

## ADHESIVE CAPSULITIS; MANAGEMENT BY PHYSIOTHERAPY VERSUS INTRA-ARTICULAR CORTICOSTEROID INJECTION

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### ABSTRACT

**Objective:** To determine outcomes of intra-articular corticosteroids injection versus physiotherapy for the treatment of adhesive capsulitis using mean pain score on the visual analogue scale.

**Study Design:** Comparative prospective study.

**Place and Duration of Study:** Orthopedic outpatient department, Bahawal Victoria Hospital Bahawalpur from Jan to Jun 2021.

**Methodology:** A total of 120 cases having adhesive capsulitis (frozen shoulder) were included in the study according to inclusion criteria. Non-probability consecutive sampling technique was used for the selection of cases. Patients were divided into two groups, group-A and group B, each containing 60 cases. Patients in group-A were given intra-articular steroid injection (2ml triamcinolone 40mg ± 2ml of bupivacaine). Patients in group B received ten sessions of physiotherapy by a well-trained physiotherapist under the supervision of an orthopaedic surgeon on alternate days. After six weeks, outcomes were measured in terms of pain score using a visual analogue pain scale.

**Results:** Significant improvement was seen among patients in group-A with mean pain score from  $7.32 \pm 0.89$  measured initially to  $5.44 \pm 1.37$  measured after six weeks ( $p < 0.001$ ). No significant improvement was found among patients in group B with a mean pain score of  $7.58 \pm 0.94$  measured initially to  $7.12 \pm 0.88$  measured after six weeks ( $p > 0.05$ ).

**Conclusion:** Significant improvement in pain relief can be achieved using intra-articular steroid injection administered in the shoulder as compared to supervised sessions of physiotherapy among patients with adhesive capsulitis.

**Keywords:** Adhesive capsulitis, Frozen shoulder, Intraarticular injection, Shoulder physiotherapy, Visual analogue pain scale.

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### INTRODUCTION

Adhesive capsulitis is a painful condition in which shoulder movement becomes limited. In this condition, the joint capsule becomes inflamed, stiff and thick. It is associated with spontaneous onset of pain, restricted movements due to contracture of the capsule. It is a very common problem with an incidence of 2% reported in the general population and 30% reported in patients with diabetes mellitus<sup>1</sup>. Adhesive capsulitis (AC) can be primary also called idiopathic without any reported aetiology or factor triggering a chronic inflammatory response and increased fibroblast proliferation forming excessive scar tissue or adhesions in glenohumeral joint<sup>2</sup>. It is mostly found in obese and overweight people with age usually <50 years<sup>3</sup>. Secondary adhesive capsulitis is caused due to diabetes mellitus, shoulder injury, cerebrovascular accidents, cardiovascular disease or rotator cuff injury. It is rare among children, more common among males than the female population. Its prevalence is 2-5% among people with age 40-60 years<sup>4</sup>. Limited active and

passive range of motion of shoulder with pain make the diagnosis of AC.

It is a self-limiting disease comprising of three stages. In the first stage, the patient has painful movements, in the second stage, movements are decreased and the last third stage is the recovery stage. Their symptoms last for an average period of 30 months<sup>5</sup>. Painful movements of the shoulder joint disturb normal activities of routine life. There are different treatment options for this condition according to various studies. Initially, NSAIDs and acetaminophen can be used for pain relief<sup>6</sup>. Other options include physical therapy, intraarticular corticosteroid injection, manipulation of shoulder joint under anaesthesia and arthroscopic release of the joint capsule, while physiotherapy helps in achieving a pain-free range of motion and it is a much effective treatment option<sup>7</sup>. Few studies report no satisfactory outcome by physical therapy alone and reported that intra-articular corticosteroids injection gives better outcomes in terms of reduced pain and improved range of motion as compared to physiotherapy<sup>8,9</sup>. Ultrasound-guided hydrodistention of joint followed by serial sessions of physiotherapy has been proved much effective<sup>10</sup>. Different studies recommend

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different treatment options, hence still it is unclear that which option is better<sup>8-10</sup>. According to our knowledge, limited studies have been done in Pakistan regarding the treatment of adhesive capsulitis using intra-articular corticosteroids injection compared to physiotherapy in terms of mean pain score. We hypothesize that intra-articular corticosteroids injection is more effective and provide a quick improvement in adhesive capsulitis than physiotherapy alone.

**METHODOLOGY**

After taking approval from institutional ethical review committee (ref. No 448, dated: 30-11-2020) 120 patients with adhesive capsulitis (in freezing phase of AC) were selected for study using no-probability consecutive sampling technique. This was a comparative prospective study. Patients presenting to orthopedic outpatient door Bahawal Victoria Hospital Bahawalpur from January to June 2021 were included in the study as per inclusion criteria. Sample size was calculated using WHO sample size formula  $Z^2PQ/D2$  (where  $p=20\%$ )<sup>4</sup>.

**Inclusion Criteria:** Patients of either gender, having age 18-70 years with shoulder pain without any known reason from more than three weeks but less than six months were included in the study after making diagnosis on the bases of history points like spontaneous onset of shoulder pain and limited passive range of motion in at least two planes.

**Exclusion Criteria:** Patients having previous history of any sort of surgery around the shoulder, history of trauma to shoulder, history of intra-articular steroids injection previously, having degenerative joint disease, osteoporosis, neuromuscular disorders, radiculopathy or referred pain from prolapsed intervertebral disc or already taking successful treatment for adhesive capsulitis, we-re excluded from the study.

Plain radiographs (antero-posterior view in neutral rotation, internal and external rotation, axillary lateral view and scapular-Y view) were taken to exclude any other shoulder pathology. Shoulder ultrasound and baseline investigations done like complete blood count, fasting and random blood sugar level, glycosylated hemoglobin (HbA1c) level and thyroid profile to determine any possible cause of adhesive capsulitis. Informed written consent was taken from the patients in study group. Patients were divided into two groups group-A and group-B using lottery method, each containing 60 patients. Patients in group-A were given intra-articular Triamcinolone (corticosteroid) 40mg mixed with bupivacaine 2ml injection via posterior

approach under aseptic measures by orthopedic consultant without using imaging technique. While eight sessions of physiotherapy on alternate days were given to the patients in group-B by a trained physiotherapist under supervision of orthopedic consultant. Each session was comprised on ultrasound therapy, TENS (Transcutaneous electrical nerve stimulation), range of motion (ROM) and continuous passive motion exercises. Patients of both groups were given same home exercises and same analgesics. At six-week follow-up all patients were evaluated for success of treatment by measuring mean pain score using visual analogue pain scale. In this study 57 (47.5%) patients were laborers (maids and servants), 38 (31.6%) were doing desk job and 25 (20.8%) were housewives.

Data was collected on a self-designed proforma. Data was analyzed using statistical software SPSS-20. Descriptive statistical analysis was done for qualitative and quantitative variables. For quantitative variables like age and pain score, means and standard deviation were determined and for qualitative variables like gender, diabetes mellitus frequency and percentages were determined. Chi square test was applied on the qualitative data. Statistical significance was determined using independent t-test for quantitative data. The *p*-value of  $\leq 0.05$  was considered statistically significant.

**RESULTS**

Total 120 cases included in this study were divided into two groups group-A and group-B, each containing 60 cases. Overall, male cases were 54 (45%) and female cases were 66 (55%) (Table-I). In group-A 26 (43.3%) were male and 34 (56.6%) were female cases, right shoulder was most commonly involved in 39 (65%) cases. Mean age of the patients in group-A was  $47.35 \pm 7.8$  years. In group-B, 28 (46.6%) were male and 32(53.3%) were female cases, mean age of the patients was  $46.21 \pm 6.4$  years and right shoulder involvement was more commonly found in 42 (70%) cases (Table-I).

In group-A mean pain score was improved significantly from  $7.43 \pm 0.98$  to  $5.12 \pm 0.739$  after six

**Table-I: Basic characteristics of patients in group-A and B.**

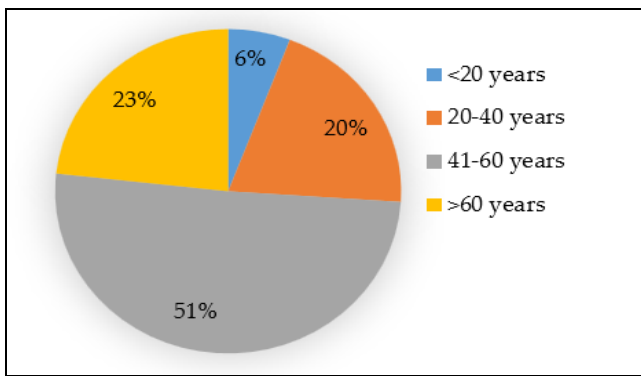
Characteristics	Group-A (n=60)	Group-B (n=60)	<i>p</i> -value
<b>Gender</b>			
Male	26 (43.3%)	28 (46.6%)	0.687
Female	34 (56.6%)	32 (53.3%)	
Mean age (years)	$47.35 \pm 7.8$	$46.21 \pm 6.4$	0.176
<b>Shoulder Side Involvement</b>			
Right	39 (65%)	42 (70%)	0.590
Left	17 (28.3%)	15 (25%)	
Both	04 (6.6%)	03 (5%)	

weeks of treatment with intra-articular corticosteroid injection, while no significant improvement was reported in group-B patients after ten sessions of physiotherapy with a mean pain score of  $7.51 \pm 0.947$  initially to  $7.02 \pm 1.066$  when assessed on six weeks follow-up (Table-II).

**Table-II: Improvement in mean pain score in both groups measured on visual analogue scale.**

	Group-A (n=60)	Group-B (n=60)	p-value
Initial Visual Analogue Score (Mean $\pm$ SD)	$7.43 \pm 0.980$	$7.51 \pm 0.947$	0.656
Visual Analogue Score after 6 weeks (Mean $\pm$ SD)	$5.12 \pm 0.739$	$7.02 \pm 1.066$	<0.001

Most of the cases (46%) were having age 41-60 years in our study group. This disease was not uncommon (23%) among the patients with age 21-40 years. It was seen that this disease is more common in old age patients (Figure).



**Figure: Age distribution of cases in study group (Group-A & B) (n=120).**

**DISCUSSION**

Adhesive capsulitis is a common cause of shoulder pain mainly in old age people. Conservative treatment in the form of physiotherapy and intra-articular corticosteroids injection is much effective in the majority of cases<sup>11</sup>. However, other measures like manipulation under anaesthesia and arthroscopic release of shoulder capsule can be done in those not responding to conservative treatment<sup>12,13</sup>. It is very common in people between 60-70 years of age 33.3%<sup>14</sup>. In our study majority of cases (51%) were between 40-60 years of age and 23% cases were between 60-70 years of age. However, results are similar as most of the cases were old age. Many studies show adhesive capsulitis more common in the female gender<sup>15</sup>. Sattar *et al* found adhesive capsulitis more common in females (60%) than males (40%). He found a strong association of female gender<sup>16</sup>. In our study female

cases were more (55%) than male cases (45%) with male to female ratio of 1:1.2. It usually involves the dominant side due to increased use of that side<sup>17</sup>. A study was conducted in Turkey on 64 patients in which 56.6% cases were having right shoulder and 50% were having left shoulder adhesive capsulitis<sup>18</sup>. These results are similar to our findings where the right shoulder was involved in 67.5% of cases and the left shoulder was involved in 26.6% of cases. Studies conducted by physiotherapists have emphasized physiotherapy more than other modes of treatment and proved the role of deep heat and stretching exercises superior to invasive procedures in relieving pain and improving range of motion in AC<sup>19</sup>. A study conducted by Rawat *et al*. Reported significant improvement in 84.38% cases on six-week follow-up and improvement in all 100% cases on 12<sup>th</sup>-week follow-up measured on VAS Score after intra-articular corticosteroid injection<sup>20</sup>. In our study six weeks, follow-up was done after intra-articular corticosteroid injection and significant improvement was found in all (100%) cases as measured on VAS score. Another study conducted in Taiwan by Lin *et al* reported improvement in pain and shoulder function after an intra-articular steroid injection and shoulder distension in the medium term (6-16 weeks) but no significant benefits in the long term. He concluded that early distension can be the treatment of choice when the main complaint of the patient is limited external rotation of the shoulder<sup>21</sup>. A national study conducted at the Orthopedic department of Benazir Bhutto Hospital Rawalpindi by Butt *et al* reported improvement in VAS score from  $3.33 \pm 1.1$  to  $2.25 \pm 0.78$  after intra-articular corticosteroid injection on 4<sup>th</sup>-week follow-up. He found intra-articular steroid injection treatment of choice and safer than manipulation under anaesthesia and physiotherapy in the freezing phase of adhesive capsulitis<sup>22</sup>. Aziz *et al* studied outcomes of intra-articular corticosteroid injection and physiotherapy at Combined Military Hospital Kohat, Pakistan and reported improvement in shoulder pain measured on a visual analogue pain scale from  $7.2 \pm 0.91$  to  $5.57 \pm 1.23$  after intra-articular corticosteroid injection and no significant improvement was found after eight sessions of physiotherapy on 6<sup>th</sup> week follow-up<sup>23</sup>. These results were similar to our findings where significant improvement was observed on VAS from  $7.43 \pm 0.980$  to  $5.12 \pm 0.739$  after intra-articular corticosteroid injection after six weeks follow-up. In this study, we administered intra-articular injection without imaging modalities but the confirmation of injection site can be done using ultrasound or fluoro-

scopy. Our study is based on the best available evidence but its results cannot be generalized to any intra-articular injection or physiotherapy technique except what we have used in this study. Still, further studies are needed to be done in our set-ups to evaluate long-term outcomes of intra-articular corticosteroid injection and physiotherapy.

**CONCLUSION**

Intra-articular corticosteroid injection technique is a treatment of choice in adhesive capsulitis which provides significant improvement in pain relief as compared to supervised sessions of physiotherapy alone which show no significant relief in pain.

**Conflict of Interest:** None.

**Authors' Contribution**

MUH: Conception and data collection. BBC: Data analysis and interpretation. MNA: Data collection.

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