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Assessment of Functional Outcome in Periarthritis Shoulder Using Two Different Steroids in Ultrasound Guided Suprascapular Nerve Blocks: A Double Blind Randomized Clinical Trial

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Abstract

Background: Periarthritis shoulder affects the glenohumeral joint with a number of medical synonyms including frozen shoulder, scapula humeral periarthritis, adhesive capsulitis, pericapsulitis, stiff shoulder and obliterative bursitis.

Methods: The proposed study was conducted in the Department of Orthopaedics and Department of Anaesthesia Dr. R.P.G.M.C Kangra at Tanda after institutional ethical committee approval over a period of one year. It was a hospital-based double blind randomized clinical trial.

Results: There is no significant difference in the pain scores & disability scores and the SPADI when either dexamethasone or triamcinolone was used.

Conclusion-Suprascapular nerve block with physiotherapy (non invasive rehabilitation) is an effective treatment modality for treating periarthritis shoulder. There is no significant difference in the overall final outcomes of SSNB when either dexamethasone or triamcinolone was used.

Keywords: Dexamethasone, Triamcinolone, Suprascapular Nerve Block.

Introduction

Periarthritis shoulder affects the glenohumeral joint with a number of medical synonyms including frozen shoulder, scapula humeral periarthritis, adhesive capsulitis, pericapsulitis, stiff shoulder and obliterative bursitis.[1] It is characterised by painful gradual loss of both active and passive glenohumeral motion caused due to fibrosis and contracture of the joint capsule. Frozen shoulder may be primary which is a condition of unknown etiology or secondary with an identifiable disorder with diabetes mellitus being amongst the common causes.

The therapeutic options for periarthritis shoulder vary from simple rest, analgesics, intra articular steroid injections, suprascapular nerve block and manipulation under anaesthesia. Physiotherapy and active home exercises being the first line of management.[2-7]

Ultrasound is very useful for peripheral nerve blocks in the upper limbs as it allows the anesthetist to minimize the dose of local anesthetic agent and advance the needle to the nerve safely without puncturing the nearby vessels.[8]

Despite many studies on corticosteroid injection for periarthritis shoulder their small sizes, variable methodology, inadequate follow up and heterogenesity

means that there is little overall evidence to guide treatment. There is a need for further trials investigating the efficacy of various drug combinations for treating chronic shoulder pain using SSNB. The present study was thus planned to compare the effectiveness (reduction of disability) of two different drug combinations (4 ml 2% lignocaine, 4 ml 0.5% bupivacaine, 8 mg dexamethasone, 1500 IU injection hyaluronidase and 4 ml 2% lignocaine, 4 ml 0.5% bupivacaine, 80 mg triamcinolone, 1500 IU injection hyaluronidase) in the treatment of periarthritis shoulder using ultrasound-guided SSNB. The assessment of the patients for pain and disability was done using the shoulder pain and disability index (SPADI).[9]

Materials And Methods

The proposed study was conducted in the Department of Orthopaedics and Department of Anaesthesia Dr. R.P.G.M.C Kangra at Tanda after institutional ethical committee approval over a period of one year. It was a hospital-based double blind randomized clinical trial.

Inclusion Criteria

The patients of either sex above 18 years with pain or stiffness in one or both shoulders suggestive of periarthritis shoulder with gross limitation of the active and passive range of movements for more than four weeks.

Exclusion Criteria

Patient with degenerative pathology (rotator cuff tears, supraspinatus tendinitis) cervical pathology, polyneuropathy, carpal tunnel syndrome, known allergy to local anesthetics, abnormal radiological appearance of affected shoulder joint, recent history shoulder trauma, deformities of the shoulder joint in the affected upper limb, patient with any of the two positive tests:

a. Neer impingement test
b. Hawkins's Kennedy test
c. Jobe test

Methodology

All the patients with periarthritis shoulder reporting to orthopaedics outpatient department Dr. R.P.G.M.C Kangra at Tanda from 1-Apr-2016 to 31-Mar-2017 fulfilling the inclusion criteria as outlined above were recruited for the purpose of this study. The randomization was performed using permuted block randomization technique with allocation ratio of 1:1. Allocation concealment was used to assign individuals to each group. The patients were evaluated for periarthritis shoulder and assessed for functional outcomes using SPADI (shoulder pain and disability index) annexure attached. SPADI includes a questionnaire for both pain and disability with minimum score of 0 and maximum of 10. After the patient had answered all the questions the pain and disability was calculated in terms of percentage using the given multiplication factors. The patients were excluded using the exclusion criteria. Once the patient was included in the study, he/she was evaluated for a suprascapular nerve block by the anesthetist.

Pre treatment Evaluation

It included a complete physical examination, radiological examination of the shoulder joint, and random blood sugar levels of the patient.

Initial evaluation of the range of movements (shoulder pain and disability index) SPADI of the shoulder using a goniometer.

Group 1: The patients received 4ml of 2% lignocaine, 4 ml 0.5% bupivacaine, 8 mg dexamethasone and 1500 IU injection hyaluronidase using ultrasound guided SSNB under all aseptic conditions followed by non invasive rehabilitation measures.

Group 2: The patients received 4 ml of 2% preservative free lignocaine, 4 ml 0.5% bupivacaine, 80 mg

triamcinolone and injection hyaluronidase 1500 IU using ultrasound guided SSNB under all aseptic conditions followed by non invasive rehabilitation measures. After the procedure patients were kept for observation for a period of 2 hour and reviewed for SPADI .

Post Treatment Evaluation

After the procedure, the patients were kept for monitoring for two hours to look for any complications due to the procedure. The patients were reviewed for pain, disability and range of motion as per shoulder pain and disability index (SPADI) range of motion (ROM) at two hours interval, at 2 weeks and at one month and 3 months. Baseline data including shoulder pain and disability index, pain intensity at rest pain on movement were collected before the injection and after the injection as described in Appendix 1 after taking informed consent as in Appendix 3. In patients showing no improvement in pain and disability, second injection was repeated only after a period of one month. All patients were treated with the same rehabilitation protocol. This included pendulum circumduction and active assisted shoulder stretching exercises in forward elevation, passive horizontal adduction, internal rotation stretching three sessions per day for 10 minutes each.

Statistical Analysis

The data were presented as frequency, percentage, and/or mean±SD. Mean of parametric variables between two group was compared using student t-test. Paired t-test was used to compare mean in single group at different time intervals. Chi-square test was performed to analyze difference within categorical variables. Mann Whiteny U test was used to compare non-parametric variables in different groups. A P value < 0.05 was considered significant. Statistical analysis were performed using SPSS trial version 21.

Results

The present study was aimed to assess the functional outcome in periarthritis shoulder using ultrasound guided suprascapular nerve block using two different drug regimens. During the study period, a total of 58 patients were randomized to receive either Dexamethasone (n=29) or Triamcinolone (n=29).

The socio-demographic variable in both groups were comparable.

Table 1. Abduction angle

		Dexa	Triam	P Value
Internal Rotation	Baseline	13.97±5.07	14.31±5.13	0.783
	3 Months	30.17±8.18	31.55±7.45	0.465
	Change	16.21±6.22	17.24±6.21	0.412
External Rotation	Baseline	11.21±4.15	13.10±4.71	0.140
	3 Months	36.03±7.49	35.86±6.95	0.874
	Change	24.83±5.74	22.76±5.28	0.203
Abduction Angle	Baseline	41.72±11.04	42.41±9.88	0.695
	3 Months	139.31±14.38	142.41±13.27	0.363
	Change	97.59±13.80	100.0±13.09	0.546

Our results showed that there was a significant improvement in the internal rotation, external rotation, and abduction angle over a period of 3 months within both the groups; however, no significant difference was observed between the groups when compared to each other.

Table 2. Pain Score

Pain Score	**Dexamethasone (n=29)**	**Triamcinolone (n=29)**	**P Value**
Baseline	72.69±5.16	69.93±4.42	0.564
2 hours	68.28±5.36	64.69±4.94	0.122
2 Weeks	32.62±4.63	32.07±4.42	0.945
4 Weeks	27.72±4.30	25.93±4.33	0.220
3 Months	23.24±5.03	21.52±3.84	0.564
P Value*	0.000	0.000	

Analysis of pain score showed that there was significant decrease in individual pain score at 2 hours, 2 weeks, 4 weeks, and 3 months when compared with baseline in respective groups. There was no significant difference in pain scores when compared individually among both groups.

Table3. Change in Pain Score from Baseline to 3 Months

	Dexamethasone (n=29)	**Triamcinolone (n=29)**	**P Value**
Change in Pain Score from Baseline	49.45±7.09	48.41±5.79	0.707

There was no significant difference in pain scores when compared individually among both groups.

Table 4. **Disability Score**

Disability Score	**Dexamethasone (n=29)**	**Triamcinolone (n=29)**	**P Value**
Baseline	82.24±7.37	81.25±6.85	0.945
2 hours	64.72±5.55	62.90±5.52	0.782
2 Weeks	39.31±2.96	39.31±3.16	1.000
4 Weeks	34.09±3.42	33.92±2.83	0.945
3 Months	22.90±2.69	21.97±2.69	0.564
P Value*	0.000	0.000	

Decrease in the disability score was observed within the group when compared at 2 hours, 2 weeks, 4 weeks, and 3 months with baseline. There was no significant decrease in the disability score at when both the groups were compared with each other at 2 hours , 2 weeks , 4weeks and 3 months.

Table 5. **SPADI Score at** 2 hours 2 and 4 weeks, and 3 months

SPADI Score	**Dexamethasone (n=29)**	**Triamcinolone (n=29)**	**P Value**
Baseline	78.56±5.01	76.90±4.69	0.268
2 hours	76.05±4.70	73.26±4.78	0.039
2 Weeks	36.74±2.66	36.52±2.97	0.784
4 Weeks	31.64±2.78	30.85±2.57	0.226
3 Months	26.55±3.50	25.17±2.82	0.122
P Value*	0.000	0.000	

SPADI score was calculated at 2 hours 2 and 4 weeks, and 3 months in both Dexamethasone and Triamcinolone group and compared with baseline mean score. SPADI score decreased over the period of 3 months .Paired t-test analysis showed that the SPADI scores decreased ove a period of 3 months however there was no significant difference in SPADI score at 2 hours 2 and 4 weeks, and 3 months between Dexamethasone and Triamcinolone groups when compared to each other.

Discussion

Frozen shoulder can be primary or idiopathic or may be secondarily associated with systemic diseases such as diabetes, hyper or hypothyroidism, Parkinson's disease, sequeale of stroke, pulmonary and cardiac diseases.[2] Idiopathic frozen shoulder is a common problem presenting as pain that may be mild to severe and as a progressive loss of movement resulting in loss of function. Pathoanatomically the common denominator is an inflammatory vascular proliferation followed by thickening, scarring and contractures of joint capsule.

Primary frozen shoulder is a known cause of self-limiting disability of shoulder in the age group forty to seventy years. Though it follows a self-limiting course, the pain and functional disability produced by the disease entity in this group of patients has detrimental effects on the socio-economic status of the society. Since the pain plays an integral part of frozen shoulder pathology, breaking this vicious cycle between pain and non compliance to therapeutic exercises is a must to achieve a satisfactory result. That is why a number of treatment modalities, like oral NSAIDS, physical modalities, physical therapy,

manipulation under anaesthesia, intra-articular steroids, arthroscopic capsular release and suprascapular nerve block to name a few, have been advocated to reduce the disabilities imposed by the disease. But still no uniform treatment protocol with certain added advantages over others has been identified till date.

A total of fifty eight patients between thirty to ninety years with shoulder pain more than six weeks were in included in the study as per inclusion criteria. Group one included the patients who received 4 ml of 2% lignocaine, 4 ml 0.5% bupivacaine, 8 mg dexamethasone and 1500 IU injection hyaluronidase and group 2 received 4 ml of 2% preservative free lignocaine, 4 ml 0.5% bupivacaine, 80 mg triamcinolone and injection hyaluronidase 1500 IU using ultrasound guided SSNB under all aseptic conditions followed by non invasive rehabilitation measures. After the procedure the patients in both groups were kept for observation for a period of 2 hours and reviewed for SPADI. The patients were reviewed for pain, disability and range of motion as per SPADI range of motion (ROM) at two hours interval, at 2 weeks and at one month and 3 months.

The pain scores, the disability scores and the SPADI scores all decreased significantly in both the groups but there is no significant difference in the scores when both the groups were compared with each other except for the baseline pain scores in triamcinolone group and the disability score at 2 hours in triamcinolone group which was significantly lower than the 2 hour disability score of dexamethasone. In this study the groups were homogeneous that is other secondary causes of frozen shoulder were excluded and range of motion was compared making it a unique study.

Shanahan et al (2003) performed a randomized double blind placebo controlled trial of the efficacy of SSNB for shoulder pain in Rheumatoid arthritis using 10 ml 0.5% bupivacaine and 40 mg methylprednisolone acetate after a subcutaneous injection of 1% lidocaine for local analgesia on 83 people and concluded that SSNB is a safe and efficacious treatment for shoulder pain in degenerative disease and arthritis [10]

Sakeni and Al-Nimer (2007) compared the effectiveness of triamcinolone acetonide (40 mg) and methylprednisolone acetate (60 mg) in Iraqi patients with primary and secondary frozen shoulder. A total number of 135 patients with frozen shoulder were included in the study. Intraarticular injections of 40 mg triamcinolone acetonide or 60 mg methylprednisolone acetate were given every 3 weeks (not more than 3 injections) by using posterior route. Both triamcinolone acetonide (81.8%) and methylprednisolone acetate (83.3%) were equally effective in primary frozen shoulder. Triamcinolone acetonide is significantly improved diabetic frozen shoulder in comparison to methylprednisolone acetate (69% versus 39%). Also patients on triamcinolone acetonide required less number of steroid injections and higher percent of severe cases were significantly improved by triamcinolone acetonide in comparison with methylprednisolone acetate.[11]

Since, there is no significant difference in the pain scores the disability scores and the SPADI it can be concluded that both dexamethasone and triamcinolone both are equally effective in suprascapular nerve block in periarthritis shoulder. Because dexamethasone is non particulate steroid and less expensive compared to triamcinolone and equally efficatious it can be preferred for SSNB.

Conclusions

Suprascapular nerve block with physiotherapy (non invasive rehabilitation) is an effective treatment modality

for treating periarthritis shoulder. There is no significant difference in the overall final outcomes of SSNB when either dexamethasone or triamcinolone was used.

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