90 (56.3%)
Female	70 (43.7%)
Shoulder involved	
Right	99 (61.8%)
Left	50 (31.2%)
Both shoulders	11 (6.8%)
Treatment options	
Intra-articular corticosteroids	80 (50%)
Physiotherapy	80 (50%)
Comorbid conditions	
Diabetes mellitus	38 (23.7%)
Hypertension	21 (13.1%)
Asthma	12 (7.5%)
Ischemic heart disease	09 (5.6%)
Others	04 (2.5%)

Table-II: Comparison of pain score and range of motion at baseline and at 8 weeks in two study groups

Time	Group A Mean ± standard deviation	Group B Mean ± standard deviation	t-value	p-value
Pain VAS score				
Baseline	8.02±0.711	9.17±10.08	-1.018	0.312
8 weeks	1.73±1.45	3.08±2.00	6.501	<0.001
Elevation range of motion				
Baseline	121.43±8.45	120.60±7.82	0.620	0.537
8 weeks	171.60±6.26	152.71±7.16	17.148	<0.001
External rotation				
Baseline	40.23±4.60	39.75±4.72	0.610	0.543
8 weeks	70.30±4.68	66.95±5.89	3.779	<0.001
Internal rotation				
Baseline	44.10±7.65	45.41±8.33	-0.989	0.326
8 weeks	73.40±6.36	67.20±5.85	5.770	<0.001

Table-II showed the results of statistical analysis. At the end of 8 weeks mean pain scores were statistically significantly low in patients who took intra-articular corticosteroids as compared to those who underwent physiotherapy sessions (p-value<0.001). Range of motion parameters (elevation range of motion, external rotation, internal rotation) were also statistically significantly better in patients who took corticosteroids as compared to those who underwent physiotherapy (p-value<0.001).

DISCUSSION

Pain and restriction of mobility at any joint affect the quality of life of individual and immediate and prompt action of medical team is required to address the actual problem. Adhesive capsulitis or frozen shoulder is a painful condition which not only affects mobility of joint but restricts overall life pattern of an individual. Number of medical and surgical methods have been in use to cater for the symptoms and underlying disease process in patients suffering from frozen shoulder. Rheumatology, orthopedics, pain medicine and rehabilitation teams, all may be involved in care of these patients and providing them relief from their symptoms. We conducted this study with an aim to compare the role of corticosteroids and conventional physical therapy for management of adhesive capsulitis.

Anjum et al.¹⁵ published a prospective clinical study and revealed that combination of physiotherapy plus intra-articular methylprednisolone injection was superior in efficacy to physiotherapy alone.¹⁵ Our comparison groups were slightly different as we compared physiotherapy and steroid injection alone and found out that patients managed with steroid injection showed better results when compared to patients managed with physiotherapy.

Kraal et al. in 2018 studied patients in early phase of frozen shoulder and compared efficacy of steroid injection and physiotherapeutic techniques. They revealed that at the end of three months' corticosteroids were better option than physiotherapy but combination of both was superior to individual options.¹⁶ We studied patients for 8 weeks and at the end of 8 weeks found out that patients who took single dose methylprednisolone showed better results as compared to those who underwent physiotherapy.

A meta-analysis was published by Challoumas et al. with an objective to look for difference in efficacy of various treatment modalities used for treatment of frozen shoulder. They concluded that intra-articular steroid use was most efficacious treatment used for frozen shoulder.¹⁷ Our results supported their findings as use of corticosteroids emerged as a better option for treatment of pain and restricted range of motion in patients of adhesive capsulitis when compared to routine physiotherapy offered in our clinical settings.

Afzal et al. published a local study in Journal of Pakistan Orthopedic association in 2019 with the findings that steroid use was a superior option when compared to physiotherapy only. We also generated similar findings from our data set.¹⁸

Study limitations: It was a comparative cross-sectional study and not a randomized controlled trial which hinders the generalizability of this study. Moreover, few confounding factors may impact pain and range of motion which could be controlled in future trials to generate better results. Pain scoring was done by subjective pain score which may be under or over representation of actual pain.

CONCLUSION

Use of corticosteroids emerged as a better option for treatment of pain and restricted range of motion in patients of adhesive capsulitis when compared to routine physiotherapy offered in our clinical settings.

REFERENCES

1. Hyland SJ, Wetshtein AM, Grable SJ, Jackson MP. Acute Pain Management Pearls: A Focused Review for the Hospital Clinician. *Healthcare (Basel)*. 2022;11(1):34. doi: 10.3390/healthcare11010034.

- PMID: 36611494; PMCID: PMC9818465.
2. Mertens MG, Meeus M, Noten S, Verborgt O, Fransen E, Lluh Girbés E, et al. Understanding the clinical profile of patients with frozen shoulder: a longitudinal multicentre observational study. *BMJ Open*. 2022;12(11):e056563. doi: 10.1136/bmjopen-2021-056563. PMID: 36410809; PMCID: PMC9680192.
 3. Jacob L, Gyasi RM, Koyanagi A, Haro JM, Smith L, Kostev K. Prevalence of and Risk Factors for Adhesive Capsulitis of the Shoulder in Older Adults from Germany. *J Clin Med*. 2023;12(2):669. doi: 10.3390/jcm12020669. PMID: 36675599; PMCID: PMC9866675.
 4. Pandey V, Madi S. Clinical Guidelines in the Management of Frozen Shoulder: An Update! *Indian J Orthop*. 2021;55(2):299-309. doi: 10.1007/s43465-021-00351-3. PMID: 33912325; PMCID: PMC8046676.
 5. Cho CH, Bae KC, Kim DH. Treatment Strategy for Frozen Shoulder. *Clin Orthop Surg*. 2019;11(3):249-257. doi: 10.4055/cios.2019.11.3.249. Epub 2019 Aug 12. PMID: 31475043; PMCID: PMC6695331.
 6. Wang L, Yu G, Zhang R, Wu G, He L, Chen Y. Positive effects of neuromuscular exercises on pain and active range of motion in idiopathic frozen shoulder: a randomized controlled trial. *BMC Musculoskelet Disord*. 2023;24(1):50. Published 2023 Jan 20. doi:10.1186/s12891-023-06173-8
 7. de Sire A, Agostini F, Bernetti A, et al. Non-Surgical and Rehabilitative Interventions in Patients with Frozen Shoulder: Umbrella Review of Systematic Reviews. *J Pain Res*. 2022;15(3):2449-2464. Published 2022 Aug 19. doi:10.2147/JPR.S371513
 8. Sun Y, Lu S, Zhang P, Wang Z, Chen J. Steroid Injection Versus Physiotherapy for Patients With Adhesive Capsulitis of the Shoulder: A PRIMSA Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Medicine (Baltimore)*. 2016;95(20):e3469. doi:10.1097/MD.0000000000003469
 9. Blanchard V, Barr S, Cerisola FL. The effectiveness of corticosteroid injections compared with physiotherapeutic interventions for adhesive capsulitis: a systematic review. *Physiotherapy*. 2010;96(2):95-107. doi:10.1016/j.physio.2009.09.003
 10. Hashmi MU, Chughtai BB, Ahsan MN. Adhesive Capsulitis; Management by Physiotherapy Versus Intra-Articular Corticosteroid Injection. *Pak Armed Forces Med J* 2021; 71(5): 1824-1827.
 11. Mohammed MH, Fahmi FM, Shehata KA, Elia RZ. Shoulder adhesive capsulitis: can clinical data correlate with fat-suppressed T2 weighted MRI findings? *Egypt J Radiol Nucl Med*. 2022;53(1):76. doi: 10.1186/s43055-022-00751-x. Epub 2022 Mar 29. PMCID: PMC8961268.
 12. Stella SM, Gualtierotti R, Ciampi B, Trentanni C, Sconfienza LM, Del Chiaro A et al. Ultrasound Features of Adhesive Capsulitis. *Rheumatol Ther*. 2022;9(2):481-495. doi: 10.1007/s40744-021-00413-w. Epub 2021 Dec 23. PMID: 34940958; PMCID: PMC8696249.
 13. Yoon SH, Lee HY, Lee HJ, Kwack KS. Optimal dose of intra-articular corticosteroids for adhesive capsulitis: a randomized, triple-blind, placebo-controlled trial. *Am J Sports Med*. 2013;41(5):1133-1139. doi:10.1177/0363546513480475
 14. Phansopkar P, Qureshi MI. A Review on Current Notion in Frozen Shoulder: A Mystery Shoulder. *Cureus*. 2022 Sep 20;14(9):e29362. doi: 10.7759/cureus.29362. PMID: 36284801; PMCID: PMC9584629.
 15. Anjum R, Aggarwal J, Gautam R, Pathak S, Sharma A. Evaluating the Outcome of Two Different Regimes in Adhesive Capsulitis: A Prospective Clinical Study. *Med Princ Pract*. 2020;29(3):225-230. doi:10.1159/000503317
 16. Kraal T, Sierevelt I, van Deurzen D, van den Bekerom MP, Beimers L. Corticosteroid injection alone vs additional physiotherapy treatment in early stage frozen shoulders. *World J Orthop*. 2018;9(9):165-172. Published 2018 Sep 18. doi:10.5312/wjo.v9.i9.165
 17. Challoumas D, Biddle M, McLean M, Millar NL. Comparison of Treatments for Frozen Shoulder: A Systematic Review and Meta-analysis. *JAMA Netw Open*. 2020;3(12):e2029581. Published 2020 Dec 1. doi:10.1001/jamanetworkopen.2020.29581
 18. Afzal T, Chaudhry AA, Gillani SFUHS, Rafiq A, Dar UZ, Sultan N. Intra-articular Corticosteroid with Physiotherapy Versus Physiotherapy alone for the Treatment of Frozen Shoulder: A Randomized Controlled Trial. *J Pak Orth*. 2019;31(03):85-9.