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Intra articular steroid injection versus shoulder arthroscopy in the patients with adhesive capsulitis

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Abstract
Introduction: Shoulder stiffness has been variously described as frozen shoulder, adhesive capsulitis and scapulohumeral periarthritis. It is commonly found disorder especially in patients with diabetes mellitus. Our aim is to compare the symptomatic and functional outcome of intra articular steroid injection as an out-patient procedure with shoulder arthroscopy for adhesive capsulitis of shoulder.
Materials and Methods: The study was conducted by a single surgeon at a tertiary care hospital between October 2017 and May 2019. Total of twenty patients diagnosed with adhesive capsulitis were taken into the study. These patients were divided equally into two groups namely Intra articular injection group (IA) and Shoulder arthroscopy group (SA). The patients were followed by after two, six, twelve and sixteen weeks. They were assessed according to visual analogue scale (VAS) and Quick DASH (Disability of Arm, Shoulder and Hip). The results were analysed using SPSS software (Illinois, Chicago). P value ≤ 0.01 was considered to be statistically significant.
Results: The VAS, and Quick DASH were found to be better and statistically significant in SA group as compared to IA group.
Discussion: Arthroscopic capsular release when combined with biceps tenotomy, sub acromial decompression, manipulation under anaesthesia and peri articular steroid injection improves the functional outcomes of patients as compared with intra articular injection alone.
Conclusion: Shoulder arthroscopy along with steroid injection provides better functional and clinical outcomes as compared with intra articular steroid injection alone.

Keywords: Hip fracture, bone turnover markers, CTX, PINP, vitamin D

Introduction
Frozen shoulder is one of the common problems encountered in the out-patient clinic by orthopaedic surgeons. Various eponyms include adhesive capsulitis and scapulo-humeral joint arthritis. It is a clinical manifestation where both passive and active range of movements of the affected shoulder is restricted. It can be one of the several manifestations in the patients with metabolic disorders like diabetes mellitus, hypothyroidism and rheumatoid arthritis. It can also be acquired secondary to traumatic fractures around proximal humerus, glenoid, acromion process and dislocations of glenohumeral and acromio-clavicular joints.

Aims and Objectives
The aim of our study is to compare the symptomatic and functional outcome of intra articular steroid injection as an out-patient procedure with shoulder arthroscopy for adhesive capsulitis of shoulder.

Materials and Methods
The study was conducted by a single surgeon at a tertiary care hospital between October 2017 and May 2019. Total of twenty patients diagnosed with adhesive capsulitis were taken into the study. Inclusion criteria included all the patients who were having restricted active and passive range of shoulder motion with no or minimal pain at rest, patients who were given one month of conservative treatment in the form of analgesics and shoulder physiotherapy exercises. The exclusion criteria included children, patients with rotator cuff tears and uncontrolled diabetes

($HbA_1C \geq 9.5$). These patients were divided equally into two groups namely Intra articular injection group (IA) and Shoulder arthroscopy group (SA). The procedure for the patients in IA group was carried out in the out-patient clinics. Under sterile aseptic precautions, 1 ml 2% lignocaine injection with 1 ml Triamcinolone was injected through posterior portal placement insertion area (two fingers breadth medial and distal to the acromion process) into the gleno humeral joint and just below the acromion in the lateral entry portal for sub-acromion space. All patients were sent for physiotherapy and immediate mobilisation of the shoulder. Appropriate antibiotics and analgesics were given for five days. The patients in the SA group underwent shoulder arthroscopy under general anaesthesia in beach chair position. Hydro dilation, biceps tenotomy, sub-acromial decompression by bursa excision and acromioplasty, manipulation under anaesthesia and intra articular steroid injection was carried out. These patients were also started with pendulum exercises, scapular stabilisation exercises, theraband exercises, cuff strengthening exercises and abdominal core building exercises. The patients were followed by after two, six, twelve and sixteen weeks. They were assessed according to visual analogue scale (VAS), and Quick DASH (Disability of Arm, Shoulder and Hip). The results were analysed using SPSS software (Illinois, Chicago). P value ≤ 0.01 was considered to be statistically significant.

Results

In IA group, we injected steroid with lignocaine in 10 patients. There were six females and four male patients in this group. The average age of the patients in this group was 58±9.6 years. Six patients suffered from diabetes, two patients with hypo thyroidism and two patients with rheumatoid arthritis. The pre-procedure mean VAS improved from 8±1.2 to post-procedure VAS of 3±1.4 at 16 weeks. The pre-operative mean Quick DASH score was 34.3±5.3 which improved to 83.1±3.6 post operatively at 16 weeks. There was recurrence of symptoms in three patients at 24 weeks. Two patients were all given second dose of steroid while one patient agreed underwent arthroscopic capsular release with subacromial decompression and manipulation under anaesthesia. There was no recurrence of symptoms in all three patients thereafter.

In SA group, we have operated ten patients for arthroscopic shoulder hydro dilation, biceps tenotomy, sub acromial decompression, acromioplasty, peri articular steriod injection and manipulation under general anaesthesia. There were seven female and three male patients. The average age of the patients was 54±2.5 years. Four patients suffered from freshly diagnosed diabetes. All the patients were satisfied as far as relief from pain and increase in range of motion were concerned. The pre-operative mean VAS improved from 8±1.3 to post-operative VAS of 2±1.7. The pre-operative mean Quick DASH score was 33.3±4.3 which improved to 91.1±5.7 post operatively at 16 weeks. Both improved VAS score and Quick DASH score were statistically and clinically significant. There was no recurrence of symptoms in nine patients. One patient had recurrence of symptoms in the form of tingling and numbness. So patient was treated for cervical spondylosis giving cervical traction and nerve growth stimulators.

Discussion

We found that patients in both the groups improved significantly. Females were more affected than males. The reason being women carry out house hold activities like washing clothes, utensils, carrying heavy grocery bags, suffering from vitamin D and B_{12} deficiency. The age group affected is after menopause with diabetes and hypothyroidism as associated metabolic disorders. Also, second dose of steroid injection was required in two patients after six months, while one patient converted to arthroscopy shoulder procedure.

Adhesive capsulitis or stiff shoulder is a manifestation of various pathologies with varied clinical presentations. It is a common yet poorly understood pathology of the shoulder joint. Frozen or stiff shoulder is a condition where there is a significant loss of both active and passive range of shoulder movements. Primary causes include metabolic disorders like diabetes mellitus, hypothyroidism, vitamin B_{12} deficiency, Parkinsonism and cerebrovascular disorders. The secondary or acquired causes include mainly post traumatic and post-surgical shoulder stiffness.

There are various theories proposed for this pathological condition. The immunological cause and plausible mechanisms are still investigated by various authors in the literature. Patients with adhesive capsulitis of the shoulder are found to have high levels of glucose, cholesterol/ LDL (Low Density Lipoproteins) and serum triglycerides in the blood along with low levels of vitamin D, vitamin B_{12}, T3, T4 and calcium. The adhesive capsulitis is commonly associated with fibromyalgia, trigger fingers, carpal tunnel syndrome and Dupuytren's contracture. Inflammatory cytokines mainly cause synovitis in the glenohumeral and subacromial joints leading to fibroblast proliferation. Thereafter, the capsule becomes thickened, rotator interval reduces, cuff tendinosis occurs and subacromial bursa enlarges. This leads to painful and restricted active and passive shoulder motion.

Hannafin and Chiaia have described the three stages for adhesive capsulitis. Stage 1 occurs in the first three months of the inflammatory process. There is pain with minimal loss of motion. This stage is called stage of synovitis. Stage 2 occurs between three and nine months after the onset of symptoms. The pain increases with reduction in the range of motion. Arthroscopy at this stage reveals diffuse red and inflamed synovial tissue. Stage 3 is also called as frozen stage where there is reduction of pain but complete loss of active as well as passive shoulder motion. Arthroscopy reveals thickened and fibrotic capsule and reduced rotator interval. Last stage is known as stage of thawing phase which occurs between fifteen and twenty four months. It is a stage of gradual recovery by natural process. There is minimal pain with improved range of shoulder motion. Overall, frozen shoulder or adhesive capsulitis is a self- limiting disorder which improves over a long period of time. Patients usually present during the stage of diffuse synovitis and frozen stage whereby our intervention helps to improve pain and range of shoulder motion.

Arthroscopic hydro dilation is one of the successful surgical modalities described in the literature. It helps to inject large volumes of saline fluid inside the joint thereby ballooning up the capsule, removal of cytotoxins and inflammatory mediators. Also long head of biceps is an evolutionary vestigial tissue whose tenotomy leads to increase in range of shoulder motion. Sub acromial bursa excision and acromioplasty also provide pain relief from impingement on overhead abduction. Lastly, manipulation under anaesthesia improves all range of shoulder motion especially internal rotation, overhead abduction with external rotation.

Fig 1: Patient in the IA group with intra articular steroid injection into the gleno-humeral joint

Fig 2: Patient of SA group in beach chair position with secured head and neck to the operating table

Fig 3: Posterior and anterior portals as visualisation and working portals respectively for patient in SA group for right shoulder

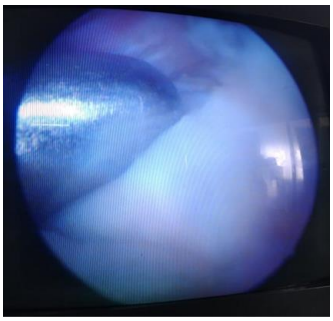

Fig 4: Arthroscopic capsular release with biceps tenotomy in patients of SA group

Conclusion

Adhesive capsulitis or Frozen Shoulder is an enigma for all orthopaedic surgeons worldwide. Proper history taking, clinical examination, diagnosis, investigations and treatment modalities are required for satisfactory patient related functional and clinical outcomes. Arthroscopic capsular release along with hydro dilation, biceps tenotomy, sub-acromial decompression with bursa excision, acromioplasty, steroid injection and manipulation under anaesthesia gives superior results when compared to steroid injection alone. It should be however noted that immediate physiotherapy with pendulum exercises, passive and active shoulder range of motion exercises, scapula stabilisation exercises, cuff strengthening exercises and abdominal core building exercises are as essential as the interventional modalities and lifestyle modifications.

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