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Is Night Pain An Indication for Intra Articular Steroid Injection in Adhesive Capsulitis?

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I. Introduction

Frozen shoulder or Periarthritis is a common, painful, and disabling condition affecting the shoulder joint which occurs in 2% to 5% of the general population, and majority of patients are females[1]. Frozen shoulder has also been documented to be more common and more difficult to treat effectively in patients who have diabetes [2], thyroid disease [3, 4]and autoimmune diseases [5].Nevasier was first credited for identifying the pathology by histological and surgical examination of patients with frozen shoulder. He reported that frozen shoulder was not periarthritis but a "thickening and contraction of the capsule which becomes adherent to the humeral head". He named it "adhesive capsulitis [6,7]. Later various studies supported this finding and conclude that it is result of contracted collagenous tissue[8].

Though adhesive capsulitis is a common problem in practice, its etiology, pathology and natural history has not been definitively established, making evaluation of treatment protocols difficult, which is clinically characterized by insidious onset and progressive shoulder pain accompanied by limitation of active and passive range of all shoulder movements. The efficacy of intra articular injections has been extensively studiedinthe literature with variable results [9, 10]. In this study we evaluated the effectiveness of intra articular steroid in adhesive capsulitis cases with night pain as significant symptom and compared the same with those patients of adhesive capsulitis without night pain.

II. Materials And Methods

This prospective study was conducted in our hospital that serves individuals with low socio economic status; this study included all newly diagnosed adhesive capsulitis patients consecutively admitted for physical therapy and rehabilitation. Adhesive capsulitis was defined as the presence of shoulder pain with limitation of both active and passive movements of the glenohumeral joint of 25% in at least two directions. The inclusion criteria were as follows, symptom duration between six weeks and six months, and no treatment other than analgesics in the last six months. The exclusion criteria were uncontrolled diabetes mellitus, contraindications of injections and previous shoulder surgery. A total of 126 patients with adhesive capsulitis were enrolled in this study. Patients were divided in to two groups after initial evaluation. Group I with significant night shoulder pain patients N-62 and group II without significant night pain patients N-56, were given intra articular 40 mg methylprednisolone acetate and local anesthetic agent followed by supervised comprehensive exercise program m in hospital followed by home exercises.

The injections were given intraarticularly via the posterior approach, with the patient seated, and the arm on the affected side slightly rotated internally. The index finger of the physician was placed on the coracoid process and the thumb on the angle between the spine of the scapula and the acromion. The needle was introduced 1 cm below the thumb and aimed at the coracoid process. 5-mL syringe, fitted with a 5-cm, 21-gauge needle was used. All the injections were applied by the same physician, who was informed with regard to the injection materials, while patients were aware of the type of injection.

All patients were assessed at initial evaluation and admitted for one day for injection and exercises, 4th and 12th weeks of follow up. Initial evaluation included the recording of demographic data, medical history, relevant relevant comorbidities and detailed examination of the effected shoulder. At all three evaluations, shoulder range of movements abduction, flexion and rotations, night pain and shoulder disability were measured. Passive range of motion of the involved shoulder was measured in all planes with a long-arm goniometer with patients in supine position. Shoulder flexion was assessed in sagittal plane with the arm at the side and hand pronated, while the shoulder abduction was measured after stabilizing the scapula in the frontal plane with the arm at the side and the shoulder externally rotated to obtain maximum abduction. Shoulder internal and external rotations were measured in transversal plane with the arm abducted to 90, the elbow flexed to 90.When the arm could not be abducted 90, the arc was considered to be 0, and internal and external rotations were measured on this plane.Night pain was measured with visual analogue scale of 0–10points, ranging from no pain to very severe pain.

All patients were given the same comprehensive home exercise programme. Initially, pendulum circumduction and passive shoulder self-stretching in forward elevation, external rotation, horizontal adduction and internal rotation were prescribed. The patient was instructed to stretch the shoulder to the point of tolerable discomfort five times a day. The goal is to stretch the capsule sufficiently to allow restoration of normal glenohumeral biomechanics. When the passive shoulder range of motions reached 80- 90% of normal ranges, the exercise protocol was followed by isometric in all planes and scapular strengthening exercises.

We recommended hot pack application before and cold pack application after shoulder exercises. Oral paracetamol(1500 mg/day) or Tramadol (1or 2 tablets) depending on pain threshold of the patient was recommended to patients when needed. The same physician, who gave the steroid injection, evaluated all patients' measurements. All patients were informed about the nature of the study procedure and provided informed consent prior to beginning the trial.

III. Results

A total of 126 patients were enrolled, group A includes 62 patients and group B includes 56 patients. Eight patients failed to complete the study and excluded.

The demographic details of the study are given in (table 1)

PARAMETERS	Group A	Group B
Age	52years(44-76)	55.75yrs(40-73)
Sex	40- males 22- females	34- males 22- females
Site	Rt –33 Lt -29	Rt –36 Lt -20
Diabetes	N=13	N=9

Over all the right side pathology was predominant (69%).

Pre injection and post injection VAS scores (table 2)

	Pre injection	Two weeks	6 Months
Group A	6.96	1.43	2.4
Group B	7.12	2.73	2.8

There was significant improvement ($p>0.05$) in VAS scores in Group A at 2 weeks after steroid injection compared to those patients in Group B. However, there was no much difference in VAS scores measurements among both groups at the end of six months ($p<0.03$). The functional outcome was assessed based on daily activities so we used DASH score to compare pre and post injection (table 3).

	PRE INJECTION	POST INJECTION (6 MONTHS)
GROUP A	76(84-61)	42(74- 30)
GROUP B	72(86-56)	46(68-34)

Although patients with night pain had better relief after steroid injection at 2 weeks, there was no statistically significant difference in functional outcome as measured by DASH Scores among both the groups ($p<0.03$).

The result showed significant improvement in range of movements at the end of 6^{th} month.

ROM Parameter	Pre injection	Post injection
Abduction	78 Degrees	124 Degrees
Internal rotation	19 Degrees	31Degrees

IV. Discussion

The shoulder is a very complex joint that is crucial to many activities of daily living. Adhesive capsulitis is common problem, characterized by decrease in range of motion and pain which we see in orthopedic practice. A variety of therapeutic interventions are available for restoring the function in patients with frozen shoulder with variable success.[12] These include rest, non-steroidal anti-inflammatory drugs, active and passive mobilization, physiotherapy, oral and intra-articular corticosteroids, hydro-dilatation, manipulation under anesthesia, arthroscopic capsular release and suprascapular nerve block.[12-15]Its treatment is difficult since none of the currently used therapies are proven to be effective. The intra-articular corticosteroid injection alone or in combination with physical therapy is most commonly used to treat adhesive capsulitis.[16] Despite its proved efficacy, the timing in relation to staging of adhesive capsulitis was not evaluated properly in the literature.

Neviaser and Neviaser initially described a staging system for adhesive capsulitis.[7]Their four stages ranged from synovial inflammation with limited motion to adhesive synovitis, to more mature adhesions with less synovitis, and finally to mature adhesions with pain less limited motion.[7]

Steroid injection therapy has been advised in adhesive capsulitis based on the belief that inflammation plays an important role in the pathogenesis.[7] Cytokines have been implicated recently in the inflammation and fibrosis described in adhesive capsulitis. Cytokines are involved in the initiation and termination of repair processes in multiple musculoskeletal tissues, and their sustained production has been shown to result in tissue fibrosis. Adhesive capsulitis is frequently associated with night pain and is usually focused over the anterolateral aspect of shoulder (biceps region) or down the outside of the arm. The amount of pain experienced by patients with a frozen shoulder may be variable with some patients developing severe pain whilst others have only mild pain. The severity of the pain is usually determined by the extent of neovascular proliferation and capsular reaction that develops inside the joint as part of the disease process, the same was demonstrated by arthroscopic findings by Neviaser et al [7] and we believe that night pain is a good indicator for intraarticular steroid which in directly reflects the severity of synovial pathology (neovascularization and synovial congestion). 22 Diabetics (18.6%) were seen in both groups depicting DM to be commoner comorbidity.[17] however there was no relation to DM with association of night pain.But, 17 (77.2%) of these patients had significant relief and improved DASH scores (>good) after steriod injection.In our study the group 'A' patients following steroid injection there is significant relief in pain by the end of two weeks which indirectly reflects the synovial pathology and its relation to night pain. Although there was similar improvement in functional outcome among both groups at 6 months follow up, steroid injection in night pain population had siginificant immediate pain relief that encouraged them to adhere to good rehabilitation.

V. Conclusion

Early and prompt recognition of adhesive capsulitis (Stage I and Stage II with night pain) and treatment with intra articular corticosteroid may provide a chemical ablation of synovitis, thus limiting the subsequent development of fibrosis and shortening the natural history of the disease. We propose early administration of intra articular steroid in patients with night pain that permits rehabilitation and achieve good outcome.

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