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Frozen shoulder: evaluation of intraarticular corticosteroids injection versus suprascapular nerve block “A prospective clinical study”

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Abstract

Introduction: Adhesive capsulitis (frozen shoulder) has an incidence of 3-5% in the general population. This disorder is one of the most common musculoskeletal problem seen in orthopaedics.

Aims and objectives

1. The study was designed to assess the effectiveness of suprascapular nerve block (SSNB) and intra articular steroid (IAS) to relieve pain and improve range of motion.
2. To assess which one had better results in terms of simple pain score and SPADI (shoulder pain and disability index) score along with range of movement at shoulder joint.
3. To record any adverse effects and complications.

Materials and methods: The study was conducted in department of orthopaedics, S.M.S. Medical college and attached group of hospitals, Jaipur, with due permission from institutional ethical committee and review board after taking informed and written consent from the patient from 1.4.2015 to 1.4.2016

Study design: hospital based, prospective, randomized, comparative study.

Sample size: sample size was calculated to be 23 subjects in each of 2 groups.

Inclusion criteria

1. Patients with history of chronic shoulder pain and decreased range of motion (active and passive) of shoulder.
2. Age group 40-70 years.
3. Either sex.
4. Patients with pain and stiffness for atleast 4 weeks.
5. Who have been on conservative management like pain killers, physiotherapy etc.
6. Patients who give consent to participate in study.
7. Diabetic patients whose HbA1c is less than 6.5% and fasting blood sugar levels are less than 126 mg/dl.

Exclusion criteria

1. Patients with intrinsic pathologies of the shoulder such as

- a) rotator cuff tears
- b) biceps tendinitis
- c) Calcific tendinosis.
- d) History of fracture and dislocation.
- e) Arthritis of glenohumeral or acromioclavicular joint.
- f) Sympathetic dystrophy.

2. Patients with extrinsic problems such as

- a) Neuromuscular disorders (Parkinsonism).
- b) Referred pain from associated conditions- extrusion of a cervical disc with radiculopathy.
- c) History of previous surgery of affected shoulder.

3. Patients who refuse to participate in study

Results: In early follow ups there was significant improvement in abduction in IAS group than SSNB group, but at final follow up almost normal range of motion was achieved in both the groups. The average improvement in abduction in SSNB group was 86.92° and 68.46° in IAS group.

Both groups achieved almost normal range of ER movement at final follow up. The average improvement in ER was 25.19° (SSNB- 32.3° & IAS – 18.08°).All groups achieved significant improvement in pain and restriction of movement and achieved almost normal day to day activity at final follow up.

Overall good to excellent results were seen in both the groups.

Keywords: Frozen shoulder, steroids, suprascapular nerve block.

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1. Introduction

Painful stiffness of the glenohumeral joint is popularly known as frozen shoulder, first described by Duplay in 1872. Frozen shoulder is characterised by shoulder pain of more than 4 weeks duration and accompanied by a reduction in glenohumeral movement of atleast 50% in all directions. Adhesive capsulitis (frozen shoulder) has an incidence of 3-5% in the general population and upto 20% in those with diabetes. This disorder is one of the most common musculoskeletal problem seen in orthopaedics.

Historically frozen shoulder has been regarded as a condition from which “recovery is always sure and may be confidently expected”. Several investigators using a variety of treatment methods have reported that a high percentage of affected patients obtain a full range of motion of the shoulder as well as complete or nearly complete relief of symptoms. However, other investigators questioned these optimistic findings and reported, measurable restriction at the time of follow up in 39-76% of patients and persistent symptoms in as many as 45%.

2. Materials and methods

2.1 Aims and objectives

2.1.1 The study was designed to assess the effectiveness of suprascapular nerve block and intra articular steroid to relieve pain and improve range of motion.

2.1.2 To assess which one had better results in terms of simple pain score and SPADI score along with range of movement at shoulder joint.

2.1.3 To record any adverse effects and complications.

2.2 Study center

The study was conducted in department of orthopaedics, S.M.S. Medical college and attached group of hospitals, Jaipur with due permission from institutional ethical committee and review board after taking informed and written consent from the patient from 1.4.2015 to 1.4.2016

2.3 Study design: hospital based, prospective, randomized, comparative study.

2.4 Sample size: sample size was calculated to be 23 subjects in each of 2 groups at alpha error of 0.05 and power 80% assuming detectable difference in mean of external rotation to be 30 degrees and S.D. 35 (as per seed articles), hence for study purpose 26 subjects were taken for each group including 10% attrition /dropout / loss of follow up in each group.

2.5 Randomisation: patients were randomised in 2 groups using chit in the box method.

2.6 Procedure

2.6.1 Group A: suprascapular nerve block group: 40 mg methyl prednisolone + 9.5 ml of bupivacaine hydrochloride given under supervision of anesthetist.

2.6.2 Group B: intra articular steroid group: 40 mg methyl prednisolone acetate + 5ml 2% lidocaine hydrochloride given through posterior approach to shoulder.

2.7 Eligibility criteria

2.7.1 Inclusion criteria

- a. Patients with history of chronic shoulder pain and decreased range of motion (active and passive) of shoulder.

- b. Age group 40-70 years.
- c. Either sex.
- d. Patients with pain and stiffness for atleast 4 weeks.
- e. Who have been on conservative management like pain killers, physiotherapy etc.
- f. Patients who give consent to participate in study.
- g. Diabetic patients whose HbA1c is less than 6.5% and fasting blood sugar levels are less than 126 mg/dl.

2.7.2 Exclusion criteria

Patients with intrinsic pathologies of the shoulder such as:

- a. rotator cuff tears
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- c. calcific tendinosis
- d. d.history of fracture and dislocation
- e. arthritis of glenohumeral or acromioclavicular joint
- f. sympathetic dystrophy

Patients with extrinsic problems such as:

- a. Neuromuscular disorders (parkinsonism)
- b. Referred pain from associated conditions- extrusion of a cervical disc with radiculopathy
- c. History of previous surgery of affected shoulder.
- d. Patients who refuse to participate in study.

2.7.3 Clinical assessment

Clinical history: To elicit duration of symptoms, specific aggravating / relieving factors, any other significant medical / surgical illness specially diabetes mellitus, any other significant orthopaedic condition.

2.7.4 Assessment of pain

Simple pain score was recorded on 10 cm visual analogue scales for night pain, pain on movement and rest pain during the day.

Assessment of shoulder range of motion

	Measurement	Plane
1	Forward flexion	Sagittal plane, thumb up
2	Forward elevation	Scapular plane, midway between sagittal plane and coronal plane thumbup
3	Abduction	Coronal plane thumbup
4	Adduction	Coronal plane
5	External rotation	Elbow at side flexed at 90 degrees, forearm supinated
6	Internal rotation	Tip of thumb relative to spinal level

- The measurements taken from society of shoulder and elbow surgeons.
- All motions were measured in degrees except internal rotation, which was measured by spinal level.

Standard radiographs of shoulder

- a) True antero posterior and lateral radiograph made with the shoulder in internal and external rotation.
- b) 10 degrees caudal outlet Y radiograph.

2.7.5 Treatment options

Group A: suprascapular nerve block

The technique consists of injecting anesthetic in supraspinatus fossa of affected shoulder, with the patient sitting down and upper limbs pending beside the body. The health care provider must palpate anatomical parameters like clavicle, acromioclavicular articulation, acromion, scapula spine and coracoid process. This entire area is sterilized with alcohol,

the needle introduction site is medial to vertex obtained from two imaginary lines traced over upper edge of clavicle and anterior edge of scapula spine, laterally to the coracoid process. It is in this location that Neviaser portal is made in the arthroscopic surgery of shoulder. The needle is advanced in craniocaudal direction, perpendicular to skin, crossing the trapezium and supraspinatus muscles, until it reaches the supraspinatus fossa (3 to 4 cm), adjacent to coracoid process basis where the nerve is located. Sometimes the patient reports a slight paresthesia on lateral surface of affected arm or shoulder. The needle must be aspirated, before infusion of anesthetic solution so that there is no risk this solution enters the bloodstream directly.

Group B: Intra articular steroid

The needle should be inserted 2 to 3 cm inferior to the posterolateral corner of the acromion and directed anteriorly in the direction of the coracoid process. As with any injection, aspiration should be done to ensure that there has not been needle placement in the blood vessel. The injection should be performed slowly, but with consistent pressure. Follow-up care should include the following recommendations. Patients should remain seated or placed in supine position for several minutes after the injection. To ascertain whether the pharmaceuticals have been delivered to the appropriate location, the joint or area may be put through passive range of motion. The patient should remain in the office to be monitored for 30 minutes after the injection, and the patient should avoid strenuous activity involving the

injected region for at least 48 hours. Patients should be cautioned that they might experience worsening symptoms during the first 24 to 48 hours, related to a possible steroid flare, which can be treated with ice and NSAIDs. A follow-up examination should be arranged within three weeks.

2.7.6 Post procedural physical therapy

2.7.7 Post procedural follow up

Timing: after

- 1st week
- 3rd week
- 7th week
- 12th week

2.7.8 Clinical evaluation of

1. Any specific complaints, subjective improvement as reported by the patient.
2. Evaluation of range of motion.
3. Evaluation of SPADI (shoulder pain and disability index) score.

2.7.9 Final outcome assessment

Was done with comparison of SPADI at first visit, 1 week, 3 weeks, 7 weeks and 12 weeks.

3. Results and discussion

Table 1: Pain Score

	Group A Mean±SD	P Value	Group B Mean±SD	P Value	P value
At first visit	3.730±0.72	-	3.53±0.859	-	0.387
1 Week	2.69±0.68	0.0002	2.5±0.905	0.00009	0.390
3 Week	2.46±0.76	0.00003	1.96±0.720	0.00003	0.018
7 Week	1.92±0.63	0.0002	1.730±0.533	0.00001	0.239
12 Week	1.58±0.50	0.00005	1.30±0.470	0.00007	0.051

Table 2: Abduction

	Group A Mean±SD	P Value	Group B Mean±SD	P Value	P value
At first visit	55±19.03	-	78.84±11.77	-	0.000002
1 Week	79.62±20.29	0.00003	100±10.19	0.00003	0.00003
3 Week	101.92±18.12	0.00004	118.07±8.95	0.0003	0.0001
7 Week	123.46±19.38	0.0009	136.15±4.96	0.00006	0.0021
12 Week	141.92±21.54	0.00001	147.30±7.24	0.0002	0.232

Table 3: External Rotation

	Group A Mean±SD	P Value	Group B Mean±SD	P Value	P value
At first visit	36.35±7.15	-	45.38±7.60	-	0.000054
1 Week	50.19±9.64	0.00003	55±8.12	0.00005	0.057
3 Week	56.54±9.36	0.0000	58.07±9.38	0.000002	0.556
7 Week	61.92±8.49	0.00006	63.07±7.35	0.00000	0.602
12 Week	68.65±10.54	0.0000	63.46±8.45	0.0000	0.055

Table 4: Internal rotation – group A (suprascapular block)

	Not upto sacrum	Upto sacrum	Above sacrum
1 st visit	22	4	0
1 week	6	20	0
3 weeks	0	21	5
7 weeks	0	4	22
12 weeks	0	1	25

Table 13: Internal rotation – group B (Intra articular steroid)

	Not upto sacrum	Upto sacrum	Above sacrum
1 st visit	20	6	0
1 week	2	24	0
3 weeks	0	19	7
7 weeks	0	3	23
12 weeks	0	1	25

Table 5: shoulder pain and disability score (spadi)

	Group A Mean±SD	P Value	Group B Mean±SD	P Value
Presentation	88.27±6.70	-	85.15±6.74	
1 Week	70.81±5.73	0.00004	69.08±5.64	0.00005
3 Week	35.19±3.18	0.00003	35.12±3.97	0.00004
7 Week	22.65±2.40	0.00001	23.85±2.60	0.000001
12 Week	5.62±4.67	0.00002	4.81±4.33	0.000002

Clinical photographs: Case 1 – group A – suprascapular nerve block Day 1



Abduction – 80° and internal rotation not upto sacrum
12 weeks post supra scapular nerve block



Abduction - 170° and internal rotation upto L4 level

4. Discussion

The cause behind the good to excellent results in almost all of the patients in our study may be due to –

1. We combined our treatment modalities with continuous supervised physical therapy.
2. Regular follow ups and motivation of patients.
3. We had chosen 2 best treatment modalities approved by previous studies.

5. Conclusions

- All groups achieved significant improvement in pain and restriction of movement and achieved almost normal day to day activity at final follow up.
- Overall good to excellent results were seen in both the groups.

It is important in developing countries like India to find a cost effective and safe procedure to reduce the morbidity of the condition. The procedures are simple and cost effective. In our impression, spontaneous recovery does not necessarily occur even after a long period, so we therefore recommend that these modalities should be offered to all patients with frozen shoulder and suggest that these modalities would be of more value if carried out at an early stage of the disorder.

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