

# Comparison of intra articular NSAID (ketorolac) injection versus hyaluronic acid injection for the mean decrease of pain score (according to UCLA shoulder rating scale) in the management of adhesive capsulitis

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**Abstract:** Adhesive capsulitis is painful condition, associated with gradual loss of active and passive shoulder motion that has a disabling capability. In this study we compared the short term outcome by measuring the mean decrease of pain in adhesive capsulitis using University of California Los-Angeles (UCLA) shoulder rating scale after intra-articular Non-Steroidal Anti Inflammatory Drug (NSAID) Ketorolac and Hyaluronic acid injection. This Randomized controlled trial was carried out using non probability consecutive sampling technique from 1<sup>st</sup> November 2015 to 30<sup>th</sup> April 2016. Total 160 patients with adhesive capsulitis for six months' age between 18 to 70 years were taken and randomly divided into two equal groups by computer allocation method. The 80 patients in Group A received Intra-articular (NSAID) Ketorolac injection while patients in Group B were given Intra-articular Hyaluronic acid. Pain score for both the groups were recorded using UCLA shoulder rating scale before treatment and then at follow up after a period of 4 weeks. Out of total 160 cases, 47.5% (n=38) in Group A and 45% (n=36) in Group B were male whereas 52.5% (n=42) in Group A and 55% (n=44) in Group B were females. Most commonly affected age group with 40% (n=32) participants was aged between 51 - 60 years. Mean age of Group A was 37.87±1.027 and in Group B was 45.37±5.743. Interestingly 60% (n=48) of Group A and 55% (n=44) of Group B had involvement of the right shoulder. Pre-treatment UCLA pain score was calculated to be 14.90±4.969 in Group-A and 15.16±5.578 in Group-B. Final post treatment UCLA score was 26.67±2.331 in Group A and 21.72±3.838 in Group B. The mean decrease of pain in Adhesive capsulitis using UCLA rating scale was significantly better in NSAID group as compared to Hyaluronic acid group.

**Keywords:** Adhesive capsulitis, intra articular NSAIDs, hyaluronic acid injection, UCLA pain rating scale.

## INTRODUCTION

Adhesive capsulitis, first described by Codman (Tighe *et al.*, 2008) in 1934, as a condition of uncertain etiology that is characterized by clinically significant restriction of both active and passive shoulder motion occurring in the absence of a known intrinsic shoulder disorder (Ahmad *et al.*, 2009). The incidence of adhesive capsulitis in general population is reported to be 2-5% (Tighe *et al.*, 2008), with 20% prevalence in diabetic individuals. Although regarded as a self-limiting disorder that resolves in 1-3 years, approximately 10% of patients never had full recovery of ROM (Ewald *et al.*, 2011). Pathophysiology of Adhesive capsulitis reveals fibrosis and thickening of the shoulder joint capsule (Neviaser *et al.*, 2010). Patients present with pain and later with reduced range of motion (ROM) at the shoulder joint. The three defined stages of adhesive capsulitis are painful stage, freezing/adhesive stage and the recovery stage. The various methods of treatment include shoulder exercises, physiotherapy with ultrasound, laser, transcutaneous electrical stimulation and iontophoresis, oral NSAID, oral corticosteroids, intra-

articular injections of the glenohumeral joint and manipulation under anesthesia or a combination these (Bal *et al.*, 2008). The effectiveness of any treatment modality over the other is not clear in terms of improvement in function, pain relieve and patient satisfaction. Because of the potent anti-inflammatory properties of NSAIDs, they are commonly used in the treatment of rotator cuff tendinitis. Therefore, we conducted this study to compare the mean decrease of pain using UCLA (Amstutz *et al.*, 1981) score with intraarticular NSAID (ketorolac) injection versus hyaluronic acid injection for the management of adhesive capsulitis.

## MATERIALS AND METHODS

We conducted this randomized controlled trial using non-probability consecutive sampling technique in the Department of Orthopedics Surgery at Mayo Hospital Lahore for six months from 1<sup>st</sup> November 2015 to 30<sup>th</sup> April 2016. We selected 160 patients, randomly divided into two Groups A and B, by computer allocation method. Inclusion criteria of the study was all patients aged between 18 to 70 years with adhesive capsulitis for last

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**Table 1:** Demographic data of age, gender, side of shoulder

Variables	Group A (n=80) (%)	Group B (n=80) (%)	N=180 (%)
Gender of the patient			
• Male	38 (47.5%)	36 (45%)	74 (46.25%)
• Females	42 (52.5%)	44 (55%)	86 (53.75%)
Age in years			
• 18-30	03 (3.75%)	01 (1.25%)	04 (2.5%)
• 31-40	05 (6.25%)	07 (8.75%)	12 (7.5%)
• 41-50	19 (23.75%)	20 (25.00%)	39 (24.37%)
• 51-60	32 (40.00%)	29 (36.25%)	61 (38.12%)
• 61-70	21 (23.25%)	23 (28.75%)	44 (27.5%)
Mean age $\pm$ SD	37.87 $\pm$ 1.027	45.37 $\pm$ 5.743	
Pain score (UCLA) (Mean $\pm$ SD)			
• Pre-treatment	14.90 $\pm$ 4.969	15.16 $\pm$ 5.578	
• Post-treatment	26.67 $\pm$ 2.331	21.72 $\pm$ 3.838	
Side of the shoulder			
• Right side	48 (60%)	44 (55%)	92 (57.5%)
• Left side	32 (40%)	36 (45%)	68 (42.5%)

**Table 2:** Paired “t” Test of both Group A NSAID (ketorolac) & Group B hyaluronic acid pre and post treatment UCLA pain score.

Variables	n	Mean	Standard Deviation	t	p-value
Group A					
• Pre-treatment UCLA pain score	80	14.90	4.969	-13.091	<0.001
• Post-treatment UCLA pain score	80	26.67	2.331		
Group B					
• Pre-treatment UCLA pain score	80	15.16	4.969	-13.872	<0.001
• Post-treatment UCLA pain score	80	21.72.6	2.331		

six months evaluated on history and clinical examination. We excluded patients who had local skin infection, renal failure, uncontrolled diabetes mellitus, drug reaction, previously treated with intra-articular injections or had previous shoulder surgery.

We obtained approval from the hospital ethical committee. After we explained purpose of the study, a written consent was taken from all participants who fulfilled the inclusion criteria. Patients in Group A (n=80) were administered with NSAIDs (Ketorolac) injection and Group B patients received hyaluronic acid injection. Group A was administered 6ml of 1% lidocaine with epinephrine and 60 mg ketorolac and Group B received 6ml of 1% lidocaine with epinephrine and 4ml 1% hyaluronic acid. We used standard posterior approach for intra articular injection in all the patients. We also obtained patients demographic information, side of involvement, pain score before intra articular injection and at follow up of four weeks after administration of the injections according to UCLA (Amstutz *et al.*, 1981) shoulder rating scale on pre-designed proforma and patients satisfaction with both treatment methods. The pain score more than 27 was graded as good/excellent while score less than 27 was taken as fair/poor.

The data was entered SPSS software version 20.0. We presented data for age, pre-and post-pain scores as Mean  $\pm$  standard deviation. We calculated gender frequency and percentages, t- test was applied to compare the difference in treatment outcome by UCLA shoulder pain score before and after the injection. P value  $\leq$ 0.05 was considered as significant.

## RESULTS

Out of total 160 cases, there were 47.5% (n=38) in Group-A and 45% (n=36) in Group-B were male and 52.5% (n=42) in Group-A and 55% (n=44) in Group-B were females. Age distribution of the patients was done, which showed 32 (40%) participants Group-A were aged between 51 to 60 years (37.87 $\pm$ 1.027) and 29 (36.25%) in Group-B were between 51 to 60 years of age (45.37 $\pm$ 5.743). There were 48 (60%) right sided shoulder in group A and 44 (55%) in group B. Pre-treatment UCLA Mean  $\pm$ SD pain score in both groups was calculated which was 14.90 $\pm$ 4.969 in Group-A and in Group-B it was 15.16 $\pm$ 5.578 and post treatment in group a mean  $\pm$ SD UCLA score was 26.67 $\pm$ 2.331 in group A and 21.72 $\pm$ 3.838 in group B (table 1).

When statistically calculated, we compared the treatment outcome in both group pre and post treatment and t test was applied, p value was recorded as <0.001 in both groups which shows a significant difference in both groups (table 2).

## DISCUSSION

Adhesive capsulitis is characterized by sudden onset of shoulder pain associated with progressive loss of both active and passive range of motion. The painful shoulder condition can be disabling and estimated to affect 2-5% of the general population (Wolf *et al.*, 2002). It affects routine activities of life and effective treatment is necessary in all patients. There are different treatment options for adhesive capsulitis including shoulder exercises, physiotherapy with ultrasound, laser, transcutaneous electrical stimulation and iontophoresis, oral NSAIDs, oral corticosteroids, intra-articular injections of the glenohumeral joint (Dias *et al.*, 2005).

Oral NSAIDs due to their anti-inflammatory properties has been used for treatment of adhesive capsulitis for pain management and for rotator cuff tendinitis (Karrthikeyan *et al.*, 2010). Exercises and physiotherapy don't have pivot role in relieving pain and have little effect on improving function in this condition. Hyaluronic acid a high molecular weight glycosaminoglycan has good viscoelastic properties and it can be used to change joint mechanics of synovial fluid (Brockmeier *et al.*, 2008; Strauss *et al.*, 2009).

In our study, there were 46.72% patients were male and 38.12% (Mean 49.63) were presented between age group of 51 to 60 years of age (range 18-70) while Lim *et al.* (Lim *et al.*, 2014) reported that 53% patients were male with their mean age was 53.5 years (range 37-77). When we compared the side of shoulder pain, there were 57.5% right sided shoulder while 53% were reported by (Lim *et al.*, 2014) and (Sun *et al.*, 2015) in his meta-analysis reported the result of NSAIDs as better treatment for pain relief and functional outcome for adhesive capsulitis and they are similar to our study while contrary to these results Sakurai *et al.* suggested that hyaluronic acid can be used for adhesive capsulitis (Sakurai *et al.*, 1997).

When we asked about patient's satisfaction against two treatment methods, they were satisfied with NSAID treatment due to better functional improvement and pain relief. Study done by (Nevaser *et al.*, 1987) to identify the inflammatory process involving synovium and joint capsule using pathological findings concluded that there is accelerated progression while Lundberg *et al.*, 1969 concluded that in adhesive capsulitis inflammation has no significant effect. Intra-articular hyaluronate injection have chondroprotection properties and improves the quality of synovial fluid.

On the other hand, NSAID are not only anti-inflammatory, but effective analgesics as well making them a reasonable first choice for treatment. The intra-articular route significantly decreases the required dose of Ketorolac and therefore diminishes the potential complications associated with NSAID e.g. kidney dysfunction, and possible bleeding. A systemic review of the literature showed significant improvement of symptoms in patients treated with NSAIDs compared with placebo (Van der Windt DA *et al.*, 1995). But those with diagnosed gastric ulcers are not candidates for this treatment as it may exacerbate their condition ((AOSSM *et al.*, 2011).

However, the results of the study demonstrated that on comparison, mean decrease of pain (according to UCLA shoulder rating scale) with intra articular NSAID (Ketorolac) and hyaluronic injection was found in both groups but the results of NSAID were better than hyaluronic acid in terms of pain relief, functional outcomes and patients' satisfaction for the management of adhesive capsulitis.

## CONCLUSION

We concluded that mean decrease of pain (according to UCLA shoulder rating scale) with intra articular NSAID injection and hyaluronic acid was comparable but NSAID has better short term treatment outcome than hyaluronic acid for the management of adhesive capsulitis. We recommend further trial with larger population to find the difference in two treatment methods.

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