Outcome of Needle Fenestration, Subacromial Steroid and Diclofenac Phonophoresis in Acute Calcific Tendinitis of Shoulder

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ABSTRACT

Introduction: Acute calcific tendinitis of shoulder is very painful and disturbing condition. There are many modalities with variable outcome to address the condition. We studied needling technique with multiple fenestration, subacromial steroid and diclofenac phonophoresis and evaluated the outcome in term of pain relief and improvement of shoulder function at a simple outpatient clinical set up without image or ultrasound guidance.

Methods: We studied cases of acute calcific tendinitis presenting within one week from onset of symptoms and X-ray showing calcific deposit. All underwent needle fenestration at maximum tender site with lignocaine loaded syringe, subsequent injection of 40 mg subacromial methylprednisolone and diclofenac phonophoresis done by qualified physiotherapist for five days. Visual Analogue Scale was used to measure pain, Simple shoulder Test applied to evaluate shoulder function and size of calcific deposit was measured at maximum length.

Results: Pain subsided dramatically and there was substantial improvement of shoulder function within a week.

Conclusions: Needle fenestration and subacromial methylprednisolone along with diclofenac phonophoresis without image guidance gives excellent pain reduction and improves shoulder function which can be done at simple outpatient clinic.

Keywords: *acute calcific tendinitis; phonophoresis; simple shoulder test; visual analogue scale.*

INTRODUCTION

Acute calcific tendinitis commonly affecting supraspinatus tendon is quite dramatic with sudden onset of severe pain, exquisite tenderness and attempted motion is very painful.[1,2] Tenocytes response to exposed mechanical force undergo metaplasia into chondrocyte like cell and subsequently deposit basic calcium phosphate.[3]

Several treatment options has been proposed but clinical results are controversial and often remain a matter of clinician's choice.[4] Ultrasound enhances drug delivery by increasing cell permeability and also increases diffusion hence phonophoresis is more effective than topical application of gel.[5-8] Needle aspiration or barottage is painful and may need general anesthesia furthermore localization of the deposit warrants image guidance and is often used in many studies for needling and aspiration with variable outcome.[9,10]

Hence purpose of our study is to evaluate the outcome of needle fenestration at maximum tender point without image guidance, subacromial steroid and diclofenac

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phonophoresis at outpatient clinic to evaluate the effectiveness in term of pain relief and functional outcome.

METHODS

This observational study was conducted at Lumbini Zonal Hospital and Lumbini Hospital and Technical College, Butwal, Nepal from August 2011 to July 2017. Patients visiting outpatient clinic with onset of shoulder pain within one week with visible calcific deposit on X-ray were included in our study. Ethical approval was taken from the Institutional Review Committee. Those visiting more than one week of onset of symptoms or shoulder pain without X-ray evidence of calcific deposit were excluded. Duration of symptoms was one to seven days (average 3.5 days). Treatment procedure was explained to all and consent was taken. Visual Analogue Scale (VAS) was used to score the level of pain due to its simplicity, reliability and validity as well as its ratio scale properties.[11,13] A vertical VAS of 100mm was used ranging across a continuum from no pain zero to extreme pain 100. Function of shoulder was scored and recorded with modified Simple Shoulder Test (SST), scored zero for "no" answer and score one for "yes" answer.[14] Size of the calcific deposit was measured on its maximum length.

Table 1. Modified Simple Shoulder Test (SST) Yes = 1, No = 0.

Serial Number of test	Question for patient
1	Comfort at side
2	Sleep comfortably
3	Tuck in Blouse or Shirt
4	Hand behind head
5	Place object on shelf
6	Lift half kg to shoulder level
7	Lift 5kg to head level
8	Carry 10 kg
9	Toss stone underhand
10	Throw stone overhand
11	Wash opposite shoulder
12	Work as before

We used diclofenac diethyl ammonium 1.6% w/w equivalent to diclofenac sodium 1% w/w gel with Meditech brand ultrasound machine (made in India) with one megahertz probe for five minutes in continuous mode to deliver the drug by phonophoresis, done once a day for minimum of five days. Two ml of 2% lignocaine in 10 ml disposable syringe with 21 G needle was used to blindly puncture the deposit multiple times marked as maximum tender site, injecting the local anesthetic during the fenestration. We avoided large bore needle and aspiration to minimize pain during procedure. Finally needle advanced to subacromial space using different syringe preloaded with methyl prednisolone 40mg and 2% lignocaine. All patients were given oral indomethacin 25 mg thrice a day for five days and were asked to follow up in one week, one month, one year and later. Our average follows up was 11.7 months (range 1-49months).

VAS, SST score and size of the deposit were noted. Data collected and analyzed using standard statistical test including standard of deviation, paired t test to test the hypothesis of no difference between initial VAS and VAS in one week, one week and one month and one month to final follow up. Hypothesis of no difference between initial SST and SST in one week, one month and one month and final follow up were tested using paired t test. Regression analysis was done to measure the correlation between initial size of deposit and VAS score.

RESULTS

In our study we found acute calcific tendinitis of shoulder commonly affecting elderly (average age 52.9 years), 14 (77.8%) were females, 16 (88.9%) gave some history of strain or overuse. Average duration of seeking treatment from onset of symptoms was 3.5 days (range 1-7days). Right side shoulder was involved in 15 (83.3%). We had no simultaneous bilateral involvement but one of our patient had left shoulder involved three years later of right side.

All our patients initially presented to us had severe pain, mean VAS was 84.2 (Range 74-94). After continuous one megahertz diclofenac phonophoresis for five minutes for at least five days, multiple needle puncture at maximum tender site along with two ml 2% lignocaine and subacromial injection of 40 mg methyl prednisolone mixed again with two ml 2% lignocaine, acute pain subsided in all within one week. Mean VAS in one week came down to 20.3 (range 7-37) showing significant decrease in pain (paired t test $P<0.001$, SD 9.15).

Average initial Simple Shoulder Test (SST) score was 1.83 (range 0-3) in one-week SST score increased to 9.61 (range 8-10) showing significant improvement ($P<0.001$ paired t-test, SD 1.003).

There was significant improvement of VAS from one week to one month ($P<0.001$ paired t-test, SD 3.84) and improvement from one month to final follow up (average final follow up 11.7 months) was non-significant ($P>0.05$ paired t-test, SD 17.36).

Table 2. Patients VAS, SST and size of calcific deposit.

Case No.	Age Sex	Initial (Vas, SST, Deposit size in cm)	One week(VA, SST, Deposit)	One month(VAS, SST, Deposit)	Final follow up (VAS, SST, Deposit)	Duration of final follow up(months) & Remarks
1	60M	87, 2, 2.2	21, 10, 1.8	12, 11, 1.2	0, 12, 0.7	10, pulled by cow
2	62F	92, 0, 1.5	37, 9, 1.2	20, 10, 0.8	8, 12, 0.6	11, dug field
3	37M	78, 3, 0.75	23, 10, 0.5	13, 11, 0.3	0, 12, 0	13, chopped wood
4	53F	80, 3, 0.2	14, 10, 0.1	6, 12, 0	5, 12, 0	2, carried bucket
5	57F	93, 0, 1.4	22, 9, 1.2	11, 11, 0.8	0, 12, 0	49, deweeded field
6	46F	93, 0, 0.6	7, 10, 0.6	4, 12, 0.3	0, 12, 0.3	4, no trauma
7	58F	81, 2, 0.8	14, 9, 0.8	7, 11, 0.8	0, 12, 0.8	12, milked buffalo
8	49F	87, 2, 1.8	16, 10, 1.4	9, 11, 1.2	0, 12, 0.8	14, no trauma
9	65M	76, 3, 0.2	8, 10, 0.2	6, 12, 0.2	6, 12, 0.2	1, strained on scooty
10	55F	92, 1, 0.3	22, 10, 0.3	9, 11, 0.2	6, 12, 0	17, harvested paddy
11	27F	88, 2, 1.6	34, 9, 1.4	23, 10, 1.2	68, 2, 0.8	13, cut branches pain recurred
12	49F	82, 2, 0.4	20, 10, 0.3	8, 12, 0.2	8, 12, 0.2	1, washed clothes at hand pump
13	44M	82, 3, 0.7	13, 10, 0.6	6, 12, 0.4	0, 12, 0.2	13, chopped wood
14	54F	78, 3, 1.7	21, 10, 1.4	9, 11, 1.2	6, 12, 0.8	5, cut grass
15	72F	83, 1, 0.4	36, 8, 0.4	26, 9, 0.3	72, 8, 0.2	9, pain recurred on milking
16	55F	94, 0, 2.4	23, 9, 2.0	12, 11, 1.4	0, 12, 0	3, cut branches for cattle
17	53F	76, 3, 1.0	14, 10, 0.8	8, 11, 0.6	0, 12, 0.3	34, strained on raising up
18	56F	74, 3, 1.4	21, 10, 1.2	6, 12, 0.8	6, 12, 0.8	1, harvested maize

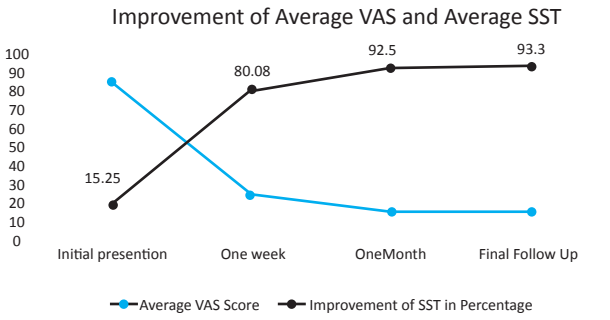

Figure 1. Improvement of average VAS and SST in follow ups.

Increase in SST from one week to one month was significant (P<0.001 paired t-test, SD 0.514) but long term result from one month to final follow up was nonsignificant (P>0.05 paired t-test, SD 2.09).

Complete desolation of calcific deposit was seen in five (27.8%), desolation by more than half in seven (38.9%) and half or less than half desolation in six (33.3%).

We found size of calcific deposit and initial VAS has very limited positive correlation (r=0.313). During our study, we observed six (33.3 %) with visible calcific deposit on X-ray were asymptomatic (VAS 0). Two (11.1 %) had relapsed symptoms though initial improvement hence we labeled them as chronic calcific tendinitis. One patient had right shoulder involved and after three years left shoulder was affected. We saw no case of simultaneous bilateral involvement.

DISCUSSION

We wanted to make the procedure simple to be done at outpatient clinic, we avoided aspiration as it requires large bore needle eliciting more pain and also requires image guidance. Furthermore, there is insufficient evidence to conclude ultrasound guided needle lavage is superior and needle fenestration may be contributing to observed therapeutic effect.[15-17] We also believe needle fenestration may initiate more inflammation to hasten resorptive phase. We used multiple modalities to address the problem as there are many modalities with varying degree of efficacy.[1,4]

Result we obtained may be the summation effect of diclofenac phonophoresis, needle fenestration and

steroid injection as some reports suggest short term benefit of subacromial steroid and some repost suggest little reproducible benefit.[18,19] Our aim was not to seek the effectiveness of the individual modality but to address the dramatic painful condition at outpatient clinic and we were able to dramatically end the problem. All our patients were asked to come for initial follow up in one week but some recalled end of pain very next day and some said in few days but all had significant pain relief by one week.

We observed excellent short term relief of pain and regaining of shoulder function but there were two (11.1%) recurrence hence we considered those as chronic tendinitis, they reach beneficial plateau within short period hence further improvement in long follow up in not significant which was also reported by Serafini et al, in his series of 10 years of follow up.[16] Six (33.3 %) with visible calcific deposit on X-ray were completely pain free hence we assume may be calcific deposit itself is not the cause of pain and it can be asymptomatic which is reported in other series too.[1,20]

In our study, we included those who came within one week of symptoms and those who came for follow up for at least one month. Many of our patients did not turn up after the painful episode was over hence we had to exclude them from our study thus decreasing our number of study cases. We may have done longer follow ups to see the long-term behavior of deposit and larger sample size would have been better.

CONCLUSIONS

Acute calcific tendinitis of shoulder is very painful condition. Diclofenac phonophoresis, needle fenestration and subacromial methyl prednisolone at outpatient clinic gives quick pain relief and improves shoulder function.

Needle fenestration, subacromial steroid and diclofenac phonophoresis without image guidance can be done at simple outpatient clinic with good result.

Conflict of Interest: None.

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