



## SUPRASCAPULAR NERVE BLOCK IN ADHESIVE CAPSULITIS SHOULDER- A RANDOMISED CONTROL TRIAL

### Medical Science

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### ABSTRACT

**Background:** Adhesive capsulitis is a common condition involving glenohumeral joint.

**Objective :** To compare outcome of physical therapy alone and with suprascapular nerve block in adhesive capsulitis shoulder.

**Methodology:** This study was performed in a tertiary care teaching institution of North India. Age and sex matched, subjects with peri arthritis shoulder were enrolled in this study. Subjects were assessed by ROM parameters, Oxford Shoulder Score (OSS) and Shoulder Pain and Disability Index (SPADI) at 3 weeks, 6 weeks and 3 months interval.

**Results:** 80 patients were included with mean age group of  $51.28 \pm 7.63$  yrs and  $52.88 \pm 7.59$  yrs in control and intervention group respectively. Outcome measures were ABD, ER, IR, FLX, EXT, OSS and SPADI which improved from  $83.10 \pm 8.57$ ,  $35.38 \pm 6.03$ ,  $32.00 \pm 5.52$ ,  $18.10 \pm 1.71$  and  $79.23 \pm 2.51$  respectively to  $126.13 \pm 10.65$ ,  $63.25 \pm 5.83$ ,  $63.13 \pm 5.37$ ,  $36.13 \pm 2.03$ ,  $45.38 \pm 2.94$  respectively at 12 weeks of suprascapular nerve block.

**Conclusion:** Combined approach of SSNB followed by physical therapy accelerates the recovery of idiopathic frozen shoulder. It is effective and safe to administer.

### KEYWORDS

Adhesive capsulitis, Suprascapular nerve block, Oxford shoulder score, Shoulder pain and disability index.

### INTRODUCTION

Adhesive capsulitis, also known as frozen shoulder, is a common condition involving glenohumeral joint pain and loss of motion. This condition was termed "peri arthritis scapulohumeral" by Duplay in 1896. Codman<sup>1</sup>, in 1934, described the diagnosis of frozen shoulder as a condition characterized by pain and reduced range of motions in the affected shoulder. Neviasser<sup>2</sup> in the prearthroscopic era, subsequently used the term adhesive capsulitis to describe the findings of chronic inflammation and fibrosis of joint capsule, although arthroscopic examination support the term fibrotic capsulitis with absence of adhesions. It affects approximately 2% to 5% of the general population.<sup>3,4</sup> It most commonly affects women aged between 40 and 60 years.<sup>5</sup> Patients are classified as having **primary or idiopathic adhesive capsulitis** if no findings on history or examination explain the onset of disease. **Secondary adhesive capsulitis** develops from known causes of stiffness and immobility, such as previous shoulder trauma or surgery, and may represent an entirely different condition. The disease begins in the painful, or "**freezing,**" phase, documented to last between 10 and 36 weeks. This is followed by the stiff, or "**frozen,**" phase, in which the pain gradually decreases but there continues to be a reduction in the range of motion lasting from 4 to 12 months. Finally, the recovery, or "**thawing,**" phase involves the gradual spontaneous improvement of shoulder mobility and function over the course of 5 to 26 months.

### MATERIAL AND METHODS

80 patients were randomised based on computer generated random number of tables coming to or admitted in our department due to shoulder pain caused by adhesive capsulitis from September 2014 to September 2016. 40 were treated with conventional physical therapy while 40 were given additional single dose of suprascapular nerve block with Meier technique using 9ml of 0.5% bupivacaine and 1ml 40mg methylprednisolone. Outcome were assessed by Abduction, Flexion, Extension, External Rotation, Internal rotation Shoulder Pain And Disability Index (SPADI) and Oxford Shoulder Score (OSS) at 3 weeks and 3 months. Patients were having **inclusion criteria** of age

group 40 -70 yrs, reporting local shoulder pain, frequently present over anteromedial aspect of shoulder extending distally into biceps region or over the lateral aspect of shoulder extending into lateral deltoid region of more than 4 weeks and less than 6 months duration and with limitation of active and passive range of motion greater than 25% in abduction and external rotation and normal X rays on AP and lateral views of glenohumeral joints. the exclusion criteria served to eliminate subjects with an inappropriate diagnosis of peri arthritis shoulder and subjects with inappropriate medical conditions complicating the pathology .

**Suprascapular nerve block was done by meier procedure** in which the patient was seated with their head hanging forward; they place their hand of the side to be blocked on their contralateral shoulder. The scapula is thereby lifted up from the dorsal chest wall, making the spine of scapula easy to palpate. The medial and lateral edges of the scapular spine were marked and the connecting line between the two points was halved. The puncture site was marked about 2 cm cranially and 2 cm laterally from this point. After skin preparation, a 21 G × 38 mm needle was introduced at the puncture site. The needle was directed in the plane of the scapula and advanced until contact was made with the floor of the suprascapular fossa. After attempted aspiration, the agent was slowly injected to fill the fascial contents of this fossa to produce an indirect suprascapular nerve block. At this point the suprascapular nerve gives off branches to supply the glenohumeral joint, the acromioclavicular joint, and the supraspinatus muscle.

### RESULTS

Total 80 symptomatic patients who were age and sex matched were recruited and randomized equally in two groups and treated with conventional treatment (Group 1) and conventional treatment along with suprascapular nerve block (Group 2). The outcome measures of the study were Abduction (ABD), External rotation (ER), Internal rotation (IR), Flexion (FLX), Extension (EXT), Oxford shoulder score (OSS) and Shoulder pain and disability index (SPADI) score assessed at initial visit (Visit 1), 3 weeks (Visit 2) and 3 month (Visit 3) post

treatment. The age of Group 1 and Group 2 patients ranged from 38-68 yrs and 40-69 yrs respectively with mean ( $\pm$  SD)  $51.28 \pm 7.63$  yrs and  $52.88 \pm 7.59$  yrs respectively, and median 50 yrs and 53 yrs respectively. Comparing the mean age of two groups, Student's t test showed similar age between the groups ( $51.28 \pm 7.63$  vs.  $52.88 \pm 7.59$ ,  $t=0.94$ ,  $p=0.350$ ) i.e. did not differ significantly. Comparing the sex proportions (M/F) of two groups,  $\chi^2$  test showed similar sex proportions between the groups ( $\chi^2=0.05$ ,  $p=0.820$ ) i.e. also not differed significantly. Comparing the mean abduction within the groups showed significant ( $p<0.001$ ) increase (improvement) in abduction at Visit 2 and Visit 3 as compared to Visit 1 in both groups. It is also increased (improved) significantly ( $p<0.001$ ) at Visit 3 as compared to Visit 2 in both groups. At final evaluation, the net mean improvement (i.e. mean change from Visit 1 to Visit 3) in abduction of Group 2 (34.1%) was found 6.1% higher as compared to Group 1 (28.0%). Comparing the mean external rotation within the groups, showed significant ( $p<0.001$ ) increase in external rotation at Visit 2 and Visit 3 as compared to Visit 1 in both groups. Further, in both groups, the mean external rotation also increased significantly ( $p<0.001$ ) at Visit 3 as compared to Visit 2. At final evaluation, the net mean improvement (i.e. mean change from Visit 1 to Visit 3) in external rotation of Group 2 (44.1%) was found 8.3% higher as compared to Group 1 (35.8%). Comparing the mean internal rotation within the groups showed significant ( $p<0.001$ ) increase in internal rotation at Visit 2 and Visit 3 as compared to Visit 1 in both groups. At final evaluation, the net mean improvement (i.e. mean change from Visit 1 to Visit 3) in internal rotation of Group 2 (49.3%) was found 11.9% higher as compared to Group 1 (37.4%). Comparing the mean flexion within the groups showed significant ( $p<0.001$ ) increase in flexion at Visit 2 and Visit 3 as compared to Visit 1 in both groups. Further, comparing the mean extension between the groups showed insignificant ( $p>0.05$ ) difference in extension between the groups at all periods i.e. did not differ significantly. Comparing the mean OSS within the groups showed significant ( $p<0.001$ ) increase in OSS at Visit 2 and Visit 3 as compared to Visit 1 in both groups. However, at both Visit 2 and Visit 3, it was significantly ( $p<0.001$ ) different and higher in Group 2 as compared to Group 1. Moreover, at final evaluation, the net mean improvement (i.e. mean change from Visit 1 to Visit 3) in OSS of Group 2 (49.9%) was found 10.1% higher than Group 1 (39.8%). Comparing the mean SPADI score within the groups, showed significant ( $p<0.001$ ) decrease in SPADI score at Visit 2 and Visit 3 as compared to Visit 1 in both groups. However, at both Visit 2 and Visit 3, it was significantly ( $p<0.001$ ) different and lower in Group 2 as compared to Group 1. Moreover, at final evaluation, the net mean improvement (i.e. mean change from Visit 1 to Visit 3) in SPADI score of Group 2 (42.7%) was found 15.5% higher than Group 1 (27.2%).

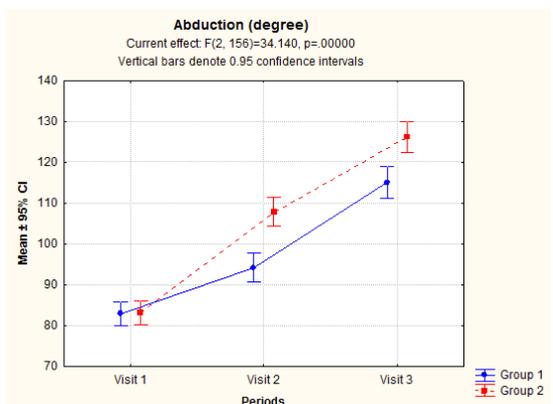
## DISCUSSION

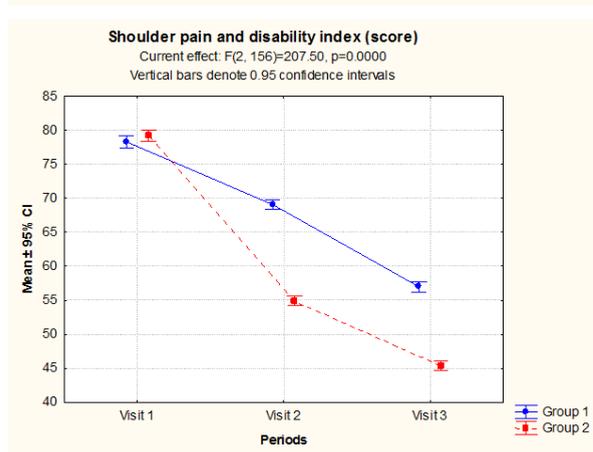
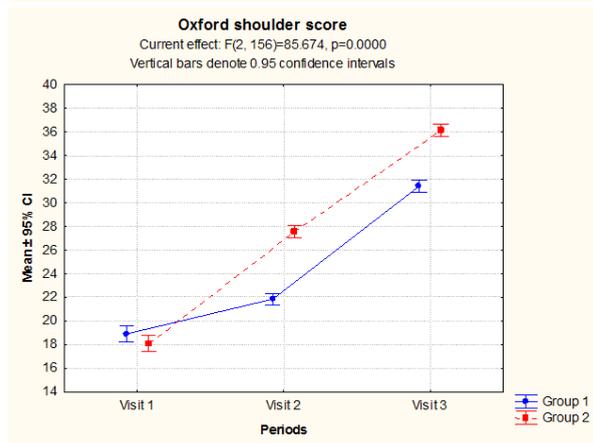
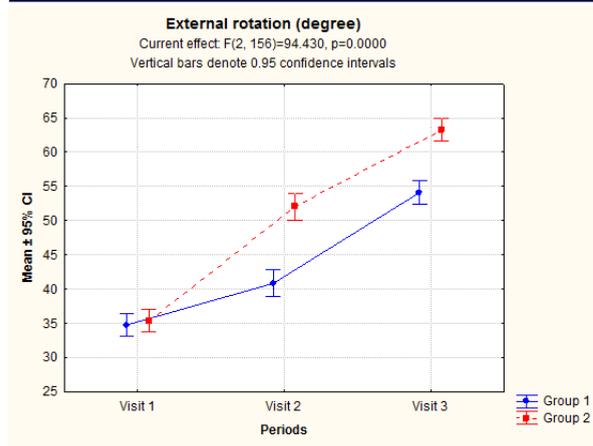
Frozen shoulder is a disabling condition that causes restriction of motion and pain in shoulder joint. It is a condition of insidious onset and its diagnosis is usually based on clinical finding with a painful stiff shoulder, inability to use affected arm with restriction of movement and loss of full function, pain at night causing sleep disturbance and inability to lie on affected side. (Korhan Ozkan et al 2012) The results of this study show a clear benefit from the use of suprascapular nerve block using bupivacaine and methylprednisolone in patients with frozen shoulder. There were statistically and clinically significant reduction in pain and disability. This benefit was prolonged, with benefit still present at 3<sup>rd</sup> month. The improvement in these parameters are better or at least comparable with published studies examining NSAIDs or intra-articular steroid injection. There were no significant side effects from the injection, and was well tolerated by most of the patients (E M Sanhan et al 2003 ) Malik javed Iqbal et al (2012) studied 64 patients with frozen shoulder out of which, 27 were males and 37 were females. The mean age patients was 65.3 years with range of 48 to 85 years. In this study, 80 patients were enrolled. The age of patients in group 1 and group 2 ranged from 38-68 years and 40-69 years respectively with mean ( $\pm$  SD)  $51.28 \pm 7.63$  years and  $52.88 \pm 7.59$  years respectively, showed that they did not differ significantly. The comparisons concluded that the patients of two groups were age and sex matched and thus comparable and had not influenced the study outcome measures. Considering the functional disability, the most important components of the treatment were pain relief and therapeutic exercises for early mobilization. After the pain reduction, an effective treatment was accomplished by the cooperation and active participation of the patient. Muscle guarding because of pain was reduced, and stretching was performed up to the available limit of

motion. Korhan Ozkan et al (2012) included patients with refractory frozen shoulder pain having diabetes and previous intra articular steroid injection. No such criteria was used in this study. All patients having frozen shoulder pain whether or not having diabetes or previous intra articular injection were included. EM Sanhan et al (2003) in his study has given a single suprascapular nerve block by Dangoisse technique while other group received a placebo injection of normal saline subcutaneously. In our study, we used Meier technique, with indirect suprascapular nerve block, using anatomical landmark. This type of approach was easy and decreased the risk of pneumothorax. It could be performed by most trained specialists. The low incidence of reported side effects was an advantage. Pneumothorax has been reported as a complication of this procedure. However, in this study we had no such event. Our findings in this trial confirmed that the approach of Meier is safer than previous methods. Our safety record is consistent with that of other recent studies using this method. David S Jones et al (1999) compared results of single suprascapular nerve block with multiple intra articular steroid injections while in this study results of suprascapular nerve block were compared with physical, heat and drug therapy. Korhan Ozkan et al (2012) used a mixture of 40mg methylprednisoloneacetate and 5ml 1% lidocaine. In this study we used 10 ml volume with 9ml 0.5% bupivacaine and 1ml of 40mg methylprednisolone acetate. Malik javed Iqbal et al (2010) concluded that SPADI, the mean baseline total, subscale pain and disability scores were  $70.9 \pm 6.8$ ,  $72.3 \pm 6.9$  and  $69.5 \pm 8.5$  respectively which improved to  $24.6 \pm 5.6$ ,  $22.3 \pm 5.3$  and  $27.5 \pm 6.6$  respectively at 4 week of suprascapular nerve block of the affected shoulder with p value of 0.000 each. Abhay kumar et al (2012) in their study of 40 patients has used SPADI, VAS and ROM as parameters for comparison of results of Maitland techniques with Codman's exercises in one group and Codman's exercises alone in other group. Their study has showed significant improvement in all these parameters in former group as compared to later. In this study, we have used Oxford Shoulder Score and SPADI as scales for comparison. Comparing the mean OSS within the groups showed significant ( $p<0.001$ ) increase in OSS at Visit 2 and Visit 3 as compared to Visit 1 in both groups. However, at both Visit 2 and Visit 3, it was significantly ( $p<0.001$ ) different and 10.1% higher in Group 2 as compared to Group 1. However, at both Visit 2 and Visit 3, it was significantly ( $p<0.001$ ) different and 15.5% lower in Group 2 as compared to Group 1. Dahan TH et al (2000) in their double blind randomised control trial of 34 patients with frozen shoulder showed 64% reduction in pain after 3 consecutive suprascapular blocks at 1 week interval but no improvement in shoulder ROM. In this study, there were significant reduction of pain as well as 6.1%, 8.3% and 11.9% improvement in Abduction, ER and IR respectively.

## CONCLUSION

Combined approach of SSNB followed by Codman's exercises and home exercises proved to accelerate the recovery of idiopathic frozen shoulder. This combined approach is effective and safe to be administered in outpatient clinics by a well-trained physician, offering clear advantages (ease of application, low cost, rare side effects) and considering that the top priority of a pain control program is restoration of function to perform usual ADL. It may prove to be a useful treatment for patients who are unfit or unwilling to consider manipulation under anaesthesia. It provides an alternative treatment or additional approach to oral drug or intra articular injections. Further, there are economic benefits as patients are able to return to work sooner without the need for hospitalization or spending time in physical therapy sessions.





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