

Original Article

FROZEN SHOULDER MANAGEMENT WITH HYDRO DILATATION VERSUS STEROID INJECTION

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Objective: To evaluate and compare the results of treatment of frozen shoulder by hydraulic distension and intra articular steroid injection with alone intra-articular steroid injection.

Methods: Clinical study comprising of two groups was carried out in the orthopedic department of services hospital, Lahore from Sept. 2013 to Dec. 2017. Patients were divided in 2 groups. Group-I was treated by hydraulic distention of gleno-humeral joint with 50 ml normal saline under local anesthesia with steroid followed by oral analgesics and muscle relaxants accompanied by exercises. Patients in group II were treated by intra-articular steroid injection followed by oral analgesics and muscle relaxants accompanied by exercises. Follow-up for both the groups was for 45 days, during the follow-up period both the groups reported pain relief, but patients in group II were unable to return to their normal activities due to less improvement in ROM.

Results: In Group 1 at the end of 45 days 25(86%) patients got complete resolution of pain while 4(14%) patients complained of occasional mild pain (VAS 3 or 4), In group-II 18(60%) patients got a complete resolution of pain while 12(40%), patients complained of occasional pain. The pain relief was statistically insignificant when compared between the two groups (p-values >0.05). The improvement in the standard of living observed in group I patients was statistically significant as compared to group I, p-value<0.001. An immediate and remarkable improvement in range of movement (ROM) 46%-95% was observed in patients of group I as compared to group II. At the end of the 45 day there was marked difference in improvement in ROM 84% in group-I and 63% in Group-II. This difference was much significant (P-Value<0.001). Twenty six (90%) patients in group-I were satisfied with the treatment and 3(10%) were unsatisfactory, while in group-II only 10(33%) were satisfied and 20(67%) were not satisfied.

Conclusions: The study concluded that outcome of treatment of patients in group I was better and statistically significant than group II patients. It is further suggested that for quick, safe and earlier results

Keywords: frozen shoulder, hydraulic distention, intra-articular steroid injection.

Introduction

The term FS was first used by Codman 1932, who described the common features as a gradual onset of pain, inability to sleep on the affected side, painful restriction movements and a normal radiological appearance.¹ More recently, ZuCkerman and Cuomo defined FS, as a condition characterized by substantial restriction of both active and passive shoulder motion that occurs in the absence of any known intrinsic shoulder disorder.² FS has been divided into three stages depending on its symptoms. Freezing phase (painful phase), lasting for 2-9 months. Frozen phase (stiffening phase), lasting for 4-12 months. Thawing phase (recovery phase), may last for 6-9 months.³ Adhesive capsulitis usually occurs during the fourth to sixth decades, a gender predisposition is seen affecting women more often.⁴ A close relationship also exists between FS and diabetes mellitus, the incidence in general population is 2-5% while among diabetics is 10-20%.¹ A wide range

of varying lines of treatment with some success rate have been adapted to date, these include benign neglect, chiropractic manipulation oral corticosteroids, injection of corticosteroids, Physical therapy exercises and modalities, manipulation under anesthesia and arthroscopic and open release of the contracture.² Fareed and Gallivan (1989) treated 20 cases of FS syndrome and concluded that the distension technique of the joint brought immediate resolution of previous pain and resumption of normal sleeps with no side effects.⁵ The current study is conducted to evaluate and compare the results of treatment of frozen Shoulder by hydraulic distension under local anaesthesia with steroid and with intra-articular steroid therapy.

Methods

59 patients with 60 shoulders, clinically diagnosed as FS syndrome were selected and treated as out-patients in the department of orthopedic, Services Hospital, Lahore and PSRD hospital Lahore, from

September 2013 to December 2017. All patients were selected according to an inclusion and exclusion criteria. All patients in this study were between the ages of 30-70 years. Pain stiffness and functional restriction of affected shoulder was for more than one month. Restriction of passive shoulder motion was 100 degree of abduction or less and less than 50% of external rotation as compared with the motion of the contralateral shoulder. All patients with fracture of proximal humerus. Patients having age below 30 years and above 70 years. Patients who refused. Patients having evidence of severe osteoporotic bones on X-rays and shoulder stiffness due to other causes. The selected patients were randomly divided into two groups by lottery method; In Group-I, 30 cases were treated with hydraulic distention of GH joint under local anesthesia with steroid followed by exercises and oral medicine (NSAIDs analgesics and muscles relaxant). In Group-II, 30 cases were studied with intra-articular steroid followed by exercises and oral medicines (NSAIDs, analgesics and muscles relaxants). Patients were managed initially by preparing skin with povidone iodine solution. 03 ml of 1% plain lidocaine was injected into the skin and soft tissues overlying the joint. Thereafter, 3 ml of 1% lidocaine was injected intra-articularly by anterior approach followed by steroid (40 mg triamcinolone acetonide mixed with 2 ml of 1% lidocaine). Distension of the capsule was then performed with 50 ml sterile saline solution. The patient then had active and assisted ROM exercises under supervision. These consisted of pendulum exercises, resisted flexion, extension, internal and external rotation and abduction exercise. Patients were followed with oral medicine (NSAIDs, analgesics and muscles relaxants). The patients continued with regular home physical therapy exercises performed four time daily, assisted by the family. after preparing skin with povidone-iodine solution, intra-articular steroid injection (40 mg triamcinolone acetonide mixed with 3 ml 1% plain lidocaine). The injection was carried out through anterior approach as in group-I, followed with exercises and medicine as in group-I. Follow up examination was done in each group on day 0, 7,15,30,45. When ROM exercises, pain grading, patients satisfaction, complications and activity level was taken note of by the same observer on each visit to decrease interobserver bias. Functional assessment of the shoulder was done by scoring system modified from constant score by constant CR and Murley AHG^{6,7} which is based on the

subjective and objective assessment.

Results

Results were evaluated according to the subjective and objective findings. Pain and daily activities level was grouped as subjective findings while ROM was grouped as objective findings by scoring system modified from constant score by constant CR and Murley AHG.^{6,7} Pain was assessed with visual analogue score (VAS). All patients in group-I and group-II noted immediate pain relief (VAS<3), at the end of 45 days 25(86%) patients got complete resolution of pain while 4(14%) patients complained of occasional mild pain (VAS 3or4)In group-II 18(60%) patients got a complete resolution of pain while 12 (40%), patients complained of occasional pain (**Table-2**). There was no significant difference in pain relief as a whole 97% improvement in group-I and 92% improvement in group-II, the pain relief was statistically insignificant when compared between the two groups (P-values >0.05). Most of the patients in our study complained of extreme difficulty in toileting, personal hygiene problems, combing hair, change of dress. The patients in group-I after hydraulic distension technique got immediate freedom from the aforementioned problems and this technique was much appreciated. 23(79%) patients resumed their full daily activities, however, 06(23%) patients were not fully satisfied. In contrast to group I, most of the patients in group II were not as happy, only 03(10%) patients returned to near full daily activities. 22(73%) patients could achieve half of their daily activities (**Table-3**). The improvement in the standard of living observed in group-I patients was statistically significant as compared to group-II, P-value < 0.001. An immediate and remarkable improvement in range of movement (ROM) 46%-95% was observed in patients of group-I as compared to group-II. This marked difference continued till 45th day. At the end of the 45 day there was marked difference in improvement in ROM 84% in group-I and 63% in Group-II. This difference was much significant (P-Value<0.001). There was maximum improvement in forward elevation and lateral elevation (abduction). 93% and 87% in group-I, 78% and 59% in group-II, respectively, and least improvement in external rotation and internal rotation, 83.5% and 73% in group-I, 63.5% and 53% in group-II respectively. 26(90%) patients in group-I were satisfied with the treatment and 3(10%) were unsatisfactory, while in group-II only 10(33%) were satisfied and 20(67%) were not satisfied.

Table-1: Subjective grading of pain in 29 patients with 30 shoulder in GROUP -I.

Pain	Score	No. of Patients				
		Before Treatment	7 DAY	15 Day	30 Day	45 Day
None	0-2	0	03	15	21	25
Mild	3-4	0	26	14	8	4
Moderate	5-6	25	0	0	0	0
Severe	7-10	04	0	0	0	0

Table-2: Subjective grading of pain in 30 patients with 30 shoulders in Group -II.

Improvement	No. of Patients Group-I	No. of Patients Group-II	Results Assessment
85% - 100%	23	03	Excellent
75% - 84%	14	22	Good
65% - 74%	02	03	Fair
65% or Less	-	02	Poor

Table-3: Improvement in activities of daily living in both groups after 45 days

Pain	Score	No. of Patients				
		Before Treatment	7 DAY	15 Day	30 Day	45 Day
None	0-2	0	03	11	16	18
Mild	3-4	0	27	19	14	12
Moderate	5-6	28	0	0	0	0
Severe	7-10	02	0	0	0	0

Table-4: Improvement in ROM after 45 days.

	No. of Patients Group-I	No. of Patients Group-II
ROM	84%	63%
Forward Evaluation	93% (167°)	78% (140°)
Lateral Evaluation	87% (157°)	59% (160°)
External Evaluation	83.5%	63%
Internal Evaluation	73%	53%

Discussion

FS is a very protracted condition, which only resolves after years rather than months.⁸ Distension treatment has been advocated as giving immediate pain reduction but without any support in the literature.⁹ Review of the previous literature on frozen shoulder demonstrates controversy about which of the many available treatment is best.² A number of different treatments, such as rest and analgesics, NSAID, local or oral steroids physiotherapy, distension of the joint capsule, manipulation or a combination of these have been advocated. No standard treatment regime is universally accepted.¹⁷ Recently arthroscopic treatment and surgical release has been recommended for this condition.⁵

Some studies have found that local steroid injection have some pain relief, but without restoring movements and with no superior effect on the duration of symptoms compared with other treatments e.g. Heat physiotherapy, ice, local analgesic injections manipulation or no treatment. Other studies have reported that local steroid was without advantage compared to physiotherapy or oral non-steroidal anti-inflammatory therapy.⁷ Corticosteroid therapy was suggested in 155 by Crisp and Kendall and since has been advocated in FS with the belief that inflammation has played an important role in the pathogenesis. Naviaser found mild subsynovial inflammation in some cases, with edema, vascular dilatation, and mononuclear cell infiltration. However, Lundberg did not find significant inflammation; excellent response to steroid therapy was also noted in one patient in group-II. Manipulation of the shoulder under general anesthesia with an intra-articular steroid and local anesthetic injection has been recommended for FS. This requires a more costly inpatient stay with general anesthesia and immediate post-operative physiotherapy. There are also risks of fracture of the humeral neck and rupture of the rotator cuff during manipulation. MUA may accelerate recovery but literature has failed to support MUA as a treatment in diabetic patients. A similar study has demonstrated similar short- and long-term outcomes in non-diabetics and diabetic patients.¹⁰⁻¹²

Sharma RK, treated 32 patients, who had FS which had not improved with physiotherapy were treated by manipulation under general anesthesia or by steroid injection and hydraulic distension under local anesthesia and recommended distension technique as it was easy to carry out and gave better results than manipulation.¹³ In a prospective study Van Royen said that hydraulic distension technique and manipulation under local anaesthesia is safe, reliable and effective treatment for frozen shoulder.¹⁴ Fareed and Gallivan treated 20 cases of FS syndrome by hydraulic distension under local anaesthesia. All these patients noted immediate resolution of previous pain and resumption of normal sleep.⁵ The patients in group I of the current study also noted immediate relief of pain and resumption of normal sleep pattern. It was noted by Fareed and Gallivan that the local anaesthetic, lyses adhesions and allows progressive motion.

In a study Loyd JA and Loyd HM, noted that the steroid injections have not been shown to improve the rate of return of shoulder motion. This is in concurrence with our results that did not show

significant improvement in ROM (average 63%) after 45 days in group II. No side effects, other than mild pain during hydraulic distension technique were observed in group-I. One female patient with a previous history of fear of injections, however, went into transient shock (vasovagal) during hydraulic distension technique but recovered immediately by conservation measures.

Conclusion

We conclude by saying that because this technique

is safe, and cost effective and provides immediate relief of symptoms and early return to nearly full function should be considered first in the management of frozen shoulder. Further studies are required to know more about etiology pathology and treatment of FS. These could lead to better understanding of this common, protracted and painful condition.

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References

1. Codman EA. The Shoulder: Ruptures of the supraspinatus tendon and other lesions in or about the subacromial bursa. Boston, MA: Thomas Todd Co, 1934
2. Griggs S.M. Anthony AHN, Green A. Idiopathic Adhesive Capsulitis. A prospective functional outcome study of non operative treatment. The Journal of Bone and Joint Surgery [U.S.] incorporated October 2000. Vol. 82-A. No. 10:1398-1407.
3. Ogawa K, Diagnosis and treatment of periartthritis of the shoulder. Asian Med. J. 41(1) 1998: 29-36.
4. Ekulund AL. And Rydell N. Combination treatment of Adhesive capsulitis of the shoulder Clin. Orthop; 282:1992:105-109
5. Fareed D.O. and Gallivan, W.R. Jr. Office management of frozen shoulder syndrome. Treatment with hydraulic distension under local anaesthesia. Clin. Ortho. 242. 1989. 177-183.
6. Kuhn JE, Blasler R.B. Assessment of outcome in shoulder arthroplasty. Orthopaedic Clinic of North America. Vol.29, (3) July 1998: 549-563.
7. Constant C.R. Murley AHG. A clinical Method of functional assessment of shoulder Clin. Ortho. No. 214, 1997: 160-164.
8. Bunker T.D. Reilly J. Baird K.S. Hamblen D.L. Expression of growth factors, cytokines and matrix metalloproteinases in frozen shoulder. J. Bone Joint Surg. (Br). 2000; 82-B: 768-73.
9. Gam AN. Schydlowsky P, Rossel IB, Remvig L. and Jensen EM. Treatment of "Frozen Shoulder" with distension and Glucorticoid compared with glucorticoid alone. A randomized Controlled trial. Scan. J. Rheumatol 1998; 27: 425-30.
10. Othman A, Taylor G. Manipulation under anaesthesia for frozen shoulder. Int Orthop 2002;26:268-270. 30.
11. Ogilvie-Harris DJ, Biggs DJ, Ftsialos DP, MacKay M. The resistant frozen shoulder. Manipulation versus arthroscopic release. Clin Orthop Relat Res 1995;319:238-248. 31.
12. Wang JP, Huang TF, Ma HL, et al. Manipulation under anaesthesia for frozen shoulder in patients with and without non-insulin dependent diabetes mellitus. Int Orthop 2010;34:1227-123
13. Sharma RK, Bajaj Kal r.A. Bhan S. Frozen shoulder syndrome. A comparison of hydraulic distension and manipulation. Int. Ortho 1993 Nov. 17(5): 275-8.
14. Van Royen BJ, Pavlov PW; Treatment of frozen shoulder by distension and manipulation under local anaesthesia. Int. Orthop. 1996; 20(4): 207-10.