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Evaluation of results of physical therapy v/s intra articular steroid injection in periarthritis of shoulder: a comparative prospective study

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ABSTRACT

Background: Frozen shoulder or adhesive capsulitis is a condition where the patient experience stiffness and pain in joint of the shoulder. It is an enigma as till now its etiology is unknown. It affects both the genders of the middle and elderly age. A retrospective, comparative study was to evaluate the effects of physical therapy versus intra-articular steroid injection in periarthritis of shoulder.
Methods: 30 patients each with frozen shoulder who were treated either using physical therapy (Group 1) and intra-articular steroid injection (Group 2). The data was collected at baseline and at different follow-up periods and analyzed.
Results: There were 3 lost to follow-up in physiotherapy group and 4 in intra-articular injection group. Slight male preponderance (51.9% vs. 48.1%) was seen in physiotherapy group. Left side more affected in both the groups. Literacy (p=0.064), socioeconomic status (p=0.22), occupation (p=0.866), comorbidities (p=0.974), abnormal x-ray (p=0.34) were all comparable between the two groups. Mean duration of shoulder pain and restriction of shoulder motion were also comparable (p>0.05). Side effects– 46.2% were higher in intra-articular injection group. Response to treatment, disability score and SPADI index showed significant reduction in both the groups, but significantly more reduction in intra-articular injection was seen in comparison to the physiotherapy group.
Conclusions: The overall treatment outcome in intra-articular injection group is much better in comparison to the physiotherapy group, but with higher side effects. Intra-articular injection of steroid will prove to be a boon after effective management of side effects.

Keywords: Physical therapy, Intra-articular injection, Adhesive capsulitis, Frozen shoulder, SPADI

INTRODUCTION

Frozen shoulder a 'ENIGMA' is a challenge to our profession for many decades.

Frozen shoulder is a problem in all countries in all times because of its obscure etiology, varied pathological processes and improper therapeutic measures. Frozen shoulder is common shoulder lesion affecting the middle aged and elderly persons both males and females. So far very little attention has been paid to this ill understood subject specially in our country. Periarthritis or Frozen shoulder is a common but poorly understood syndrome of painful shoulder stiffness. It was Duplay in 1872 who first described about frozen shoulder syndrome.[1] It was in 1945 that Neviaser coined the term 'Adhesive Capsulitis', this term reflected his findings of patients who were treated for painful, stiff shoulder.[2]

The treatment modalities include benign neglect, oral corticosteroids, injection of corticosteroids, hyaluronates, physical therapy exercises, deep heat modalities,

manipulation under anaesthesia, arthroscopic and open release of the contracture.

The present study was taken to compare and evaluate the results of physical therapy (deep heat therapy and ROM exercises) versus intra-articular steroid injection and ROM exercises in periarthritis of shoulder.

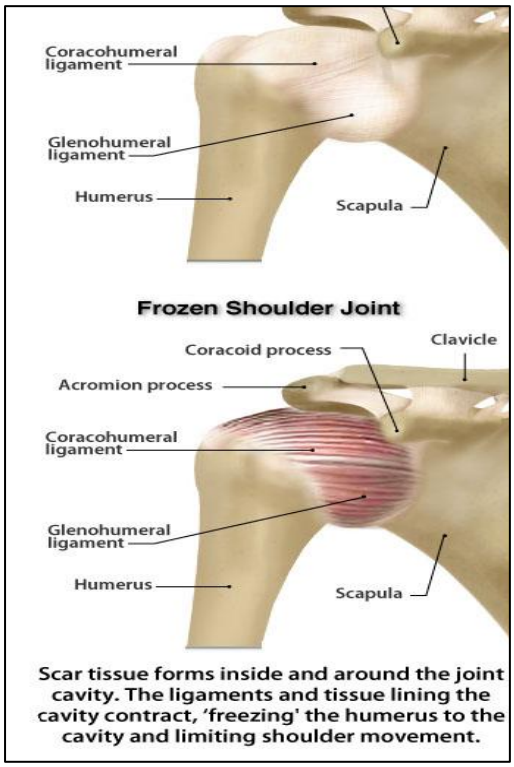

Figure 1: Frozen shoulder joint.[3]

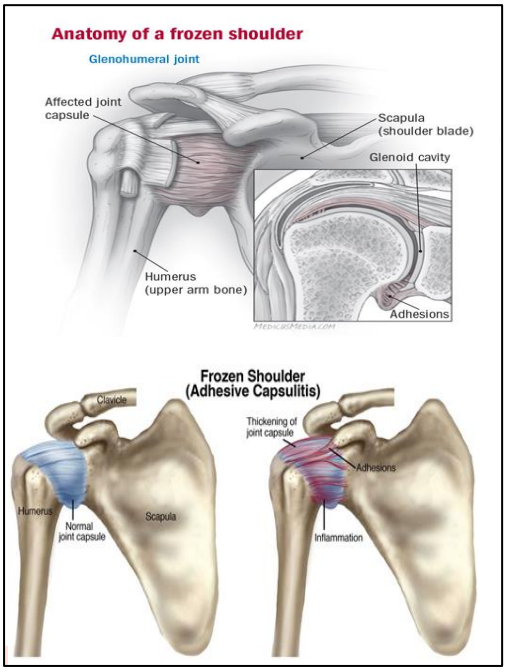

Figure 2: Anatomy of a frozen shoulder.[4,5]

METHODS

The present randomized, prospective, comparative study was conducted on 60 patients in the Department of Orthopaedics, SAIMS and Postgraduate Institute, Indore from June 2017 to March 2018 after obtaining ethical clearance from the Institutional Ethics Committee and all procedures were performed were in accordance with 1964 Helsinki Declaration and its later amendments or comfortable ethical standards. All patients with age more than 18 years, presenting with complains of pain in the extremities for all movements along with marked loss of active and passive shoulder movements were included in the study. Patients with any pathology of shoulder (tuberculosis, malignancy, glenohumeral arthritis); history of surgery, dislocation, fractures in shoulder area; uncontrolled diabetics or any cervical pathology were excluded from the study. Before enrolling any patient into the study, a written voluntary informed consent was obtained from the patient and/or his/her legally acceptable representative.

These 60 patients were randomly allocated two groups of 30 patients each, using computer generated numbers. After initiation of treatment in both the groups were followed up at 3 weeks, 6 weeks, 12 weeks and 24 weeks. Assessment was done using SPADI Score (shoulder pain and disability index), where higher SPADI indicated higher disability or pain.

Group 1 (physiotherapy)

The patients of this group were treated by physiotherapy along with ROM exercises on OPD basis in Department of Physical Medicine.

Group 2 (intra articular injections)

Patients of this group received intrarticular injection with posterior approach at the most tender points along with ROM exercises.

Demographic information including age, sex, religion, domicile state, socioeconomic status, occupation, relevant comorbidities, duration of shoulder pain and shoulder restriction were evaluated. Active and passive range of motion (ROM) of shoulder measured using goniometer. Patient kept in sitting position, the active and passive ROM in flexion, extension, abduction and external rotation were also recorded. SPADI was completed at all the visits (initial, 3 weeks, 6 weeks, 12 weeks and 24 weeks).

Patient were asked to refrain from taking any NSAIDs, but in case of need were allowed to take paracetamol tablets 500 mg with a maximum dose of 2000 mg per day.

The patients were re-evaluated at 3 weeks,6 weeks, 12 weeks and 24 weeks after initial visit. On each visit the

SPADI score was measured, active and passive ROM measured and noted any adverse reaction. Number of paracetamol tablets taken were recorded

Physiotherapy

Following methods were used:

- Active and passive shoulder mobilization exercises.
- Shoulder wheel and pulley exercises.
- Short wave diathermy.
- Interferential therapy (IFT).

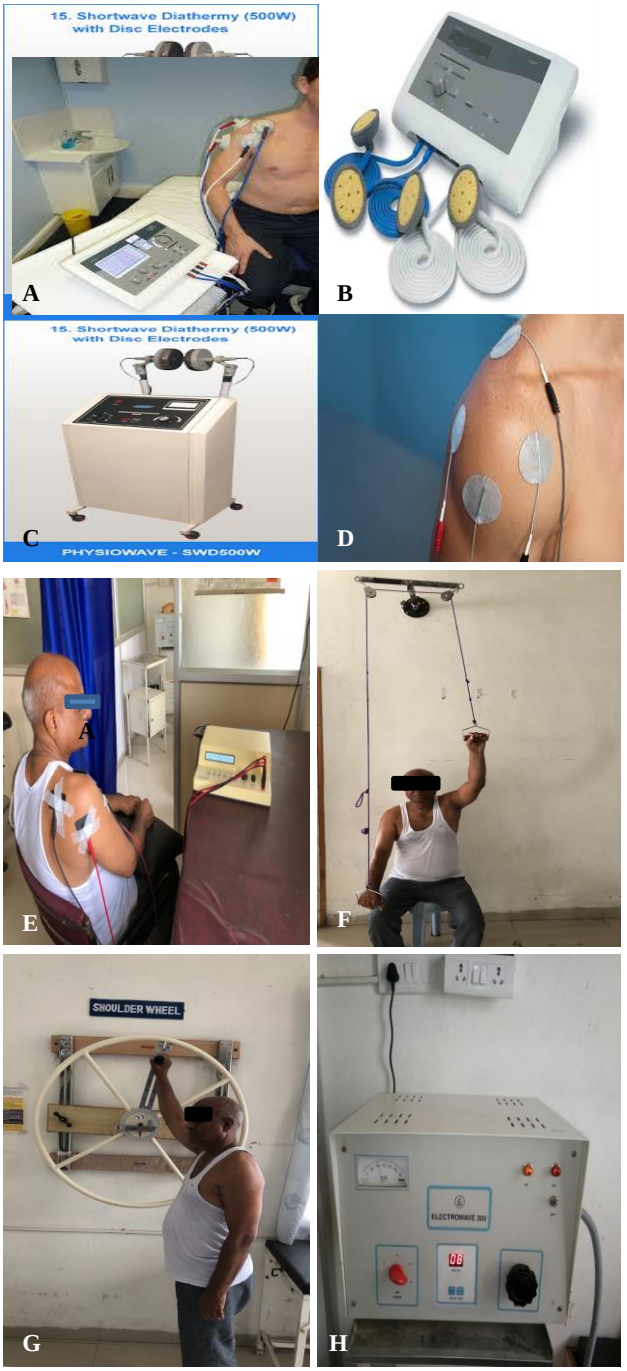

Figure 3 (A-H): Physiotherapy.

Intra-articular injection

Materials used

Lignocaine plain 2% and 2 ml was used along with triamcinolone 40mg/ml in the present study.

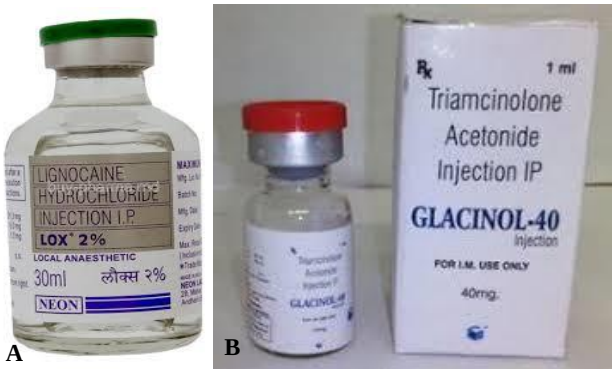

Figure 4 (A and B): Commercially available lignocaine.

Technique of injection

Posterior approach is most suitable for periarticular infiltration. Patient lied in side with the joint to be injected above. Posterior acromion angle was felt just lateral to and behind it. A finger tip was insinuated into a depression marked. Injection was given anteriorly with very little downward (about 15°) inclination.

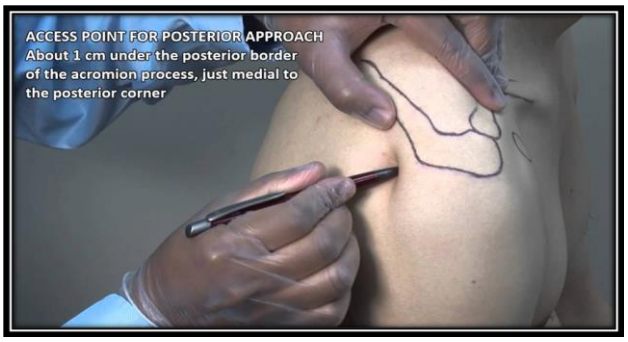

Figure 5: Technique of injection.

In all the cases aseptic precautions were taken, and site of injection was ascertained by anatomical landmarks and marked by skin pencil and then the injection was given.

*Routine investigation included***:** TLC, DLC, Hb, blood sugar (fasting and Post prandial, HbA1c), TSH, T3, T4, Plain X-ray of shoulder–antero posterior view; USG of shoulder and CT and MRI shoulder (in cases when is needed).

Statistical analysis

Customized proforma was used for collecting the data. Comparison of mean between the two groups was done

using Mann Whitney U test, comparison of means of more than two groups was done using ANOVA (F statistics) and p value calculated. A p<0.05 was taken as statistically significant. Analysis was carried out using SPSS version 21 for Windows.

Financial considerations

All the costs towards the treatment were borne by the patient, but no additional test/procedure was conducted for the specific requirement of the study, hence, there was no additional financial burden on the patient or on the institution. Also this study was not sponsored by any pharmaceutical company or institution.

RESULTS

There were 3 lost to follow-up in the physiotherapy group (Group 1) and 4 were lost to follow-up in intra-articular injection group (Group 2). Hence final analysis carried out accordingly.

Majority of the patients in the physiotherapy group were in the age group 51-65 years (51.9%, while in the intra-articular injection group majority of them were in 35-50 years (53.8%). The age was found to be comparable between the two groups (p=0.52) (Table 1).

In the physiotherapy group, there was a slight male preponderance (51.9% vs. 48.1%), while there was equal number of males and females in the intra-articular injection group (50% vs. 50%). Gender was also found to be comparable between the two groups (p=0.89).

In both the groups, majority of the patients had left side affected, but the difference was found to be comparable (p=0.856).

Other parameters like literacy (p=0.064), socioeconomic status (p=0.22), occupation (p=0.866), comorbidities (p=0.974), abnormal X-ray (p=0.34) were all comparable between the two groups.

The mean duration of shoulder pain in the physiotherapy group was 5.63±5.49 months, while in the intra-articular injection group it was 5.21±3.58 months. The difference was found to be comparable (p=0.823).

The mean duration of restriction of shoulder motion was 4.39±4.69 months in the physiotherapy group, while in intra-articular injection group it was 4.37±3.04 months. The difference was found to be comparable (p=0.399).

Side effects were seen in 7.4% patients of physiotherapy group, while in intra-articular injection group it was seen in 46.2%. The difference was found to be statistically significant (p=0.002), showing a higher side effects incidence in the intra-articular injection group (Table 2).

There was statistically significant improvement in flexion range, passive flexion, active extension range, passive extension range, active abduction range, passive abduction score, active external rotation score, passive external rotation, in both the groups at 24 weeks in comparison to the initial visit (p=0.001), but flexion range in intra-articular injection group was significantly higher in comparison to the physiotherapy group (p=0.05).

Table 1: Distribution according to age.

Age (in years)	Physiotherapy		Steroids		Mann-Whitney U	P value
	No.	%	No.	%		
35-50	12	44.4	14	53.8	319.50	0.52
51-65	14	51.9	11	42.3		
66-80	1	3.7	1	3.8		
Total	27	100.0	26	100.0		
Mean±SD	1.59±0.57		1.50±0.58			

P=0.52, not significant.

Table 2: Adverse reaction to treatment.

Adverse reactions	Physiotherapy		Steroids		Mann-Whitney U	P value
	No.	%	No.	%		
No side effects	25	92.6	14	53.8	215.00	0.002*
Side effects	2	7.4	12	46.2		
Total	27	100.0	26	100.0		
Mean±SD	1.59±0.57		1.50±0.58			

P=0.002, significant.

Response to treatment was seen in both the groups. There was a significant decrease in pain score from initial visit (P0) to follow-up at 24 weeks (P6M) in both the groups (p=0.001), but the patients in intra-articular injection group showed significant reduction in pain score in comparison to the physiotherapy group at 24 weeks (p=0.05).

The disability score also a significant reduction in the score from initial visit (D0) to follow-up at 24 weeks (D6M) in both the groups (p=0.001), but the patients in intra-articular injection group showed significant reduction in disability score at 24 weeks in comparison to the physiotherapy group (p=0.05) (Table 3).

The SPADI score also a significant reduction in the score from initial visit (T0) to follow-up at 24 weeks (T6M) in both the groups (p=0.001), but the patients in intra-articular injection group showed significant reduction in disability score at 24 weeks in comparison to the physiotherapy group (p=0.05) (Table 4).

Table 3: Disability score at various intervals (out of 80).

Group	D0	D3W	D6W	D3M	D6M	F value	P value
Physiotherapy	48.41±23.16	36.97±23.18	32.33±22.53	27.48±21.98	14.44±15.71	9.094	0.000*
Steroid	53.27±19.04	40.42±18.34	29.9±15.98	17.73±11.68	5.65±7.74	39.312	0.000*

Table 4: Disability score at various intervals (out of 100).

Group	T0	T3W	T6W	T3M	T6M	F value	P value
Physiotherapy	64.81±24.98	46.47±22.31	38.35±22.55	31.48±26.84	14.1±15.79	18.162	0.000*
Steroid	67.93±22.39	50.06±18.99	34.01±17.38	18.52±12.07	4.5±6.28	60.582	0.000*

DISCUSSION

In our study majority of the patients of physiotherapy (51.9%) were in the age group 51-65 years, while majority of patients (53.8%) of intra-articular injection group were in the age group 35-50 years, the age were comparable between the two groups (p=0.52). Winters et al, Van der Windt et al also reported similar age ranges in their studies.[6,7] We found a slight male preponderance, but studies done by Dacre et al, Shaffer et al and Calis et al reported it otherwise.[8-10]

In our study, male preponderance was seen in physiotherapy group, while it was comparable in intra-articular injection group.

At 24 weeks, intra-articular injection group showed significant reduction in pain score (p=0.05), significant reduction in disability score (p=0.05) and significant reduction in SPADI score (p=0.05) in comparison to physiotherapy group.

Van der Windt et al concluded that effects of corticosteroid injections administered by general practitioners in painful stiff shoulder is superior to those of physiotherapy.[7]

Various studies had shown involvement of dominant extremity to be more than non-dominant extremity whereas a few studies have shown the opposite trends.[6,11] There seems to be no consensus regarding the extremity involved.

Eustace et al reported a successful outcome in 88.8% patients in whom steroid placement was done at the time of arthrography, using the actual cannula through which the contrast material had been introduced in the joint.[12]

Many issues remain unclear about steroid injection – as to how many injection are needed, the stage of disease at which injection should be administered, the most effective corticosteroid and most effective dosage.

CONCLUSION

Periarthritis shoulder is a rheumatological enigma. Precise definition varies; response to many recommended treatments is often capricious. Though it is a self-limiting disease it leaves behind stiffness in shoulder. Comparison of deep heat therapy (short wave diathermy and interferential therapy with range of motion exercises) for 4 weeks, three steroid injections once every 3 weeks with range of motion exercises program in our studies has revealed the intra-articular injection of steroid has much better outcome in terms of improvement in flexion range, passive flexion, active extension range, passive extension range, active abduction range, passive abduction score, active external rotation score, passive external rotation, in both the groups at 24 weeks in comparison to the initial visit (p=0.001), but flexion range in intra-articular injection group was significantly higher in comparison to the physiotherapy group (p=0.05).

The overall treatment outcome in intra-articular injection group is much better in comparison to the physiotherapy group, but with higher side effects. If these side effects are managed effectively then intra-articular injection of steroid will prove boon to such patients in a developing country like ours.

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Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

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