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Original Article

Comparison Between Manipulation Under Anaesthesia and Intra-Articular Steroid Injections for Frozen Shoulder

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Abstract

Background: To compare the outcome between manipulation under anaesthesia (MUA) and intra-articular steroid injections in the shoulder, for patients diagnosed with frozen shoulder (adhesive capsulitis), within a short follow up period.

Methods: In this randomized control trial 140 patients with primary frozen shoulder were included. Patients that had been injected with steroid in the frozen shoulder already, and those with comorbidities such as diabetes, were excluded. Patients were randomized into two groups, manipulation under anaesthesia (MUA) or intra articular steroid injection. All patients were reviewed at 04 weeks with each patient completing the shoulder pain and disability index Score along with the Visual Analogue Sale (VAS) score to assess pain levels at follow-up.

Results: Mean age was 51.13 ± 6.84 years. The ratio of female to male was 1:3. Mean pain score is decreased significantly from 3.33 ± 1.10 before intervention to 2.25 ± 0.78 (SD) and mean disability index score dropped from 5.85 ± 1.46 before intervention to 2.46 ± 0.72 , after intervention (p-value <0.001). There was no significant difference between the time within which pain was reduced or function of the shoulder was improved.

Conclusion: Given the cost implications and the potential risks of manipulation under anaesthesia , it is recommended to use steroid injections as a preferable treatment option over MUA and physiotherapy as the primary treatment option during the freezing phase of adhesive capsulitis.

Key words: Frozen shoulder, Adhesive capsulitis, Manipulation under anaesthesia, Intra articular steroid injection.

Introduction

The definition of frozen shoulder also known as adhesive capsulitis according to the American Orthopaedic Association is, a condition of varying severity characterized by the gradual development of global limitation of active and passive shoulder motion where radiographic findings other than osteopenia are absent. The Shoulder joint is the joint with the widest range of motion in the human body but is also highly vulnerable to injury. Frozen shoulder (adhesive capsulitis) is idiopathic and usually resolves by itself within 12 to 24 months, occasionally taking upto 36 months. It is characterized by pain and stiffness in the shoulder due to thickening and contracture of the capsule. [1-3] Diagnosis is usually made after history taking, examination, and CT or MRI imaging. Risk factors include diabetes, hypothyroidism, hyperthyroidism, injury and prolonged immobilization.[4] Prevention can be done by early mobilization after injury.[5] The disease course is divided into three stages characterized by pain, stiffness and slow resolution.[6]

The main aim of therapies is to achieve pain control and to restore motion.. Patient education about the natural disease history helps to make them aware of the disease course and recovery. It highlights the importance of consistently performing home exercises.[7] Some treatment options for pain management and muscle relaxation include using ice, heat, electric stimulation and ultrasound to improve the role of exercises and manual techniques. Other treatment options are pain killers and muscle relaxants used orally, exercise, acupuncture, intraarticular steroid injections, nerve blocks, joint mobilization and manipulation and surgery. If no improvement is seen after physiotherapy and anti-inflammatory medication, then surgical intervention to release the contracted joint capsule may be considered. [8]

Complete or near complete return of motion has been achieved by open surgical release in the past. But now, arthroscopic approach has become more popular as a method of surgical capsular release, typically performed alone or accompanied with manipulation.[9] Arthroscopy has the benefit of causing no damage to the healthy tissue while selectively releasing pathologic fibrosis. This is achieved by passing a camera and small instruments which cut through the tightened fibres of the contrature. Conversely, manipulation under anesthesia which was until now

accepted as the gold standard of treatment, has the downside of rupturing healthy tissue along with the contracture release. [10]

A consensus has still not been reached on which structures need to be released arthroscopically**.** One research trial conducted in 25 patients whose coracohumeral ligament and RCI was released, has shown impressive early and long term outcomes.[11] There has been research during which additional portions of the CLC including the superior, middle and inferior glenohumeral ligament, the intra-articular component of the subscapularis tendon and the posterior capsule have been selectively released. [12] An intra articular steroid injection had to be given in 37% patients at 4.5 weeks.

Continuous passive exercising or regular physiotherapy are among the post operative treatment modalities deemed necessary to preserve the mobility achieved via surgical release.[13] Now, manipulation and arthroscopy are being done together to achieve better outcomes.[14] A variation in the time for recovery has been observed ranging from 6 weeks to 3 months depending on the patients occupational requirements and healing time. [15]

Study comparison has been rendered difficult by the varied success criteria which relies more on the return of normal motion rather than having pain free functional motion. This can be difficult to achieve early on due to the dense fibrotic tissue. Other factors are the varied natural history of disease progress and resolution in different patients, underlying natural resolution leading to false positive results of treatment modalities and the unestablished criteria for the modalities, frequency and timing of physiotherapeutic treatment options.

Patients and Methods

In this randomized control trial, conducted in Orthopedic Department of Benazir Bhutto hospital, Rawalpindi, patients with a diagnosis of frozen shoulder were enrolled . Study was conducted from March to September 2015. The calculated study sample size was 70 patients in each group. The inclusion criteria were, age 30 to 70 years old.Inclusion criteria was either sex, spontaneous onset of a painful stiff shoulder, marked loss of active and passive global shoulder motion, with at least 50% loss of external rotation, symptoms present for at least six months,normal x-rays on anteroposterior and axillary lateral radiographs of the glenohumeral joint, no treatment other than analgesics ever employed for this problem.Exclusion criteria was radiographic pathological findings or glenohumeral osteoarthritis on X-ray, significant cervical spine disease,history of significant trauma to the shoulder,local corticosteroid injection or any physiotherapy intervention to the affected shoulder within the last three months,cerebral vascular accident affecting the shoulder,inflammatory joint disease affecting the shoulder,bilateral frozen shoulder due to possible underlying systemic cause such as,thyroid disease, any coronary event, post coronary artery by-pass or catheterization prior to the clinical appearance of frozen shoulder, prior surgery, dislocation or fractures on the affected shoulder.

Patients in both groups were given standard clinically accepted treatment. This design ensured that no patient entering the study was denied potentially beneficial treatment for their condition. Routine radiographs were performed. After the baseline measurements were carried out, an administrative assistant assigned the patients into the two intervention groups according to the computer generated permuted block randomization scheme and confidentiality was maintained.

Patients were randomized into two groups. Group 1 (n=70) comprised intraarticular injection patients and Group 2 (n=70) included patients who received manipulation under anaesthesia.The patients were prohibited from using any other adjuvant therapy apart from analgesics like non-steroidal anti-inflammatory drugs during the study period. In intraarticular injection group patients (n=70) were treated with a posterior approach intra articular injection containing a mixture of 5cc of 1% lidocaine HCl (xylocain) and 2cc (80 mg) methylprednisolone acetate (depomedrol) via an 18 gauge spinal needle. All patients were injected once.Active and passive range of movement (AROM and PROM) assessments were performed before and after injection and at all subsequent visits. Patients were advised to perform range of movements exercise within the limits of pain daily for ten minutes. In Group 2 MUA was done on elective operation list under general anesthesia using a short lever arm and fixed scapula. Audible and palpable release of adhesions was a good prognostic sign. Pain (VAS) was measured at rest, the patient was asked to identify the worst pain they felt when the shoulder was at rest, using the visual analogue scale. (VAS). Scale values were then obtained by measuring the distance marked by the patient from zero to 10cm, 0 being no pain and 10 being the worst pain. [16] The Shoulder Pain and Disability Index (SPADI) was used as a self-administered questionnaire. It is designed by Roach and colleagues to measure the impact of

shoulder pathology in terms of pain and disability, for both current status and change over time to produce a total score ranging from 0 (best) to 100 (worst). [17]

Results

Mean age of the sample was 51.13 years old (SD 6.84). The ratio of female to male was 1:3. The dominant arm was affected in 53 %. The mean duration of symptoms was 19 weeks in MUA group and 16 weeks in injection group (Table 1).

Table I: Baseline characteristics of patients in the two study groups

	Group 1 intra articular injection	Group 2 Manipulation under anaesthesia
Mean age (years)	51.27	50.14
Gender : Male No (%)	53(75)	50(71.42)
Gender : Female No(%)	17(25)	20(28.58)
Affected shoulder right	31	45
Affected shoulder left	39	30
Mean duration of symptoms (weeks)	16	19
Mean Pain score (VAS)	3.33	3.45
Disability index	5.85	5.74

In MUA group The mean pain score decreased significantly from 3.4571 ± 0.9784 to 2.25 ± 0.78 and the mean disability index score dropped from 5.7414 ± 1.1214 to 2.64 ± 0.72. This shows the change in mean pain and disability score which is decreased significantly after intervention and this difference in mean change was found statistically significant (p-value <0.001) (Table 3).

Table 2:Descriptive statistics for Group 1 (intra-articular steroid) before and after intervention

Variables	Before injection (n=70) Mean ±SD	After injection (n=70) Mean ±SD	T-value	p value
Pain score	3.3357 ± 1.10	2.2571 ± 0.7808	5.917	< 0.001
Disability index score	5.8571 ± 1.46	2.4643 ± 0.7238	-6.513	<0.001

In intra-articular group mean pain score decreased significantly from 3.33 ± 1.10 before intervention to 2.25 ± 0.78 and mean disability index score dropped from 5.85±1.46 before intervention to 2.46 ± 0.72. This shows the change in mean pain and disability score which is decreased significantly after intervention and this difference in mean change was found statistically significant (p-value <0.001) (Table 2)

Table 3:Descriptive statistics for Group 2 (MUA) before and after intervention

Variables	Before MUA (n=70) Mean ±SD	After MUA (n=70) Mean ±SD	T - value	p value
Pain score	3.4571 ± 0.9784	2.2541 ± 0.7808	6.1248	< 0.001
Disability index score	5.7414 ± 1.1214	2.6443 ± 0.7238	-5.7841	<0.001

Discussion

Controversy exists around the management of frozen shoulder as no consensus has been reached regarding the standard management including medical, surgical or physiotherapy based treatment. Considering the protracted nature of this disorder the goal should be to achieve early pain relief and functional restoration.[18]It is difficult to differentiate frozen shoulder from other conditions, associated with inflammation leading to pain and immobilization**. Q**uraishi et al observed that 94% patients favored intra-articular injections in terms of pain relief and mobilization compared to 81% of those receiving MUA.[19] In another study, Sharma et al concluded that intra-articular injections show a better outcome than MUA. [20]

In our prospective, randomized trial, the intra articular injection has been observed to be preferable over MUA as they are easy, safe, cost effective and show early response**.** Manipulation under anesthesia has the downside of being associated with a small percentage of anesthetic risks and the risk of fracture in the proximal humerus. [21,22] The research outcomes were found to be comparable with the observations in Reeves's study which suggested that frozen shoulder is experienced most commonly in people aged 30-70 years old .[23] There is also a difference in the results between this study and that of Bunker conducted in 2009 which suggested the male to female ratio to be 1:1. [24]

It is important for the treating doctor to know about the psychological issues which can accompany this condition due to the pain and decreased functionality**.**

These issues along with a poor treatment result can make it further difficult for the treating doctor and the patient to work towards optimum treatment strategies and outcomes. Multiple avenues need to be pursued in the future. Research into the probable long term positive outcomes of physiotherapy can prove to be useful in optimally managing frozen shoulder.

Conclusion

Intra articular injection method has been found to be preferable over MUA as it turned out to be relatively easier, safe, cheaper and showed early results. It seems reasonable to use an intra articular steroid injection which aims at a rapid recovery rate with a minimum number of visits to the hospital after which a follow up period with a home based exercise program could be recommended.

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