Comparison Between Manipulation under Anesthesia and Hydraulic Distension for Treatment of Frozen Shoulder

SHAH M.A., KHAN I.
Address for correspondence: *Dr Mohammad Ali Shah, Assistant Professor, Department of Orthopaedic surgery Gomal Medical College, D.I.Khan.* ***Email:*** *dralishah72@hotmail.com*

Objective: To evaluate and compare the outcome of Manipulation under anesthesia (MUA) and Hydraulic distension as treatment options for frozen shoulder and to see which treatment option is superior in terms of early pain relief and improved range of motion (ROM).

Type of study: Prospective, Randomized trial.

Place and duration of study: District headquarter teaching hospital, Dera Ismail Khan. July 2005- September 2006.

Materials and Methods: A total of 36 patients were randomized to receive either method. Group A included 16 patients who underwent manipulation under anesthesia. Group B consisted of 20 patients who had hydraulic distension. The patients received supervised physiotherapy after both procedures. Both the groups were then compared regarding early pain relief and range of motion.

Results: Regarding pain relief in Group A, 9 out of 16 patients reported no pain within 1 week whereas in Group B, 17 out of 20 patients were pain free within first week of procedure. Regarding active ROM, during first week in Group A, 10 patients had "excellent" while 6 patients showed "good" results. In Group B, 18 patients had "excellent" and 2 patients "good" results.

Conclusion: Hydraulic distension gave better results in terms of early pain relief and improved ROM. Moreover it is cost effective and carries less complication rate.

Key words: Hydraulic distension, Manipulation under anesthesia (MUA), Shoulder.

Frozen shoulder syndrome is commonly encountered in orthopaedic practice. It is a condition characterized by pain and global restriction of movements. It can be divided into primary and secondary forms. Primary (Idiopathic) frozen shoulder may be defined as idiopathic shoulder pain of at least one month duration accompanied by increasingly severe limitation of active and passive gleno-humeral movements in people who have no identifiable general illness and whose radiographs are normal[1]. Secondary frozen shoulder is clinically indistinguishable from primary; however it has an identifiable disorder.[2]

Frozen shoulder is more commonly found in female population, in diabetics and those having heart disease.[3, 4]

Although many treatment options are available for frozen shoulder syndrome, each has limitations.[5] Home exercises may not improve the rate of natural recovery.[6] Benefits from intensive physical therapy are slow.[7] Injection of intra articular steroids may benefit some patients.[8] Arthroscopic release under anesthesia is invasive and few patients' outcomes are reported.[9] Manipulation under anesthesia (MUA) is commonly used treatment modality for frozen shoulder syndrome but carries the risk of humeral fracture, dislocation, cuff injuries, laberal tears or brachial plexus injury.[10] Effective treatment of frozen shoulder can be achieved in the majority of cases with Hydraulic distension (HD) method.[11]

Surgery is usually reserved for patients in whom conservative treatment has failed. Surgical interventions provide good to excellent results with few failures. The final outcome may depend on the initial degree of disability[12].

Materials and Methods

Between July 2005 and December 2006, patients ranging from 40-70 years of age who presented with frozen shoulder in OPD were included in the study. Loss of passive ROM of at least 50% in at least 2 of the following motions was an inclusion criterion: abduction, external rotation (ER) and flexion in saggital plane.

After obtaining informed consent from all patients, they were randomly allocated to either MUA (group A) or the hydraulic distension group (group B). Patients with previous fracture of ipsilateral humerus, rheumatoid arthritis and osteoarthritis of shoulder were excluded.

Initially 45 patients were included in the study but only 36 completed their follow-up. One patient died before completion of the trial from unrelated condition and was excluded. Out of these 36 patients, 16 were in group A and 20 in group B, 12 were male and 24 female. Right shoulder was involved in 26 patients and left shoulder in 10 patients. There were 4 diabetics in each group. The diagnosis was made on the basis of history, clinical and radiological examination and exclusion of other shoulder pathologies espe-

cially impingement syndrome. The duration of symptoms was from 1 month to 14 months (Average 4.8).

3 patients had received prior treatment by local bone setters (pehlwans) in the form of local massage and manipulation. 4 patients had received a corticosteroid injection in their affected shoulder from their general practitioner; one patient received 4 injections. None of the patients reported satisfactory results (progress in mobility, pain, or ADL).

Assessment took place prior to treatment (t_0), after 1 week of treatment (t_1) and 1 month after treatment (t_2). A detailed history of complaints and disabilities in daily life was taken from each patient at each assessment. Both pre- and post-procedure ROM was recorded and was compared with the normal shoulder. Patients from both groups were referred to physiotherapists after the procedure where supervised physiotherapy was carried out daily for 2 weeks to prevent recurrence.

We used active mobility and pain as primary outcome measures because we believe that they are important features in frozen shoulder. Patients were asked for the presence of pain during ADL and at night. We considered the treatment result for active mobility to be "excellent" if the deficit in mobility was 20 degrees or less in all 3 directions (abduction, flexion in sagittal plane, and lateral rotation) as compared with the opposite glenohumeral joint. A "good" result was scored if the deficit in joint mobility was between 20 and 30 degrees in1 or more directions. We used the scoring system of Heller et al[13], which was originally designed to assess the function of posteriorly dislocated shoulders, but worked well in our study. Active and passive movements of both shoulders were measured with each patient in a standing position using a goniometer at t_0, t_1 and t_2. The average follow up was 5.5 months.

MUA was done on elective operation list under general anesthesia using a short lever arm and fixed scapula. Audible and palpable release of adhesions was a good prognostic sign.

Hydraulic distension was carried out in the OPD as described by Fareed[14] with slight modification. The shoulder area was prepped while patient sitting. The skin was anesthetized using 1% lidocaine. 10cc syringe was used to enter the joint and 4ml of 1% lidocaine mixed with 1ml of triamcinolone (40mg) was injected. Minimal plunger resistance ensured the joint space entry. Then up to 40ml of sterile saline was forcibly injected into the joint space. A sensation of reduced resistance during saline injection suggested capsular distension or rupture.

Results

9 patients in group A (manipulation under anesthesia MUA) reported no pain at the t_1 and t_2 assessment but 7 patients reported pain during ADL and at night (figure 1). 15 patients reported their overall progress at t_2 assessment as "improved" or "much improved". Improvement was seen in pain level and in ADL, especially overhead activities. 1 subject reported having "unchanged" shoulder function. Regarding active ROM (figure 2), at the t_1 assessment, 10 patients had "excellent" result and 6 patients had "good" result. At the t_2 assessment, all patients had excellent result.

In group B (hydraulic distension HD), 17 patients at the t_1 and t_2 assessment reported no pain, 3 patients complained of some pain during ADL and at night (figure 1). All 20 patients at t_2 reported their overall progress as "improved" or "much improved". Regarding active ROM in group B (figure 2), 18 patients had "excellent" result and 2 patients had "good" result at t_1 assessment. At t_2 assessment all patients had excellent result.

There was no major complication reported in either group.

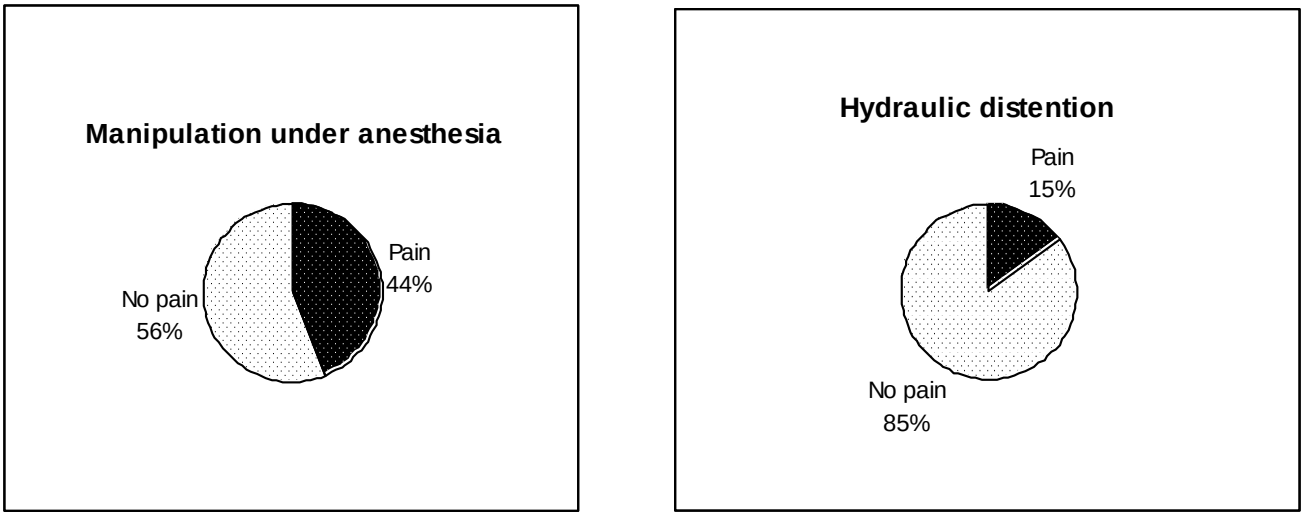

Fig. 1: *Comparison between Manipulation under anesthesia (MUA) and Hydraulic distention (HD) regarding pain.*

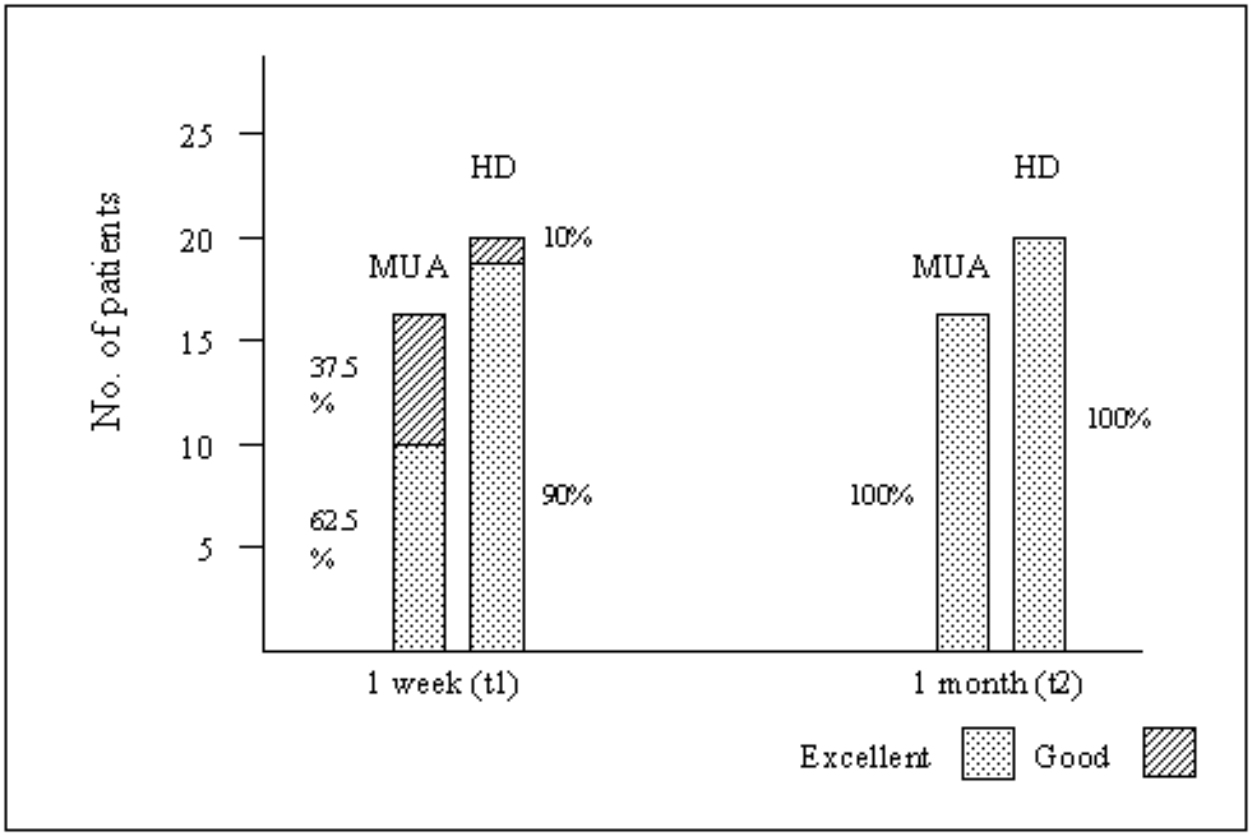

Fig. 2: *Comparison between Manipulation under anesthesia (MUA) and Hydraulic distention (HD) regarding Active range of motion.*

Discussion

In addition to pain and sleep disturbance, most of the patients having frozen shoulder complain of difficulty accomplishing personal hygiene and overhead movement, reaching or rotation activities[15].

Some authors state that pain relief is the main objective of all treatments for frozen shoulder[16]. However, considering the protracted nature of this disorder and its impact on patients' functionality, this objective should be refined to early pain relief and functional restoration[17].

Up to 3% of general population is affected by idiopathic loss of shoulder ROM[18]. Age and sex distribution reported in the literature have been widely variable, with ages ranging from 22 years[19] to 85 years[20] and with percentage of female subjects ranging from 48%[21] to 84%[22].The question of diagnostic uncertainty is important. A clinical examination may be insufficient to differentiate this process from other inflammatory processes that cause pain and loss of motion.

There is no agreement on the standard management of frozen shoulder. Treatment options vary from benign neglect to clinical interventions including regular physiotherapy, NSAIDs, oral steroids, intraarticular injections, hydraulic distension and closed manipulation, open surgical release and arthoscopic capsular release.

Quraishi et al.[23] compared MUA with hydraulic distension. In their study 94% of patients were more satisfied after hydraulic distension as compared to 81% of those receiving MUA. Sharma et al[24] recommended hydraulic distension a better option than MUA. Buchbinder et al.[25] have published a randomized, double blind placebo controlled trial which supports the use of hydro dilatation for frozen shoulder.

Our prospective, randomized trial was carried out to determine the effectiveness of the two above mentioned treatment modalities for frozen shoulder in our population. Subjective complaints included pain, sleep loss and limited shoulder motion, which compromised daily activities. Objective findings included decreased glenohumeral motion, especially internal and external rotation. ROM was measured with conventional goniometer. It was difficult to determine the amount of glenohumeral mobility as a part of the total range of abduction and flexion due to scapulothoracic compensation. However some motions of the shoulder can be measured by goniometer with high intraobserver and interobserver reliability, and this approach is commonly used by orthopaedic surgeons[26]. Study limitations included less number of patients in each group and poor patient compliance. The hydraulic distension method had been found preferable over MUA for being easy to perform in OPD, safe with direct and immediate results and moreover cost-effec-

tive. On the other hand, in MUA, apart from anesthesia complications there is small but definite risk of fracture in proximal humerus.[10] There is little long-term advantage in any of the treatment regimens but hydrodistension may benefit pain and ROM in early stages of the condition.

Conclusion

Most of our patients were treated successfully, but that undergoing hydraulic distension did better than those who were manipulated. Hydraulic distension is an OPD procedure that may provide immediate and dramatic benefit to patients suffering from frozen shoulder.

References

1. Pearsall AW, Speer KP. Frozen shoulder syndrome: diagnosis and treatment strategies in the primary care setting. Med Sci Sports Med 1998; 30 (4 suppl): s33-9.
2. Muller LP, Muller LA, Happ J,Kerschbaumer F. Frozen shoulder: a sympathetic dystrophy?. Arch Orthop Trauma Surg 2000; 120: 84-7.
3. Boyle-Walker KL, Gabard DL, Bietsch E, Masek- Van Arsdale DM, Robinson BL. A profile of patients with adhesive capsulitis. J Hand Ther. 1997; 10 (3): 222-8.
4. Scarlat MM, Goldberg BA, Harryman DT. Frozen shoulder in diabetic patients: handle with care; higher incidence suggests the need for early intervention. J Musculoskel Med 2000; 17 (8): 484-8.
5. Halverson L, Maas R. Shoulder joint capsule distension: a case series of patients with frozen shoulders treated in primary care office hydroplasty- Brief report. J Fam Pract 2002; 50: 61-63.
6. O'Kane JW, Jackson S, SidlesJA, Smith KL, Matsen FA. Simple home programme for frozen shoulder to improve patient's assessment of shoulder function and health status. J Am Board Fam Pract 1999; 12: 270-77.
7. Vander Windt DAWM, Koes BW, Deville W, Boeke AJP, de Jong BA, Bouter LM. Effectiveness of corticosteroid injections versus physiotherapy for treatment of painful stiff shoulder in primary care: randomized trial. BMJ 1998; 317: 1292-96.
8. Green S, Buch binder R, Glazier R, Frobes A. Systematic review of randomized controlled trails of intervention for painful shoulder: selection criteria, outcome assessment and efficacy. BMJ 1998; 315; 354-60.
9. Warner JJ, Allen A, Marks PH, Wong P. Arthroscopic release for chronic, refractory adhesive capsulitis of the shoulder. JBJS (Am) 1996; 78: 1808-16.
10. Dodenhoff RM, Levy O, Wilson A, Copenland SA. Manipulation under anesthesia for primary frozen shoulder: effect on early recovery and return to activity. J Shoulder Elbow Surg 2000; 9: 23-26.
11. Bell S, Coghlan J, Richardson M. Hydrodilatation in the management of shoulder capsulitis. Br J Sports Med. 2007 Mar; 41 (3): 167-73.
12. Chambler AW, Carr AJ. The role of surgery in frozen shoulder. JBJS Br 2003; 85: 789-95.
13. Heller K, Forst J, Forst R. Posterior dislocation of the shoulder: recommendations for a classification. Arch Orthop Trauma Surg. 1994; 1B: 228-231.
14. Fareed DO, Gallivan WR. Office management of frozen shoulder syndrome: treatment with hydraulic distension under local anesthesia. Clin Orthopaed Related Res 1989; 242: 177-83.
15. Hannafin JA, Chiaia TA. Adhesive Capsulitis: a treatment approach. Clin Orthop 2000; 372: 95-109.
16. Noel E, Thomas T, Schaeverbeke T, Thomas P, Bonjean M, Revel M. Frozen shoulder. Joint Bone Spine 2000; 67 (5): 393-400.
17. Dodenhoff RM, Levy O, Wilson A, Copeland SA. Manipulation under anesthesia for primary frozen shoulder; effect on early recovery and return to activity. J Shoulder Elbow Surg 2000; 9 (1): 23-6.
18. Ogilvie- Harris DJ, Biggs DJ, Fitsialos DP, MacKay M. The resistant frozen shoulder: manipulation versus arthoscopic release. Clin Orthop. 1995; 319: 238-248.
19. Segmuller HE, Taylor DE, Hogan CS. Arthroscopic treatment of adhesive capsulitis. J Shoulder Elbow Surg. 1995; 4: 403-408.
20. Balci N, Balci MK, Tuzuner S. Shoulder adhesive capsulitis and shoulder ROM in type II diabetes mellitus: association with diabetic complications. J Diabetes complications. 1999; 13: 135-140.
21. Bunker TD, Anthony PP. The pathology of frozen shoulder. JBJS Br. 1995; 77: 677-683.
22. Reichmister JP, Friedman SL. Long term functional results after manipulation of frozen shoulder. Maryland Medical Journal. 1999; 48: 7-11.
23. Quraishi NA, Johnston P, Bayer J, Crowe M, Chakrabarti A. J. A randomized trial comparing manipulation under anesthesia with hydrodilation. JBJS Br. 89-B, 9; 1197-1200.
24. Sharma RK, Bajekal RA, Bhan S. Frozen shoulder syndrome. A comparision of hydraulic distension and manipulation. Int Orthop 1993 Nov; 17 (5): 275-8.
25. Buchbinder R, Green S, Frobes A, Hall S, Lawler G. Arthrographic joint distension with saline and steroid improves function and reduces pain in patients with painful stiff shoulder: result of a randomized double blind, placebo controlled trial. A Rheum Dis 2004; 63: 302-9.
26. Riddle DL, Rothstein JM, Lamb RL. Goniometric reliability in clinical settings: Shoulder measurements. Phys Ther. 1997; 67: 668-673.