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Original Article

Outcome of intra-articular injection of methylprednisolone in idiopathic frozen shoulder

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ABSTRACT

Objectives

To evaluate the outcome of patients with idiopathic frozen shoulder who were treated with intra-articular injection of methylprednisolone.

Patients and Methods

This descriptive study was conducted at Orthopaedic Surgery Unit, Mardan Medical Complex Teaching hospital, Bacha Khan Medical College, Mardan, KPK, Pakistan from September 2010 to June 2011. It included 27 patients of frozen shoulder (Adhesive Capsulitis) using guidelines issued by the Dutch College of General Practitioners.[1,2] All patents were injected with 80mg of Methylprednisolone into the shoulder joint and were followed at six and twelve weeks for improvement in pain using Visual Analogue Scale (VAS) and Abduction and External rotation. Patients with little improvement at six weeks were given another injection.

Results

The average age was 51.4 years (median 49). Nineteen (70.3%) patients received one injection while 8 (29.6%) had a second injection. The average pain score on VAS was 6 at the beginning of treatment which improved to 2 at the end of follow up. The abduction improved from 45degrees to 100 degrees (average gain 55 degrees) and external rotation from 30 degrees to 90 degrees (average gain 60 degree).

Conclusion

Intra-articular steroid injection was effective in improving the range of movement and decreasing pain in frozen shoulder. (Rawal Med J 2012;37:34-37).

Keywords

Frozen shoulder, adhesive capsulitis, intra-articular injection.

INTRODUCTION

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.[3] Adhesive capsulitis is described as being either primary or secondary.[4,5] Primary adhesive capsulitis is due to an unknown cause (i.e., idiopathic), whereas secondary adhesive capsulitis results from a known cause or surgical event.[6] The original pathological descriptions of Neviaser [7]and Simmonds [8] suggested a chronic inflammatory condition, but Lundberg[9] found no significant number of inflammatory cells and suggested that the primary pathology was fibrosis and fibroplasia. A higher incidence of frozen shoulder exists among patients with diabetes (10-20%) compared with the general population (2-5%).[10] Incidence among patients with insulin-

dependent diabetes is even higher (36%), with an increased frequency of bilateral shoulder involvement.[10] The clinical course of this condition is considered self limiting and is divided into three clinical phases: painful, adhesive and recovery phase. Several treatment methods for adhesive capsulitis have been reported in literature, none of which has proven superior to the other.[11] Treatment methods include supervised benign neglect, physical therapy, intra-articular corticosteroid injections, closed manipulation under anesthesia, arthroscopic capsular release, and open surgical release.[12] The rationale for glenohumeral joint corticosteroid injection is to attempt to reduce synovial inflammation to decrease capsular fibrosis and allow improvement of motion with a decreased time to functional recovery.[13] Our study was aimed to determine the effectiveness of intra-articular methylprednisolone injection to assess a decrease in shoulder pain and improvement in range of motion.

PATIENTS AND METHODS

We recruited a total of 27 consecutive patients with frozen shoulder who attended the Orthopaedic Outpatient Department (OPD) of Mardan Medical Complex Teaching Hospital, Bacha Khan Medical College, Mardan, KPK, Pakistan from September 2010 to June 2011. The inclusion criteria were that the patients had a painful restriction of glenohumerol mobility, first episode of adhesive capsulitis, age more than 18 years, both gender and symptoms of less than six months duration. Patients wo had bilateral symptoms, received corticosteroid injections, oral glucocorticoids or physiotherapy or if they had rheumatoid arthritis, osteoarthritis and fracture dislocation of the shoulder were excluded from the study. Informed written consent was obtained from all patients participating in this study. The study protocol was approved by the Ethics Committee of the hospital.

Relevant history, clinical examination, X-ray shoulder joint and fasting blood sugar were obtained. The diagnosis of frozen shoulder was based on passive glenohumeral mobility which must be painful and limited, lateral (external) rotation must be relatively more restricted than abduction and medial rotation and the shoulder pain was not caused by another condition.[1,2] The ranges of glenohumerol joint movement were considered normal as 90 degree abduction, 90 degrees external rotation and 90 degrees internal rotation. Patients rated their pain on VAS of 0 to 10 with 0 representing no pain and 10 the worst pain they had ever experienced. Pre-injection shoulder abduction and external rotation were recorded. A uniform protocol of treatment was adopted and each patient was injected with 80 mg of methylprednisolone (Depomederol, UpJohn) in the affected shoulder without sonographic or fluoroscopic assistance.

Patients were advised to avoid strenuous activity involving the injected region for at least 48 hours. All the patients were advised active range of movements (ROM) via supervised physiotheraphy regimen. They were also prescribed oral diclofenac sodium and were followed at 6 and 12 weeks. At every follow up visit, they were assessed for improvement in pain using VAS and range of motion was measured with the use of a goniometer. Patients with unsatisfactory improvement at 6 weeks were injected again. No more than two injections were given to any patient. The data was analyzed using SPSS version11.

RESULTS

All 27 patients completed the study with no drop outs. The average age was 51.4 years (range 38-70). Among these 11(40.7%) were males and 16 (59.2%) were female. 21 patients (77.7%) had frozen shoulder of the dominant side while 6 patients (22.2%) had non-dominant side involved. Nine (33.3%) patients had diabetes mellitus. Two diabetics (7.4%) were male while

seven (25%) were female. Six (22.2%) of the diabetics were using insulin while three (11.1%) were on oral hypoglycemic drugs. 19 (70.3%) patients received one injection and the remaining 8 (29.6%) a second injection. Six patients (22.2%) who received the second injection were diabetics (all insulin dependent) while 2(7.4%) patients were non-diabetics. The post injection average pain score on VAS and abduction and external rotation showed marked improvement (Table 1).

Table 1. Pre-injection and post injection average pain score on Visual Analogue Scale (VAS) and abduction and external rotation measured with goniometer.

Outcome	**Pre-injection (at 0 week)**	**Post-injection (at 12th week)**	**Average difference**
Shoulder Pain	6	2	4
Abduction	45 degrees	100 degrees	55 degrees
External Rotation	30 degrees	90 degrees	60 degrees

There was no gross difference in gender response to methylprednisolone injections. The pain scores and shoulder range of motion also did not differ significantly between patient receiving single injection and those and those who received second injection after failure to achieve desired response from the first injection. No patients received a third injection. All patients maintained their maximal benefit throughout the course of their follow-up evaluation.

DISCUSSION

Idiopathic adhesive capsulitis is a commonly recognized but poorly understood cause of a painful and stiff shoulder. Although most orthopedic literature supports treatment with physical therapy and stretching exercises, some studies have demonstrated late pain and functional deficits.[14] In our study, the average pain score on VAS was 6 at the beginning of treatment which improved to 2 at the end of follow up. The range of motion similarly improved. 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 .[15] Van der Wind showed that steroid injection by a general practitioner to be more effective than physiotherapy alone at six weeks.[16]

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.[17] 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.[13] We injected methylprednisolone without any local anesthetic. 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.[18]

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.[19] De Jong et al reported that the response to steroid injection is dose dependent.[20] The relationship between adhesive capsulitis and diabetes mellitus is well documented; [10] there were 33.3% diabetics in our study. Six (22.2%) patients required a second injection, as frozen shoulder in diabetes is often more severe and more resistant to treatment.[21] We used a blind technique for intra-articular steroid injection but the confirmation of injection accuracy can be obtained with fluoroscopy or

ultrasound and a South Korean study concluded that improved targeting to the intra-articular space by using ultrasound can provide better results.[22]

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.[23] Our results have been satisfactory. However, we feel that with a larger case series, a longer follow up and refinement of the procedure, a fair conclusion can be drawn with regard to the efficacy and otherwise of this treatment modality of frozen shoulder.

CONCLUSION

Our results show that intra-articular methylprednisolone injection was an effective treatment option in frozen shoulder leading to a fast pain reduction and increased range of motion. We therefore recommend intra-articular steroid injection for patients of frozen shoulder not responding to analgesics.

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