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Functional outcome of intra articular injection of ethylpredisolone in idiopathic frozen shoulder

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Abstract

Introduction: *Frozen shoulder is a clinical syndrome characterized by painful restriction of both active and passive movements. A variety of therapeutic interventions are available for restoring motion and diminishing pain in patients with frozen shoulder. A key alerting feature is restriction of shoulder movement in all directions passive and active range of movement.*

Objective: *To determine the functional outcome of intra articular injection of methylprednisolone in idiopathic frozen shoulder.*

Methodology: *This descriptive case series study was conducted at department of Orthopaedics (Ward-17), JPMC, Karachi, Pakistan, All patients aged 30 to 60 years of either sex having unilateral idiopathic (primary) frozen shoulder, with phase I and phase II frozen shoulder and duration of symptoms of less than six months, University of California Los Angeles (UCLA) shoulder rating scale ≤27 were enrolled. A 4cc preparation (1cc methylprednisolone equal to 40mg and 3cc lignocaine 2%) was injected. Functional outcome was labelled as acceptable as per operational definition at the end of 12th week of injection.*

Results: *Mean age of the patients was 43.10 ±9.66 years. Majority 59 (67.80%) patients were males and 28 (32.20%) were females. Mean duration of symptoms was 3.58 ±1.09 months. In majority of the patients 63 (72.40%), duration of symptoms was ≤4 months. Acceptable functional outcome was observed in 52 (59.80%) patients.*

Conclusion: *The acceptable functional outcome of intra articular injection of methylprednisolone was observed in 52 (59.80%) patients with idiopathic frozen shoulder.*

Keywords: idiopathic frozen shoulder, acceptable functional outcome, intra articular injection, methylprednisolone

INTRODUCTION

Frozen shoulder is a clinical syndrome characterized by painful restriction of both active and passive movements.[1]

It results from contraction of the glenohumeral joint capsule and adherence to the humeral head.[2]

Frozen shoulder has traditionally been characterized as primary (idiopathic), or Secondary (resulting from an underlying condition), such as diabetes mellitus,

rotator cuff tendinopathy or tear, subacromial bursitis, biceps tendinopathy, recent shoulder surgery or trauma and inflammatory diseases.[3,4]

The incidence of frozen shoulder is approximately 3 percent in the general population.[5,6] Frozen shoulder is typically characterized as having three overlapping phases.[7]

Phase 1: In which there is progressive stiffening and loss of motion in the shoulder with increasing pain on movement, usually referred to as 'painful' phase.

Phase 2: In which there is a gradual decrease in pain but stiffness remains and there is considerable restriction in the range of movement, usually referred to as the stiffening or 'freezing' phase.

Phase 3: In which there is an improvement in range of movement, usually referred to as the resolution phase.

A variety of therapeutic interventions are available for restoring motion and diminishing pain in patients with frozen shoulder.[9]

This includes rest, non-steroidalanti-inflammatory drugs, active and passive mobilization, physiotherapy, oral and intra-articular corticosteroids, hydro-dilatation, manipulation under anesthesia, arthroscopic capsular release and suprascapular nerve block.[8,910,11,12,13,14]

Diagnosis, in both primary and secondary settings, is based on clinical examination and medical history. A key alerting feature is restriction of shoulder movement in all directions— passive and active range of movement.[15]

As per University of California Los Angeles (UCLA) shoulder rating scale at the end of 12th week, 15 (35. 7%) poor, 17 (40.5%). good and 10 (23.8%) patients with, frozen shoulder had excellent recovery (UCLA score of >27 was considered as good to excellent functional recovery).[12]

The rationale of this study was that data on this topic is scarce and reported outcome assessed on different scales, therefore the present study is designed to assess functional outcome of frozen shoulder on validated scale and if the study shows acceptable outcome then the same modality was subsequently used in similar cases.

MATERIALS AND METHODS

DATA COLLECTION PROCEDURE

Study was started after seeking approval of synopsis from the Research Evaluation Department, College of Physicians & Surgeons Pakistan, Karachi. Permission for data collections was duly sought from the Institutional Review Board of JPMC, Karachi. Confidentiality of data of patients was maintained strictly. Patients were selected from OPD of ward 17 JPMC, once they fulfilled the inclusion criteria. All the data of the patient was collected and recorded in the Proforma after getting an informed and written consent. Patients will then be shifted to day care procedure room. Informed consent was obtained and patients were made as comfortable as possible. Sterile technique was utilized and gloves worn. A 4cc preparation (1cc methylprednisolone equal to 40mg and 3cc lignocaine 2%) was made. The affected shoulder is palpated until the distal, lateral and posterior edges of the acromion are identified and marked (e.g. thumbnail or marker). The skin should be cleaned with alcohol swabs or chlorhexidine and allowed to dry completely. Topical anesthesia such as lignoacaine (lidocaine) was applied to anaesthetize the shoulder 3-5 min was allowed to ensure that the area is sufficiently anaesthetized before injecting the preparation. A 22-gauge IV cannula, was

inserted inferior to the posterolateral corner of the acromion, aiming the needle medially and slightly anteriorly under the acromion with the tip directed to the under surface of the acromion. The needle was then be advanced to the joint cavity. Prior to injection, the plunger withdraw, which may return synovial fluid and confirm the correct location. This was also ensured that a blood vessel has not been entered. The preparation was injected. An adhesive strip was used to cover the injection site after the procedure. The procedure was performed by surgeon having more than 2 years of orthopaedic experience. After the procedure, patients was advised to limit activity for 24 hours and counselled to use ice and analgesia. Patients were taught to start active home exercises after 24 hours. OPD follow ups were carried out at 3rd, 6th, 9th and 12th week of injection. Functional outcome was labelled as acceptable as per operational definition at the end of 12th week of injection.

DATA ANALYSIS

The data was entered and analyzed into statistical package for social sciences (SPSS version 11). Frequency and percentage was computed for categorical variable such as gender, and functional outcome. Mean and standard deviation was computed for age, duration of the symptoms and university of California Los Angeles scores. Effect modifier was controlled by stratification of age, gender and duration of symptoms through chi square test. P value ≤ 0.05 was taken as significant.

RESULTS

Mean age of the patients was 43.10 ±9.66 years. (Table 1), There were 57 (65.50%) patients with <45 years of age. (Figure 1), Majority 59 (67.80%) patients were males and 28 (32.20%) were females. (Figure 2), Mean duration of symptoms was 3.58 ±1.09 months. (Table 2)

In majority of the patients 63 (72.40%), duration of symptoms was ≤4 months. (Figure 3) Mean UCLA score was 27.90 ±2.89. (Table 3) Acceptable functional outcome was observed in 52 (59.80%) patients. (Figure 4) Cross-tabulation was done to see the effect of age, gender and duration of symptoms on the outcome. Chi-square test was applied. Results are shown in table 4-6.

Table 1 Age of the patients n=87

Mean ±SD	Minimum	Maximum
43.10 ±9.66	31	60

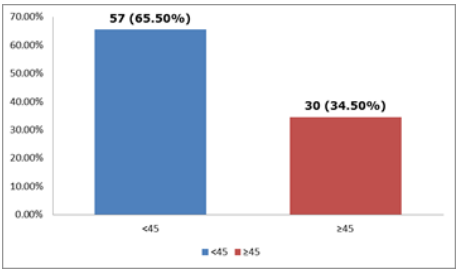

Figure 1: Age groups

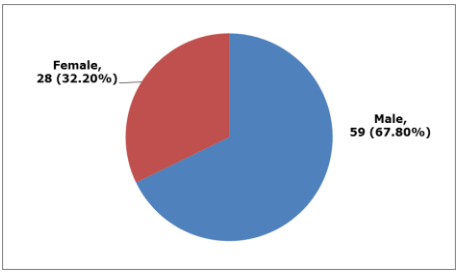

Figure 2: Gender Distribution

Table 2: Duration of symptoms (in months) n=87

Mean ±SD	Minimum	Maximum
3.58 ±1.09	2	5

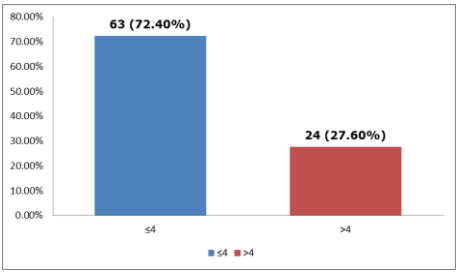

Figure 3: Duration of Symptoms (in months)

Table 3: University of California Los Angeles Scores n=87

Mean ±SD	Minimum	Maximum
27.90 ±2.89	23	33

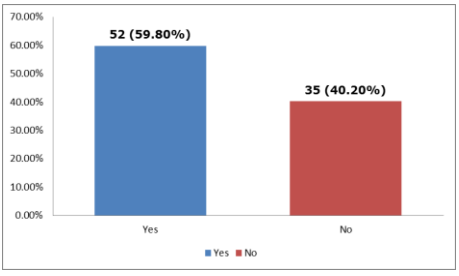

Figure 4: Acceptable Functional Outcome

Table 4: Comparison of age with Functional Outcome n=87

Age (in years)	Functional Outcome		Total	p-value*
	Yes	No		
<45	36 (69.2)	21 (60)	57 (65.5)	0.374
≥45	16 (30.8)	14 (40)	30 (34.5)	
Total	52 (100)	35 (100)	87 (100)	

n(%),*chi-square test applied taking p-value ≤0.05 significant

Table 5: Comparison of gender with Functional Outcome n=87

Gender	Functional Outcome		Total	p-value*
	Yes	No		
Male	35 (67.3)	24 (68.6)	59 (67.8)	0.902
Female	17 (32.7)	11 (31.4)	28 (32.2)	
Total	52 (100)	35 (100)	87 (100)	

n(%),*chi-square test applied taking p-value ≤0.05 significant

Table 6: Comparison of duration of symptoms with Functional Outcome n=87

Duration of symptoms (in months)	Functional Outcome		Total	p-value*
	Yes	No		
≤4	40 (76.9)	23 (65.7)	63 (72.4)	0.251
>4	12 (23.1)	12 (34.3)	24 (27.6)	
Total	52 (100)	35 (100)	87 (100)	

n(%),*chi-square test applied taking p-value ≤0.05 significant

DISCUSSION

There are many methods of treating frozen shoulder and variable success has been claimed. Symptoms of frozen shoulder show much improvement when treated with deep heating and stretching exercise combined. Superficial heating alone was less effective.[16] Traditionally stretching exercises have been used to stretch the shoulder capsule. Continuous passive motion has shown more promising results as compared to this traditional practice.[17]

Combining oral steroids, non steroid anti-inflammatory drugs and physiotherapy, provide good pain relief, that usually does not extend beyond six weeks.[18] In this study, acceptable functional outcome was observed in 52 (59.80%) patients. As per University of California Los Angeles (UCLA) shoulder rating scale at the end of 12th week, 15 (35. 7%) poor, 17 (40.5%). good and 10 (23.8%) patients with, frozen shoulder had excellent recovery (UCLA score of >27 was considered as good to excellent functional recovery).[12]

Widiastuti-Samekto and Sianturi claimed that intraarticular steroid injection gave rapid relief when compared to oral route.[19]

Dudkiewicz I et. al (2004), in their study of 54 patients, with mean follow up o 9.2 years, claimed that conservative primary treatment for frozen shoulder i.e., physiotherapy and intra-articularsteroid injection was an effective long term treatment method.[20]

In study of Dierks & Stevens where seventy seven patients with idiopathic frozen shoulder were compared with respect to the results of exercise within limits of pain and intensive physical therapy. The results were better in patients who performed exercise within limits of pain then those who had intensive physical therapy.[21]

Farrell CM et al, reported that, in patients with persistent severe stiffness, manipulation of shoulder under general anaesthesia improves range of movement at

shoulder joint for a mean period of 15 years after treatment.[22] Some authors have claimed that this does not add to the benefit of exercise program.[21]

It included 27 patients of frozen shoulder (Adhesive Capsulitis) using guidelines issued by the Dutch College of General Practitioners.[22,23]

Frozen shoulder usually affects women in the sixth decade of life, frequently involves the non-dominant extremity, and occurs bilaterally in as many as 34 per cent of patients.[24]

Incidence among patients with insulin-dependent diabetes is even higher (36%), with an increased frequency of bilateral shoulder involvement.[25]

A randomized placebo controlled trial compared the effectiveness of physiotherapy alone with a single intra-articular steroid injection given under X- ray control and concluded that when used alone, supervised physiotherapy is of limited benefit, but a single steroid injection in combination with physiotherapy was effective in reducing both pain and disability.[26]

Van der Wind showed that steroid injection by a general practitioner to be more effective than physiotherapy alone at six weeks.[28]

A meta-analysis on the use of intra-articular steroids found that the success of the treatment depends on the duration of symptoms and patients who receive the injection earlier in the course of the disease recover more quickly.[29]

Similarly, another study found that corticosteroid injection in the early stages of adhesive capsulitis allowed the patient to regain motion prior to developing severe fibrosis.[30]

In a study Rizk compared four treatments: intra-articular methylprednisolone plus lidocaine; intra-articular lidocaine; intrabursal methylprednisolone plus lidocaine; and intrabursal lidocaine and found no significant difference between intra-articular methylprednisolone plus lidocaine and lidocaine alone in pain score or shoulder motion at 24 weeks.[31]

There is debate over the use of single or multiple injections. Up to three injections were beneficial, with limited evidence that four to six injections were beneficial.[32]

De Jong et al reported that the response to steroid injection is dose dependent.[33]

Six (22.2%) patients required a second injection, as frozen shoulder in diabetes is often more severe and more resistant to treatment.[34]

In a South Korean study concluded that improved targeting to the intra-articular space by using ultrasound can provide better results.[35]

Relative to conventional palpation-guided methods, sonographic guidance resulted in 43.0% reduction in procedural pain ($p < 0.001$), 58.5% reduction in absolute pain scores at the 2 week, 75% reduction in VAS pain score.[36]

Most patients with primary frozen shoulder have no history of shoulder trauma. They usually give a history of insidious onset of pain, followed by a loss of motion. Night and rest pain are common in the early stages. Patients who suffer from secondary frozen shoulder often give a history of known diabetes mellitus.[37]

The incidence is reported to be between 10 and 36%[25] in diabetic patients. Other conditions that have shown an association with frozen shoulder and which might give a clue to the diagnosis are the following: hyperthyroidism, hypothyroidism, hypoadrenalism, Parkinson's disease, cardiac disease and a history of stroke.[38]

A history of recent surgery, such as cardiac surgery, neurosurgery and radical neck dissection has also been associated with the development of secondary frozen shoulder.

The only sign found in the early stages of the disease process is pain experienced at the end range of shoulder motion. Patients presenting with stages 1 and 2 have pain on palpation of the anterior and posterior capsule and describe pain radiating to the deltoid insertion. Later on in the disease process, one can note mild disuse atrophy of the deltoid and supraspinatus muscles. A diffuse tenderness with palpation over the glenohumeral joint can extend to the trapezius and interscapular area.[39]

The extension of this tenderness into the neck and upper back is due to the splinting of the painful shoulder. It has been shown that a complete loss of external rotation is a pathognomonic sign of frozen shoulder.[40]

It is important to distinguish whether this loss of external rotation occurs both actively and passively. If passive external rotation is full but active external rotation is absent, a possible rotator cuff tear should rather be considered. Most of the movement in a severely affected frozen shoulder occurs at the scapulothoracic joint. The disease process least affects extension and horizontal adduction motion.[41]

It is suggested in the literature[42] that an intra-articular injection has better pain relief than physiotherapy, analgesics or placebo. A Cochrane database review furthermore showed that it might be beneficial in the short term but that the effect might be small and not well maintained.[43] It is, however, more effective when used in combination with other treatment options, as proved by Carrette *et al.*[44]

They were able to show that intra-articular steroids combined with physiotherapy were more effective in improving shoulder range of motion than when each of these was used individually. In more recent, that a combination of steroids (triamcinolone) and distension (21 ml per injection) had the same outcome at two years as manipulation under anaesthesia. This suggests that their proposed outpatient procedure gives similar results without exposing the patient to the risks associated with a manipulation under anaesthesia.

CONCLUSION

The acceptable functional outcome of intra articular injection of methylprednisolone was observed in 52 (59.80%) patients with idiopathic frozen shoulder

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