Original Article

A Study of Evaluation of Effectiveness of hydraulic distension of shoulder in the management of frozen shoulder patients

Author
Amaresh Prasad Sinha*
Asso. Prof., Department of Orthopedic
Lord Buddha Koshi Medical College, Saharsa, Bihar, India

Abstract

Background: The clinical term “Frozen shoulder” is a painful and debilitating condition with an incidence of 3% to 5% in the world population and up to 20% in those with diabetes. Frozen shoulder is an extremely disabling condition, presenting with and remitting shoulder pain and stiffness. Frozen shoulder” is a chronic condition of unknown etiology characterized by gradually progressive, painful restriction of all shoulder joint motion, with slow spontaneous restoration of either partial or complete motion over months to year.

Material & Method: This study was a prospective experimental study involving 108 Patients with 118 shoulders of frozen shoulder, (of which 10 cases presented with bilateral shoulder involvement) attending the outpatient department of Orthopedics in Lord Buddha Koshi Medical College, Saharsa, Bihar, India.

Results: The average age of the patients enrolled in this study was as 58.16 years (±12.70 years). Out of 108 patients, who completed the study, 52 were females and 56 males. During post distension period, 6% of the patients had excellent results, 40% good results, 48% fair results and 6% had poor results. Whereas in 6 weeks follow up period, 44% of the patients had excellent results, 36% good results, 17% fair results and 3% had poor results.

Conclusion: On the basis of our current study hydraulic distension is a safe, reliable, & cost effective method in treating the chronically distressing painful condition of frozen shoulder. This technique can be practiced in an outpatient department without any specialized equipments, and when performed with a right technique under safe & aseptic precautions, it has absolutely no side effects.

Keywords: Frozen Shoulder, hydraulic distension, predistension, steroid.

Introduction

The term Frozen shoulder (Adhesive Capsulitis) is a chronic condition of unknown etiology characterized by gradually progressive, painful restriction of all shoulder joint motion, with slow spontaneous restoration of either partial or complete motion over months to year. Frozen shoulder condition is a chronic fibrosing condition of the capsule of the shoulder joint [1]. The clinical term “frozen shoulder” as first used by Codman 1932 & he described the common features as a pain of gradual onset, which is felt near the insertion of the deltoid, inability to sleep on the affected side, painful restriction of elevation and external rotation and a normal radiological appearance. The condition “Frozen shoulder” is a painful and debilitating condition with an incidence of 3% to 5% in the world population.
and up to 20% in those with diabetes. The term ‘frozen shoulder’ was first introduced by Codman in 1934 to describe & present a clinical condition that has been of interest to clinicians since the late 1800s. Codman, when he coined the term ‘frozen shoulder’, he claimed that this disorder is ‘difficult to define, difficult to treat, and difficult to explain from pathology point of view’. Management of frozen shoulder remains controversial.

In this study we aim to evaluate clinical evaluation of outcome of treatment of frozen shoulder by hydraulic distension under local anesthesia with steroid. A rapid, immediate result and cost effectiveness of hydraulic distension technique was also evaluated.

**Material & Method**

This study was a prospective experimental study involving 108 Patients with 118 shoulders of frozen shoulder, (of which 10 cases presented with bilateral shoulder involvement) attending the outpatient department of Orthopaedics, Lord Buddha Koshi Medical College, Saharsa, Bihar, India. All the patients were treated with hydraulic distension under local anesthesia along with intraarticular steroid, on an outpatient basis. All these cases were treated from October to December 2016. Many literatures show that different clinicians have indicated different range of restricted shoulder motion for a patient to be diagnosed as having frozen shoulder. In the study, we have used the diagnostic criteria used by Patrik. J. Mumaghan. According to these criteria, we included all those patients with progressive shoulder pain and stiffness with reduced movement, for which no specific cause was identifiable, and the patients with less than thirty degree of external rotation, less than one thirty degree of forward elevation and less than one twenty degree of abduction. There was variable limitation of internal rotation.

**Result**

This study was a prospective experimental study involving 108 Patients with 118 shoulders of frozen shoulder, (of which 10 cases presented with bilateral shoulder involvement) attending the outpatient department of Orthopaedics in Lord Buddha Koshi Medical College, Saharsa, Bihar, India. The average age of the patients enrolled in this study was as 58.16 years (±12.70 years). Out of 108 patients, who completed the study, 52 were females and 56 males. In this clinical setting case series shows 10 patients (9.25%) had bilateral involvement while in 40 patients (37.07 %) had involvement of the dominant side that is right shoulder, while 58 patients (53.57%) were found to have left shoulder involvement. Few patients were found to have certain associated conditions such as 19 patients had diabetes mellitus, 16 patients had hypertension, 12 patients had osteoarthritis of knee, 2 patients were diagnosed with peptic ulcer, and 3 patients of bronchial asthma were seen. 72 patients out of 108 patients (66.6%) were previously treated with oral NSAIDs but without much relief. 10 (9.25%) patients also had been treated with steroidal intraarticular injection. All the patients were undergone & managed with hydraulic distension under local anesthesia and steroid without using any sedatives. The procedure was well tolerated by the patients and no complications were noticed during or post procedure. Pain score at pre & post distension is represented by table 1. It is observed that pain relief is significantly low among patients after hydraulic distension & almost removed after 6 weeks follow up. Range of motion at pre & post distension is represented by table 2. It is observed that ROM is gradually increased after hydraulic distension & significantly improved after 6 weeks follow up. Moreover, the functional score among the patients were also measured before & in a follow up & the functional score is also improved reasonably after hydraulic distension (table 3). Table 4 shows the overall results & outcome of the intervention. During post distension period, 6% of the patients had excellent
results, 40% good results, 48% fair results and 6%
% had poor results. Whereas in 6 weeks follow up
period, 44% of the patients had excellent results,
36% good results, 17% fair results and 3% had
poor results. The criterion of classification of
results (i.e. excellent or good or fair etc.) is based
on three components i.e. Pain relief, ROM &
functional score which is given in footnote.

Table 1: Pain Score at pre & post distension

| Pain Score | Pre Distension | After Hydraulic Distension | At Follow Up (6 weeks post Distention) |
|------------|----------------|-----------------------------|----------------------------------------|
| 0          | 2              | 0                           | 0                                      |
| 1          | 38             | 15                          | 8                                      |
| 2          | 32             | 24                          | 10                                     |
| 3          | 30             | 26                          | 36                                     |
| 4          | 6              | 34                          | 42                                     |
| 5          | 0              | 9                           | 12                                     |

Table 2: Range of Movement (ROM) at pre & post distension

| Range of Movement | Pre Distension | After Hydraulic Distension | At Follow Up (6 weeks post Distention) |
|-------------------|----------------|-----------------------------|----------------------------------------|
| 0-60              | 36             | 12                          | 6                                      |
| 61-100            | 58             | 72                          | 74                                     |
| 100-140           | 24             | 34                          | 38                                     |

Table 3 Functional Score at pre & post distension

| Functional Score | Pre Distension | After Hydraulic Distension | At Follow Up (6 weeks post Distention) |
|------------------|----------------|-----------------------------|----------------------------------------|
| 0                | 1              | 0                           | 0                                      |
| 1                | 39             | 16                          | 4                                      |
| 2                | 30             | 23                          | 14                                     |
| 3                | 32             | 26                          | 36                                     |
| 4                | 6              | 43                          | 54                                     |

Table 4 Overall results at post distension & Follow Up

| Overall Results | Post Distension | Follow Up |
|-----------------|-----------------|-----------|
| Excellent       | 6               | 44        |
| Good            | 40              | 36        |
| Fair            | 48              | 17        |
| Poor            | 6               | 3         |

Discussion
The earliest descriptions of a frozen shoulder in
pathology point of view were by Neviaser, in
1945, who found thickened, contracted capsule
around the humeral head. Histology of the capsule
showed fibrosis and inflammatory cells [7-8]. A
nice study conducted by Quraishi et al in their
prospective study has recommended hydro
distension for patients with frozen shoulder
resistant to conservative treatment. A similar
study conducted by Khan AA, et al., compared
distension arthrography with intra-articular steroid
plus physical therapy versus physical therapy
alone and they also recommended the technique [9-10].

Conclusion
In this current study hydraulic distension is a safe,
reliable, & cost effective method in treating the
chronically distressing painful condition of frozen
shoulder. This technique can be practiced in an
outpatient department without any specialized
equipments, and when performed with a right
technique under safe & aseptic precautions, it has
absolutely no side effects. Hence, hydraulic
distension under local anesthesia can be
considered & adopted as a first line management
option in patients with frozen shoulder.

References
1. Bunker TD, Reilly J, Baird KS, et al. Expression of growth factors, Cytokines
and matrix metalloproteinases in frozen
shoulder. J Bone Joint Surg. (Br) 2000; 82-B: 768-73.
2. Jacobs LG, Barton MA, Wallace WA, et
al. Intra-articular distension and steroids in
the management of capsulitis of the
shoulder. BMJ. 1991; 302:1498–1501.
3. Rowe CR, Leffert RD. Idiopathic chronic
adhesive capsulitis (“frozen shoulder”) In:
Rowe CR, editor. The Shoulder. New
York: Churchill Livingstone; 1988. pp.
155–163.
4. Jacobs LG, Smith MG, Khan SA, Smith K. Manipulation or intra-articular steroids in the management of adhesive capsulitis of the shoulder? A prospective randomized trial. J Shoulder Elbow Surg. 2009; 18:348–353.

5. Rizk TE, Gavant ML, Pinals RS. Treatment of adhesive capsulitis (frozen shoulder) with arthrographic capsular distension and rupture. Arch Phys Med Rehabil. 1994; 75:803-7.

6. Murnaghan JP. Frozen shoulder. Chapter 21. In: Rockwood CA Jr (editor). The shoulder. Philadelphia: W.B. saunders company. 1990; 2:837-862.

7. Neviaser RJ, Neviaser TJ. The frozen shoulder diagnosis and management. Clinical orthopaedics and related research. 1987; 223:59-64.

8. Shearer JR, Nejad AH. The shoulder and elbow joints. Chapter 14. In: Duthie RB (editor). Mercer’s orthopaedic surgery. London:Arnold; 1996; 9:1034-1035.

9. Quraishi NA, Johnston P, Bayer J, Crowe M, Chakrabarti, AJ. Thawing the frozen shoulder A randomised trial comparing manipulation under anaesthesia with hydrodilatation. J Bone Joint Surg [Br]. 2007; 89-B: 1197-200.

10. Manoj Kumar R, Siddhartha Mahesh. Effectiveness of hydraulic distension of shoulder in the management of frozen shoulder. International Journal of Orthopedics Sciences 2016; 2(4): 27-30.