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Comparative Study of Effectiveness of Ultrasound-Guided Suprascapular Nerve Block Versus Intra-Articular Steroid Injection in the Management of Adhesive Capsulitis: A Randomised Controlled Trial in a Tertiary Care Hospital in Northeast India.

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ABSTRACT

Background: There is limited data on the comparative efficacy of various interventions used in the management of adhesive capsulitis. Recently intra-articular steroid injection and suprascapular nerve block have become popular in the management of adhesive capsulitis. Therefore, the objective of this study is to compare the efficacy of ultrasound-guided suprascapular nerve block and intra-articular shoulder joint steroid injection in the management of adhesive capsulitis. **Methods:** A randomised controlled trial was conducted among 60 patients having adhesive capsulitis attending PMR OPD, RIMS. The study group received USG-guided SSNB and control group received IASI. Outcome measures were shoulder range of motion, VAS and SPADI which were measured at baseline and at 4 week follow up. Inter group analysis was done using two-way repeated measures ANOVA and p-value <0.05 were considered as statistically significance. **Results:** During the subsequent follow-up at 4 weeks there was significant improvement in passive range of motion in both control and study group. The SPADI and VAS also improved significantly at 4 week in both groups. However, the mean change was statistically significant more in study group compared to control group (85.67±10.15 vs 16.9±1.73) respectively at 4 weeks follow-up. **Conclusion:** Both SSNB and IASI have efficacy in management of adhesive capsulitis. But supra-scapular nerve block was more effective than intra-articular injection at 4 weeks follow up. Therefore, it should be considered prior to steroid injection as it has more pain relief, improvement in ranges and potentially lesser contraindications and side effects as compared to IASI.

Keywords: Adhesive capsulitis, Intra-articular injection, Suprascapular nerve block, Shoulder pain.

INTRODUCTION

According to the American Shoulder and Elbow Society (ASES), adhesive capsulitis, or "frozen shoulder," is a condition characterized by functional restriction of both active and passive shoulder motion for which radiographs of the glenohumeral joint are essentially unremarkable.[1] It occurs in approximately 2-5% of the general population and up to 20% in diabetic patients. It occurs 2 to 4 times more commonly commonly in women aged between 40 and 60 years of age. [1-4] Many treatments modalities have been reported in the literature including rest, non-steroidal anti-inflammatory drugs (NSAIDs), active and passive mobilization, physiotherapy, intra articular corticosteroids, hydrodilatation, manipulation under anesthesia, arthroscopic capsular release, intra-articular hyaluronate injection and regional nerve block etc.[5-11]

However, there is limited data on the comparative efficacy of various interventions used in the management of frozen shoulder.

Intra-articular steroid injections (IASI) are a commonly used treatment modality in the management of adhesive capsulitis.[12] Various studies showed that suprascapular nerve block (SSNB) is also a safe, simple and effective method for the management of shoulder pain.[13-15]

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Therefore, recently intra-articular steroid injection and suprascapular nerve block have become popular in the management of adhesive capsulitis. Although increasing used of SSNB in treatment of adhesive capsulitis is there in Manipur, there has, not been any data published to highlight the efficacy of SSNB towards adhesive capsulitis. Therefore, the objective of this study is to compare the efficacy of ultrasound-guided suprascapular nerve block and intra-articular shoulder joint steroid injection in the management of adhesive capsulitis.

MATERIALS AND METHODS

A randomised controlled trial was conducted in the department of Physical Medicine and Rehabilitation, Regional Institute of Medical Sciences (RIMS), a tertiary care hospital in Manipur in Northeast India from April to September 2016. Patients aged between 18 to 65 years of both sexes having stage 1 and 2 unilateral adhesive capsulitis were included in the study.

Patients who had stage 3 and 4 adhesive capsulitis, bilateral adhesive capsulitis, rotator cuff tear, co-morbid conditions such as hypothyroidism, rheumatoid arthritis or other inflammatory arthritis, overlying soft tissue infections, adhesive capsulitis secondary to brachial plexopathy or other peripheral nerve injury and any recent bony injury or malignancy around the affected shoulder and those who refused to participate are excluded from the study.

After obtaining ethical approval from the Research Ethics Board, RIMS, all patients with adhesive capsulitis attending OPD were examined and screened according to the inclusion and exclusion criteria. A total of 60 patients who fulfilled the above criteria were randomly assigned to study group and control group using lottery method after taking informed written consent.

Ultrasound-guided suprascapular nerve block procedure (Study group)

The patient was placed in a sitting position with the affected hand resting on the contra lateral shoulder. The spine of scapula was visualized by placing ultrasound transducer (Medison sonoace 5-12 MHz, 38 mm broadband linear array) and sterile jelly over spine of scapula. Transducer was then gradually moved laterally along the spine of scapula to locate the suprascapular notch. By using Doppler, supra-scapular artery can be visualized within the fossa, it acts as landmark for supra-scapular nerve which lies in close proximity to artery. With higher resolution suprascapular nerve can be seen as a round hyper-echoic structure beneath the transverse scapular ligament in the scapular notch. After localizing the nerve, suprascapular nerve block was given using 3ml of 2% Lignocaine by using 21-gauge needle inserted along the longitudinal axis of the ultrasound beam.

Intra-articular shoulder joint steroid injection procedure (Control group)

The patient was placed in sitting position with the affected shoulder towards the doctor and then the arm was internally rotated. The posterior approach for entry was used in our setting. The 18-gauge needle was inserted 2-3 cm inferior and medial to the posterolateral corner of the acromion and directed anteromedially towards the coracoid process and 2ml of depot methyl prednisolone acetate (80mg) was injected intra-articular in shoulder joint.

Passive shoulder range of motions (ROM) for abduction, internal rotation, and external rotation were taken into consideration during this study. Degree of pain was assessed with a visual analog scale (VAS) and shoulder pain and disability index (SPADI) in both the groups. Shoulder range of motion (ROM), VAS and SPADI in both the groups was measured immediately before the injection and post-injection at 4 week follow up in the OPD.

All analyzes were done with SPSSv21 (IBM). Demographic characteristics of the study and control groups were summarized by descriptive statistics such as mean, standard deviation (SD) and percentages. Chi-square test and Independent t test were used to test the level of significance at baseline between the study and control group. Inter group analysis for shoulder range of motion (ROM), VAS and SPADI was done using two-way repeated measures ANOVA and paired differences between the group was done using Paired t test. P value less than 0.05 were considered as statistically significance.

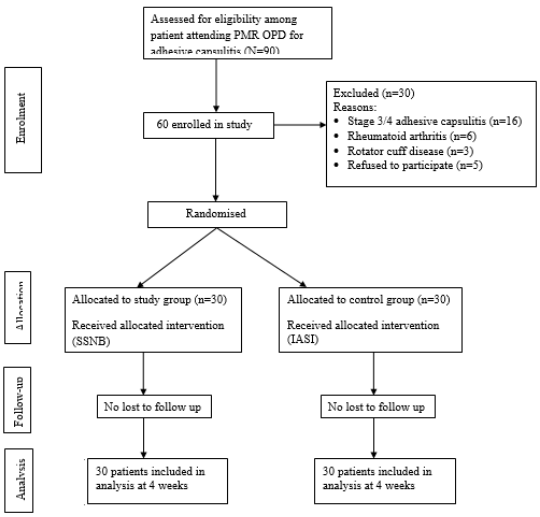

Figure 1: Flow of participants through each stage of randomized trial.

RESULTS

Ninety patients with adhesive capsulitis were screened and 60 were recruited for study. Participants moved through the trial as outlined in [Figure 1]. The mean age of the patients was 53.3

±5.7 years which ranges from 45 to 65 years. Twenty four (40%) were males and 36 (60%) females. In majority of the patients (47, 78.3%) the right sided shoulder was affected while in 13 (21.7%) patients the left sided shoulder was involved. Thirty-one patients (51.7%) have diabetes mellitus followed by past history of trauma in the involved shoulder (48.3%). In 42 (70%) of the patients the duration of the disease ranges from one month to six months with the mean duration of 4.71±5.21 months. At baseline, the socio-demographic characteristics, VAS, SPADI and shoulder range of motion (ROM) showed no statistical difference between the control and study group with p value >0.05.[Table 1]

Table 1: Socio-demographic characteristics of study and control group at baseline.

Socio-demographic characteristics		Group N (%)		P-value
		Study	Control	
Sex	Male	13 (54.2)	11(45.8)	0.598 *
	Female	17 (47.2)	19(52.8)	
Affected side (Shoulder)	Left	5 (38.5)	8 (61.5)	0.347 *
	Right	25 (53.2)	22(46.8)	
Past history	Diabetes	17 (54.8)	14 (45.2)	0.438 *
	Trauma on affected shoulder	13 (44.8)	16 (55.2)	
Age (years)	Mean±SD	55.8±6.4	53.3±5.2	0.106 #
Mean duration (months)		4.9±7.2	4.43±1.8	0.686 #
VAS_baseline		4.7±0.7	7.4±1.1	0.295 #
SPADI_baseline		98.7±8.3	95.9±1.9	0.082 #
ROM_abduction		121.3±24.3	130.3±28.6	0.194 #
ROM_internal rotation		43.5±14.1	49.3±19.7	0.193 #
ROM_external rotation		56.5±17.2	63.7±25.2	0.203 #

*Chi square test
#Independent t test

However, during the subsequent follow-up at 4 weeks the passive range for internal and external rotation improved from 49.33±19.73 to 52.33±16.90 and 63.66±25.15 to 71.17±18.42 in control group respectively and 43.50±14.09 to 57.83±7.51 and 56.50±17.23 to 77.33±7.85 in study group respectively which was statistically significance (p value <0.0001). [Table 2]

Similarly, at 4 weeks of follow up the passive range for abduction improved from 130.33±28.58 to 138.67±21.12 in control group and 121.33±24.32 to 158.0 ± 4.06 in study group which was statistically significance (p value <0.0001). [Table 2]

The total SPADI score improved from 95.93±1.87 to 79.03±2.26 at 4 week among control group and 98.70±8.36 to 13.03±3.74 in study group which was found to be statistically highly significant (p value <0.0001). [Table 3]

Using visual analogue scale (VAS) for pain intensity, mean baseline pain was 7.13±0.57 which improved to 7.37 ±1.07 at 4 week in control group and 4.67±0.66 to 1.53±0.57 among study group which was found to be statistically highly significant (p value <0.0001). [Table 3]

Table 2: Comparison among control and study group for passive range of motion (abduction, internal rotation and external rotation) at baseline and 4 weeks follow-up

Outcome measures (ROM)	Group	Mean	SD	95% Confidence interval		P-value **
				Lower	Upper	
Abduction						
Baseline	Control	130.33	28.58	120.67	140.02	<0.0001
	Study	121.33	24.32	111.64	131.03	
4 weeks follow-up	Control	138.67	21.12	133.11	144.26	
	Study	158.0	4.06	152.44	163.56	
Internal rotation						
Baseline	Control	49.33	19.73	43.07	55.59	<0.0001
	Study	43.50	14.09	37.26	49.77	
4 weeks follow-up	Control	52.33	16.90	47.55	57.11	
	Study	57.83	7.51	53.05	62.61	
External rotation						
Baseline	Control	63.66	25.15	55.79	71.54	<0.0001
	Study	56.50	17.23	48.62	64.38	
4 weeks follow-up	Control	71.17	18.42	65.99	76.34	
	Study	77.33	7.85	72.16	82.51	

**Two-way repeated measures ANOVA

Table 3. Comparison among control and study group for VAS and SPADI at baseline and 4 weeks follow-up.

Outcome measures	Group	Mean	SD	95% Confidence interval		P-value**
				Lower	Upper	
VAS						
Baseline	Control	7.13	0.57	6.82	7.45	<0.0001
	Study	4.67	0.66	4.44	4.89	
4 weeks follow-up	Control	7.37	1.07	7.05	7.68	
	Study	1.53	0.57	1.31	1.76	
SPADI						
Baseline	Control	95.93	1.87	93.72	98.15	<0.0001
	Study	98.70	8.36	96.49	100.91	
4 weeks follow-up	Control	79.03	2.27	77.94	80.16	
	Study	13.03	3.74	11.94	14.16	

**Two-way repeated measures ANOVA

There was statistically significant difference in mean change regarding VAS and SPADI at baseline and 4 weeks follow up within the control group (2.47±0.73; 16.9±1.73) and study group (5.83±1.05; 285.67±10.15) respectively as shown (p value <0.0001). [Table 4]

Table 4: Paired differences of mean change between baseline and at 4 weeks follow-up within control group and study group.

Outcome measures	Paired Differences		95% Confidence interval		P-value†
Control Group	Differences in mean change between baseline & 4 weeks		Lower	Upper	
	Mean	SD			
VAS (baseline)_ VAS(4 weeks)	2.47	0.73	2.19	2.74	<0.0001
SPADI (baseline)_ SPADI(4 weeks)	16.90	1.73	16.25	17.55	<0.0001
Study Group					
VAS (baseline)_ VAS(4 weeks)	5.83	1.05	5.44	6.22	<0.0001
SPADI (baseline)_ SPADI(4 weeks)	85.67	10.15	81.88	89.46	<0.0001

†Paired t test

DISCUSSION

In the present study all 60 patients completed the study and there was no drop-out or loss of follow up of any patients during the study period. Majority of the patients were female (60%) which was comparable to a study conducted by Iqbal MJ et al (2012) and Woo HJ et al (2014).[16,17] The total number of right side shoulder affected was 47(78.3%) and left side was 13(21.7%) which was comparable to a study conducted by Sonune SP et al in 2016.[18] In the study 31 patients out of 60 (51.7%) had associated diabetes. Our finding was higher as compared to the study.[18] This could be because of the difference in settings and background characteristics of the study participants.

In the present study, passive range of motion improved from baseline to subsequent follow up which was similar with other study.[18] There were both statistically and clinically significant reduction in pain and disability. VAS score improved significantly in both groups however improvement was significantly more in the study group at 4 weeks follow-up as compared to the control group which was comparable with other studies.[16-18]

SPADI score improved significantly in both groups however improvement was significantly more in the study group at 4 weeks follow-up as compared to the control group. Our study results for SPADI score were comparable with other studies showing the efficacy of suprascapular nerve block in shoulder pain management.[16,18,19]

CONCLUSION

Both the interventions (SSNB and IASI) were effective in terms of pain and disability score but comparing the mean change between study and control group at baseline and 4 weeks follow up suggests that the suprascapular nerve block was more effective in controlling pain as compared to intra-articular steroid. Therefore, it should be considered prior to steroid injection as it has more pain relief, improvement in ranges and potentially has lesser contraindications and side effects as compared to intra-articular steroid injection. Further research should be directed towards determining the long term effect of SSNB over IASI by increasing the duration and number of follow-up at different time interval.

REFERENCES

1. Zuckerman J, Rokito S. Definition and classification of frozen shoulder: a consensus approach. J Shoulder Elbow Surg 2011;83:322-35.
2. Neviaser J. Adhesive capsulitis of the shoulder. A study of the pathological findings in periarthritis of the shoulder. J Bone Joint Surg Am 1945;27:211-22.
3. Robert CM. Clinical commentary and literature review: diagnosis, conservative and surgical management of adhesive capsulitis. Shoulder and Elbow 2010;2:238–54.
4. Connolly JF. Unfreezing the frozen shoulder. J Musculoskel Med 1998;1:47-58.
5. Dias R, Cutts S, Massoud S. Frozen shoulder: clinical review. Br Med J 2005;331(7530):1453-56.
6. Saqlain HA, Zubari A, Taufiq I. Functional outcome of frozen shoulder after manipulation under anesthesia. J Pak Med Assoc 2007;57:181-5.
7. Lorbach O, Anagnostakos K, Scherf C, Seil R, Kohn D, Pape D. Nonoperative management of adhesive capsulitis of the shoulder: oral cortisone application versus intra-articular cortisone injections. J Shoulder Elbow Surg 2010;19:172-9.
8. Loebenberg MI, Rosen JE, Ishak C, Jazrawi LM, Zuckerman JD. A survey of decision making process in treatment of common shoulder ailments among primary care physicians. Bull Hosp Jt Dis 2006;63(3-4):137- 44.
9. Lee HJ, Lim KB, Kim DY, Lee KT. Randomized controlled trial for efficacy of intra-articular injection for adhesive capsulitis: ultrasonography-guided versus blind technique. Arch Phys Med Rehabil 2009;90:1997-2002.
10. Harris JD, Griesser MJ, Copelan A, Jones GL. Treatment of adhesive capsulitis with intra-articular hyaluronate: A systematic review. Int J Shoulder Surg 2011;5(2):31-7.
11. Taskaynatan MA, Yilmaz B, Ozgul A,Yazicioglu K, Kalyon TA. Suprascapular nerve block versus steroid injection for non specific shoulder pain. Tohoku J Exp Med 2005;205:19-25.
12. Tasto JP, Elias DW. Adhesive cap¬sulitis. Sports Med Arthrosc 2007;15(4):216–21.

13. Karata GK, Meray J. Suprascapular nerve block for pain relief in adhesive capsulitis: Comparison of 2 different techniques. Arch Phys Med Rehib 2002;83:593-7.
14. Dahan TH, Fortin L, Pelletier M, Petit M, Vadeboncoeur R, Suissa S. Double blind randomized clinical trial examining the efficacy of bupivacaine suprascapular nerve blocks in frozen shoulder. J Rheumatol 2000;27:1464-69.
15. Wassef MR. Suprascapular nerve block: A new approach for the management of frozen shoulder. Anaesthesia 1992;47(2):120-4.
16. Iqbal MJ, Anwar W, Rahman N, Kashif S, Khan A. Suprascapular Nerve Block in the Treatment of Frozen Shoulder. J Surg Pakistan (In) 2012;17(1):27-31.
17. Woo HJ, Woong PG, Joong JH, Joo YS. The comparison of effects of suprascapular nerve block, intra-articular steroid injection, and a combination therapy on hemiplegic shoulder pain: pilot study. Ann Rehabil Med 2014;38(2):167-73.
18. Sonune SP, Gaur AK, Gupta S. Comparative study of ultrasound guided supra-scapular nerve block versus intra-articular steroid injection in frozen shoulder. Int J Res Orthop 2016;2:387-93.
19. Shanahan E, Ahern M, Smith M, Wetherall M, Bresnihan B, FitzGerald O. Suprascapular nerve block (using bupivacaine and methylprednisolone acetate) in chronic shoulder pain. Ann Rheum Dis 2003;62(5):400–6.

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