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A Study of Manipulation of Shoulder Joint under Short General Anesthesia on Frozen Shoulder Patients

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Abstract: Introduction: Frozen shoulder is a common cause of shoulder pain which is characterized by pain and stiffness of shoulder. Treatment aim is symptomatic pain relief and restoration of normal joint movements by Manipulation under Anaesthesia (MUA). The aim of this study is to determine the efficacy of MUA and its safety in frozen shoulder. **Materials and Methods:** A study was carried out at District Hospital, Chitradurga, Karnataka. Study was started from January 2021 to December 2022. 36 patients were enrolled for the study. Patients underwent MUA with intra-articular steroid injection (40mg/ml methyl prednisolone) with 2% lignocaine. They were started physiotherapy excersises soon after manipulation. The results were evaluated using VAS score and improvement in range of movements. **Results:** We noticed improvement in pain intensity and shoulder range of movements. VAS score improved from 7.67 $\pm$ 1.03 to 1.64 $\pm$0.21 at the end of 3 months after manipulation. **Conclusion:** Shoulder joint manipulation under short general anesthesia can be an effective and safe treatment option for patients suffering from frozen shoulder. **Keywords:** Frozen shoulder, Peri-arthritis of shoulder, Manipulation under Anaesthesia, Corticosteroids, Physiotherapy excersises.

Introduction: Frozen Shoulder is characterized by stiffness and pain in the shoulder area which can make it difficult to move the arm freely. It is also known as adhesive capsulitis or peri-arthritis of shoulder. It can be extremely debilitating, leading to difficulty with everyday activities such as dressing, driving or even sleeping. It is most commonly seen in people between the ages of 40-60 years and is more common in women than men.[1, 2] Frozen Shoulder can be caused by a variety of factors including injury, surgery, diabetes and hemiplegic patients.[2,3] But in most cases cause is multifactorial. Treatment options for Frozen Shoulder include NSAIDS, shoulder mobilization and strengthening exercises, intra-articular steroid injections, manipulation under general anesthesia (MUA), arthroscopic release of adhesions and

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hydrodilation with normal saline.[4] Manipulation of shoulder joint under short general anesthesia is a technique involves manipulating the patient's arm and shoulder joint while they are under short general anesthesia to stretch the joint capsule and surrounding tissues. Physiotherapy sessions include exercises, stretches, and massage to improve blood circulation.[5]

The aim of this study is to determine the efficacy of this approach, as well as its safety and feasibility. This also includes observations of effect of intra-articular steroid injection during and after the procedure.

Materials and Methods: A Prospective study was conducted at Department of Orthopaedics with collaboration with Department of Anaesthesiology, District Hospital, Chitradurga, Karnataka. Study was started from January 2021 to December 2022. 36 patients with frozen shoulder who were admitted in the department of Orthopaedics were enrolled in this study. Duration of symptoms of more than one month, failure of conservative treatment, patients with age 20-70 years and patients who willingness for manipulation under anaesthesia were included in this study. Patients with previous shoulder surgery, previous history of fracture or shoulder dislocation, bilateral frozen shoulder, uncontrolled diabetes, cerebrovascular accidents, degenerative arthritis, psychological problems, malignancy and patients who did not turn-up for follow-up were excluded from this study.

Informed written consent was obtained from all patients before the study commenced. Detailed patient demographic details, history, clinical examination findings are recorded according to proforma. Passive movements in flexion, extension, adduction, abduction, external rotation and internal rotation of shoulder joint were measured by using goniometer. Routine investigations required for pre-anesthetic check-up were carried out and recorded in proforma. Patients were informed about the procedure of manipulation and possible effects of corticosteroids. All patients were explained about the Visual Analogue Scale (VAS) & were properly educated regarding possible results of the intervention.

Short general anesthesia was administered by the experienced anesthesiologist. Manipulation of shoulder joint was performed by experienced surgeon in all directions to release intraarticular adhesions. Under aseptic precautions all patients were given 2ml 40mg/ml methyl prednisolone acetate with 4 ml 2% lignocaine injection intra-articularly into shoulder joint.

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Analgesics, rest, and icepacks were given to relive post manipulation pain post operatively. On 1st post-operative day shoulder mobilization and strengthening exercises were continued. Later patients are followed at orthopaedics outpatient department at regular intervals. The study was conducted over a period of 24 months, during which the patients were evaluated based on various parameters such as pain level, range of motion, and functional ability. The patients were evaluated at 1 day after manipulation, at 1 month after manipulation and at 3rd month after the manipulation. The evaluations were done by a team of orthopaedic surgeon and physiotherapists. The data analysis was done by using the software SPSS version 20. Data was analyzed with paired Student T Test. We considered results statistical significant if p value is < 0.05.

Results and Observations: Age of patients was ranged from 32-70 years with average age of 48 yrs. Out of 36 patients 20 were male and 16 were female patients. Majority of patients had right shoulder joint involvement (19 patients). All 36 patients achieved significant reduction in pain intensity immediately after manipulation which is due to 4 ml 2% Lignocaine injections intra-articularly. VAS score before manipulation was 7.67 ± 1.03 and which is reduced to 1.64 ± 0.21 at the end of 3 months after manipulation. There was significant improvement in all range of movements following manipulation at the end of 3 months after manipulation. Flexion was improved from $96.56^{o} \pm 6.43$ to $154.45^{o} \pm 4.94$, abduction was from $80.40^{o} \pm 5.78$ to $146.98^{o} \pm 2.88$, external rotation was from $25.50^{o} \pm 1.76$ to $56.21^{o} \pm 3.10$, and internal rotation was from $28.60^{o} \pm 1.98$ to $62.54^{o} \pm 2.87$. Intra-operative complications were not encountered during the manipulation in all patients. All the patients advised to take physiotherapy exercises soon after manipulation.

Table1: Comparison of mean VAS Score before and after the manipulation of shoulder

Time of assessment	**VAS Score (Mean + S D)**
Before the Manipulation of Shoulder Joint	7.67 ± 1.03
1st day after the manipulation of Shoulder Joint	4.01 ± 0.41
1 month after the manipulation of Shoulder Joint	2.12 ± 0.54
3 months after the manipulation of Shoulder Joint	1.64 ± 0.21

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Table2: Comparison of range of movements of shoulder measured on three occasions

Movement of shoulder	Before the Manipulation	1st day after the manipulation	1 month after the manipulation	3 months after the manipulation
Flexion	$96.56^{o} \pm 6.43$	$125.73^{o} \pm 5.11$	$140.26^{o} \pm 5.02$	$154.45^{o} \pm 4.94$
Abduction	$80.40^{o} \pm 5.78$	$131.23^{o} \pm 4.12$	$136.01^{o} \pm 3.65$	$146.98^{o} \pm 2.88$
External Rotation	$25.50^{o} \pm 1.76$	$36.59^{o} \pm 2.56$	$43.23^{o} \pm 2.27$	$56.21^{o} \pm 3.10$
Internal Rotation	$28.60^{o} \pm 1.98$	$32.76^{o} \pm 2.42$	$50.01^{o} \pm 2.39$	$62.54^{o} \pm 2.87$

Discussion: Frozen shoulder is commonly seen condition in orthopaedic outpatient department. Pain and stiffness of the shoulder joint are the most common symptoms seen in frozen shoulder.[1] The incidence of frozen shoulder is 3% in general population.[6] An inflammatory synovitis coupled with contraction of joint capsule & its adherence to the head of the humerus causes this condition.[7, 8] Majority of patients was benefitted from universal shoulder mobilization exercises, physiotherapy and NSAIDs.[5] Liaw SC et al.[9] recommended that physiotherapy exercises improve movements and function in frozen shoulder. Better recovery will be noticed in those patients with early start of physiotherapy. Jacobs et al.[10] compared the results of intraarticular corticosteroids for adhesive capsulitis with manipulation alone and they recommended use of intraarticular steroids with manipulation in frozen shoulder for better results.

S Arsalan & Reyhan Celiker.[11] compared the results of local corticosteroid injection and physical therapy for the treatment of adhesive capsulitis and they found that both modalities are equally effective. Simon et al [12] compared the results of intraarticular steroids, physiotherapy & a combination of intraarticular steroids with physiotherapy. They reported that single intraarticular injection combined with simple home exercise programme was effective in the management of frozen shoulder. Kivimaki et al.[5] studied on two groups (manipulation with physiotherapy and physiotherapy alone) in terms of pain relief, shoulder function and range of

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movements over long term follow-up. Our study shows that manipulation under anaesthesia with physiotherapy excersises shows early recovery in pain relief and range of movements in all patients.

Lignocaine injection with intraarticular steroids provides immediate pain relief post-operatively. Due to post-anesthesia and intra-articular lignocaine injection we could not record VAS score immediately after manipulation. So we were recorded parameters 1 day after manipulation. We evaluated VAS score of patients before manipulation, 1 day after manipulation, 1 month after manipulation and 3 months after the manipulation of shoulder. There was dramatic decrease of pain score from 7.67 $\pm$ 1.03 to 1.64 $\pm$ 0.21 at the end of 3 months after manipulation (Table-1). In our study, we noticed significant improvement of range of movements in shoulder joint at the end of 3 months after manipulation (Table-2).

Complications such as tearing of the joint capsule, brachial plexus injury, shoulder dislocations, fracture of proximal humerus, hemarthrosis, or rotator cuff injury occur during manipulation.[13, 14] We did not experience any complication during manipulation of shoulder. Post manipulation pain was treated with adequate analgesics, rest and icepacks. The recovery time also appears to be affected by the duration of the symptoms prior to initiation of the treatment. The patients with lesser duration of symptoms recovered early as compared to patients with longer duration of symptoms.[15]

Conclusion: Shoulder joint manipulation under short general anesthesia can be an effective and safe treatment option for patients suffering from frozen shoulder. It provides a quick and easy solution to alleviate pain, improve joint function, and reduce inflammation. Intra-articular steroid with lignocaine during the procedure will give good post-operative pain relief to start early physiotherapy.

Conflict of Interest: Nil

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