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# Fluoroscopic guided capsular distention with and without suprascapular nerve block in frozen shoulder patients a prospective comparative study

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**Abstract: Background:** In general practise, frozen shoulder is a common condition, in which pain and gross restriction of movement around affected shoulder joint occur.

**Aim:** To compare the effectiveness of fluoroscopic guided capsular distension with and without suprascapular nerve block to relieve pain and improve range of movement.

**Method:** An observational study of 60 patients to compare capsular distension with steroid, local anaesthetic and normal saline in 30 patients with suprascapular nerve block (group A). Capsular distension with steroid, local anaesthetic and normal saline without suprascapular nerve block in 30 patients (Group B). After capsular distension all patients advised physiotherapy, ranges of movement and pain over shoulder joint were assessed over a 12-week period.

**Results:** In comparison to fluoroscopic guided capsular distension without suprascapular block (Group B), fluoroscopic guided capsular distension with suprascapular block (group A) has a more decreased SPADI and VAS score.

**Conclusions:** According to this study, suprascapular nerve block is a more safe and effective method of treating frozen shoulder than distension with no nerve block.

**Keywords:** Adhesive capsulitis; Frozen shoulder; Suprascapular nerve block.

## 1. Introduction

**T** Frozen shoulder (also known as adhesive capsulitis) is characterised by a painful, progressive loss of both active and passive glenohumeral motion as a result of persistent fibrosis and eventual contracture of the glenohumeral joint capsule [1,2]. Because of the inconsistent reporting of the disease stage, variable nomenclature, and wide range of treatments, the approach to manage is unclear and contradictory [1]. There are numerous treatments that have been mentioned in the literature, including rest, non-steroidal anti-inflammatory drugs (NSAIDs), active and passive mobilisation, physiotherapy, intra-articular corticosteroids, hydro dilatation, manipulation under anaesthesia, arthroscopic capsular release, intra-articular hyaluronate injection, regional nerve block, and others [3–9].

Pain relief and the restoration of normal shoulder function are the common treatment objectives for frozen shoulder. Therapeutic activities and patient co-operation are essential to achieving this goal. The main barrier preventing people from engaging in active exercise is pain. Both chronic and recent pain can be effectively treated with a regional nerve block. [2,10] One of several effective, simple, and helpful nerve block techniques for treating shoulder pain is the suprascapular nerve block [2,11–13]. It is possible to place the needle in a clinic using anatomical cues [14].

Hence the present study was try to find out clinical effectiveness and safety of suprascapular block as well as capsular distension in the treatment of frozen shoulder using anatomical landmarks.

## 2. Material and methods

after approval from Institutional IEC between 2020-2022 all the patient who were fit in our inclusion criteria and ready to give written Informed Consent were included in the study. 60 patients were enrolled in the study. They were randomly allocated in two groups i.e. capsular distension with steroid, local anaesthetic and normal saline without suprascapular nerve block in 30 patients (Group A). In group B suprascapular nerve block followed by capsular distension done with steroid, local anaesthetic and normal saline in 30 patients . After capsular distension all patients advised physiotherapy, range of movement and pain over shoulder joint were assessed over a 12-week period for evaluation of pain VAS scale and SPADI score were calculate.



Figure 1



Figure 2



Figure 3

## 3. Results

in our study among 60 participant 26 were female and 34 were male while in Group – A and group B the gender composition is same 17 male and 13 female in both the groups, in both the groups most of the

cases belong to age group 46-55 in group A- 13 patients and in group B – 15 followed by age group 35-45 years in which number of participants were 9 and 8 in group A and group- B respectively followed by 56-65 years group in which number of participants were 8 and 7 in group A and group- B respectively. The mean age of participant in group A and B  $51.1 \pm 5.79$  and  $50.13 \pm 6.34$  respectively. The mean BMI of participants in group A was  $27.27 \pm 3.41$  while in group B was slightly higher  $29.62 \pm 4.90$  in our study in group A right side was mostly affected while in group- B the distribution was equal, in both the groups the most of patient were having symptoms from past 7-9 months.

**Table 1.** Demographic characteristic and clinical presentation of study participants

Particulars	Sub particulars	Group A (Without Block)	Group B (With Block)
		Number of Patients	Number of Patients
Age (in years)	35-45	9	8
	46-55	13	15
	56-65	8	7
	Total	30	30
Sex	Female	13	13
	Male	17	17
BMI	Mean $\pm$ Std Deviation	$27.27 \pm 3.41$	$29.62 \pm 4.90$
Affected Side	Left	12	15
	Right	18	15
Duration of illness in months	Mean $\pm$ Std Deviation	$6.47 \pm 1.89$	$6.40 \pm 1.69$

Most of the patients were belong to age group of 46-55 years, male are predominant in study subjects in both group BMI is more than normal in both the groups, right side affected more in group A while while in group b both are equal. mean duration of illness is same in both group. Table 1.

**Table 2.** Comparison Of VAS and SPADI Score among Group- A and Group –B at Pre-procedure, 15 Days, 1 Month and 3Months

VAS (With and Without Block)		Pre-procedure	15 days	1 month	3 months
Mean $\pm$ Std.Deviation	Group A (Without Block)	$6.2 \pm 0.92$	$5.23 \pm 0.57$	$3.7 \pm 0.59$	$3.33 \pm 0.48$
	Group B (With Block)	$7.03 \pm 0.76$	$5.5 \pm 0.73$	$4.6 \pm 0.56$	$3.5 \pm 0.57$
t – value		-3.47	-1.16	-5.83	-1.3
p – value		<.001	<.001	<.001	0.100893
The Means VAS score was statistically significantly difference between preprocedure and follow up at 15 days and 1 month					
SPADI (With and Without Block)		Pre-procedure	15 days	1 month	3 months
Mean $\pm$ Std.Deviation	Group A (Without Block)	$74.37 \pm 6.07$	$65.93 \pm 5.55$	$51.6 \pm 3.65$	$3.33 \pm 0.48$
	Group B (With Block)	$77.07 \pm 4.74$	$66.57 \pm 4.42$	$58.07 \pm 4.22$	$3.5 \pm 0.57$
t - value		-1.99	-0.53	-6.19	-4.65
p - value		<.001	<.001	<.001	<.001

The Means SPADI score was statistically significant difference between preprocedure and follow up at 15 days, 1 month and 3 month

**Table 3.** Comparison Of abduction, flexion and external rotation degree among Group- A and Group –B at Pre-procedure, 15 Days, 1 Month and 3 Months

Abduction (With and Without Block)		Pre-procedure	15 days	1 month	3 months
Mean ± Std.Deviation	Group A (Without Block)	66.83 ± 10.13	108.17 ± 16.68	141.5 ± 14.81	170.67 ± 8.28
	Group B (With Block)	70.33 ± 13.58	99.67 ± 10.98	125.33 ± 12.52	158 ± 11.26
t - value		-1.09	2.73	4.37	5.92
p - value		<.001	<.001	<.001	<.001
The mean abduction degree among group-A and group-B at preprocedure, 15 days 1 month and 3 month was statistically different					
Flexion (With and Without Block)		Pre-procedure	15 days	1 month	3 months
Mean ± Std.Deviation	Group A (Without Block)	44.5 ± 21.59	112.5 ± 20.92	142.83 ± 17.15	168.67 ± 9.37
	Group B (With Block)	55.5 ± 16.83	99.67 ± 13.77	128.33 ± 13.67	160.33 ± 8.89
t - value		-1.96	2.57	3.39	3.78
p - value		<.001	<.001	<.001	<.001
Mean flexion degree among group-A and group-B at preprocedure, 15 days 1 month and 3 month was statistically different					
ER (With and Without Block)		Pre-procedure	15 days	1 month	3 months
Mean ± Std.Deviation	Group A (Without Block)	43.5 ± 6.84	58.33 ± 8.02	75.5 ± 6.07	84.5 ± 4.61
	Group B (With Block)	39.5 ± 6.74	56.17 ± 5.83	67.17 ± 6.78	77.33 ± 6.79
t - value		2.11	1.27	5.76	4.68
p - value		<.001	<.001	<.001	<.001
Mean degree of external rotation among group-A and group-B at preprocedure, 15 days 1 month and 3 month was statistically different					

#### 4. Discussion

The main clinical manifestations of frozen shoulder are shoulder pain and restricted glenohumeral movements. Recovery occurs at a varying and frequently incomplete rate. [2,19] In long-term follow-up studies, 7% to 15% of patients had functional disability, and 33% to 61% of patients still had some residual motion restriction. [19] Pain management and therapeutic exercises for early mobilization are the most crucial elements of treatment for better outcome [2].

Suprascapular nerve block (SSNB) is a quick and efficient method for treating shoulder pain. Haque R et al. [21] stated that suprascapular nerve block helped in effective mobilization and increased the tolerability of pain in the patients. Additionally, it was easy to perform as an outpatient procedure, with minimal complications. Shanahan EM et al. [22] concluded that SSNB improved pain and reduced the duration of frozen shoulder by 6 months.

Hydrodilatation is used to dilate contracted capsule and to increase ROM. ElKardosy et al. (2021) [23], in their study, performed hydrodilatation of the glenohumeral capsule, and observed improvement in VAS, ROM and SPADI. Debeer P et al. [24] concluded that hydrodilatation resulted in continuous improvement of pain and range of movements. It also significantly improved depression and anxiety in these patients.

Injection of steroids directly into the joint capsule causes anti-inflammatory effect and reduces pain. Goyal T et al. [25] observed that corticosteroid injections administered in the sub-acromial and gleno-humeral joint provided relief in pain, as well as, improved function in patients with a frozen shoulder. The improvement was statistically significant at 3,6,12 weeks and 6 months.

Our study comprised of performing all three procedures i.e. hydrodilatation (which consisted of injecting 5 ml of 2% lignocaine, 5 ml of injection triamcinolone 40mg and 20 ml Normal Saline) after giving supraclavicular nerve block, thus increasing patient compliance for painless procedure. Also here block effect wears off after 5-6 hours. Thus, patient gets time to perform active painless shoulder ROM. It was also observed that by combining these three procedures, the duration of pain relief was greater than by the use of isolated procedures. The reduction in pain and disability was statistically and clinically significant. This benefit was extended in duration, and it persisted through the fourth week. Our findings are comparable with Gencer Atalay K et al. [26], who studied SSNB and intra-articular corticosteroid injection and concluded that it led to immediate relief in pain and functional improvement. Dai Z et al. [27] observed that a combined approach of arthroscopic release and corticosteroid hydrodilatation yielded better results in terms of ROM and function as compared to corticosteroid hydrodilatation alone.

There are also various limitations to the study. Although the study was adequately supported, only a small number of patients were included in the analysis. The follow-up duration of the patients was also less, so long term effects could not be analysed.

## 5. Conclusion

This study provides evidence that Capsular distension with Suprascapular nerve block is better than capsular distension without suprascapular nerve block. Both procedure are safe, effective, and well tolerated treatment for patients with frozen shoulder.

**Author Contributions:** All authors contributed equally to the writing of this paper. All authors read and approved the final manuscript.

**Conflicts of Interest:** The authors declare that they do not have any conflict of interests.

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