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ROLE OF HYDRAULIC DISTENSION IN THE MANAGEMENT OF FROZEN SHOULDER

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ABSTRACT **BACKGROUND & OBJECTIVES:** Frozen shoulder is a clinical syndrome of unknown etiology characterized by a gradually progressive, painful restriction of all shoulder joint motion, chronicity and slow spontaneous restoration of partial or complete motion over month to year[1].Frozen shoulder treated by hydraulic distension of glenohumeral joint under local anaesthesia is safe, has direct and immediate results, and is cost effective[2] .The purpose of this study was to evaluate the efficacy of hydraulic distension in the treatment of frozen shoulder. **METHODS:** 50 Patients with 54 shoulders of frozen shoulder syndrome (4 cases with bilateral shoulder involvement)were studied in the out and in patient departments of Government General Hospital attached to Kurnool Medical College, Kurnool. All the patients were treated with hydraulic distension under local anesthesia, on an out patients and in patient basis. All these cases were treated from August 2018 to September 2020.Various parameters like pain, range of movements and function of shoulder were assessed on pre distension, post distension and at 6 weeks follow up. Results were graded as excellent, good, fair and poor based on above parameters. **RESULTS:** During post distension period, 4% of the patients had excellent results, 44% good results, 46% fair results and 14% had poor results. At follow up 38% had excellent results, 52% had good results, 16% had fair results and 2% had poor results. **CONCLUSION :** Hydraulic distension is a safe, reliable, cost effective procedure without requiring specialized equipments in the management of frozen shoulder. Under total aseptic precautions, when performed with a right technique, it has absolutely no side effects.

KEYWORDS : Frozen shoulder, Hydraulic distension, Predistension, Local anaesthesia

INTRODUCTION

"Frozen shoulder" is a condition of unknown etiology characterized by a gradually progressive, painful restriction of all shoulder joint motion, chronicity and slow spontaneous restoration of partial or complete motion over months to year.[1]

At times the terms "periarthritis" and "adhesive capsulitis" have been used synonymously with frozen shoulder.

For the past 120 years, the frozen shoulder has been an enigma to orthopaedic surgeons. Perhaps Codman□s description in 1934 best attests to this enigma. "A class of cases which are difficult to define, difficult to treat and difficult to explain from the point of view of pathology.

Other clinical conditions which are to be excluded from frozen shoulder includes, patients with shoulder arthritis, fractures, dislocations, cervical spondylosis, and referred pain. Specific exclusion includes conditions like calcific tendinitis, supraspinatus tendinitis, bicipital tenosynovitis, and subacromial impingement. All these conditions can be excluded by careful history and clinical examination.[2]

PATHOLOGY

The pathologic anatomy was described in detail by Neviaser in 1945. It is primarily an inflammatory reaction in the capsule and synovium that subsequently leads to the formation of adhesions, specifically in the axillary fold and in the attachment of the capsule at the anatomic neck of the humerus. Recent arthroscopic evaluation of patients with arthrographically documented adhesive capsulitis has established four stages of the disease.

Stage I (preadhesive stage): Is seen in patients with minimal or no limitation of motion.
Stage II (acute adhesive synovitis): There is a proliferative synovitis and adhesion formation.
Stage III Stage of maturation: Has less synovitis with loss of axillary fold.
Stage IV-chronic stage: Adhesions are fully mature and markedly restrictive.[6]

OBJECTIVES OF THE STUDY

- To study the efficacy of "Hydraulic distension under local anaesthesia" in the management of frozen shoulder.
- To study the age and sex distribution of frozen shoulder.

MATERIAL AND METHODS

Hydraulic Distension:

Technique. The distension of the affected shoulder was performed in the sitting posture and with all aseptic precautions. The affected side was exposed, painted with povidone iodine solution, cleaned with spirit and draped with a holed sterile towel. The shoulder was palpated and good understanding of the anatomical configuration was made. The arm was held in as much external rotation as possible to facilitate the needle placement into the anterior aspect of the joint. This position was maintained while palpating anatomical landmarks and also during procedure.

The joint space was entered at a point 2 cm below and medial to posterolateral corner of Acromion. 2 ml of 2% injection Xylocaine was injected into the skin and soft tissues over lying the joint capsule.

Distension of the capsule was than performed with normal saline using a 10ml disposable syringe with a 22gauge needle. The quantity of normal saline used for distension depended on the distensibility of the joint capsule. Distension was continued till the resistance was felt. The patient then had active assisted Range of movement exercises. The patients were advised to continue regular home exercises. This consisted of pendulum exercises, resisted flexion, extension, internal and external rotation and abduction exercises performed four times daily.

The patient was sent home with an advice to take a course of antibiotics and analgesics for 5 days. They were followed up at 2 weeks interval, Range of movements and functions were examined, as second distension was repeated if necessary. At 6 weeks follow up examination, function and range of movements were again documented.

INCLUSION CRITERIA:

1) The patients should be co-operative
2) Adhere to rehabilitation program

EXCLUSION CRITERIA:

1) Frozen shoulder that is as a result of fracture of proximal humerus or shoulder dislocation
2) Osteopenia of bones around shoulder
3) Patients who are unable to cooperate with the post manipulation exercise program.

RESULTS :

Fifty patients with 54 shoulders of frozen shoulder syndrome were

treated with Hydraulic distension under local anaesthesia as an out patient procedure in Government General Hospital, Kurnool. The following analysis was made from the data.

Age incidence:
The maximum and minimum age in this study was found to be 80 years and 41 years respectively. The average age of the patients in this study was calculated as 54.16 years.

Sex incidence:
Out of 50 patients followed up 30 were females and 20 were males. The female : male ratio was 1.5 : 1

Side involved:
In this series 4 patients had bilateral involvement. In 14 patients side involved was the dominant arm that is right arm. In 32 cases the left arm that is non dominant arm was involved.

Associated conditions:
Associated conditions in this series are 8 patients had diabetes mellitus, 4 patients had hypertension, 6 patients had osteoarthritis of knee, 2 peptic ulcer, and 1 bronchial asthma were seen.

The pain score in this study before and after distension is as follows:

Table – 1: Comparison of Pre and Post distension pain score

Pain Score	No. of Shoulders			Percentage		
	Pre Distension	Post Distension	Followu p	Pre Distension	Post Distension	Followu p
0	2	0	0	4	0	0
1	16	5	0	32	10	0
2	16	12	3	32	24	6
3	20	23	13	40	46	22
4	0	14	32	0	28	64
5	0	0	8	0	0	16

Table – 2 : Pre and Post distension comparison of range of movements

Range of Movements	No. of Shoulders			Percentage		
	Pre Distension	Post Distension	Followu p	Pre Distensio n	Post Distension	Followu p
0-20	1	0	0	2	0	0
21-40	16	2	1	32	4	2
41-60	9	10	1	18	20	2
61-80	24	10	6	48	20	12
81-100	4	14	6	8	28	12
101-120	0	18	24	0	36	48
121-140	0	0	16	0	0	32

Table – 3: Pre and Post distension comparison of functional scores

Functional Scores	No. of Shoulders			Percentage		
	Pre Distension	Post Distension	Follow up	Pre Distension	Post Distension	Follow up
0	8	1	0	16	2	0
1	10	4	0	20	8	0
2	20	18	8	40	36	16
3	15	28	22	30	56	44
4	1	3	24	2	6	48

Table – 4 : Grading of results

Results	Pain	Range of movement	Function
Excellent	4 & above	111 — 130°	4
Good	3	81 - 110°	3
Fair	2	61- 80°	2
Poor	1	Below 40-60°	1

Table – 5 : Comparison of overall results
The results were as follows:

Results	No. of Shoulders		Percentage	
	Post Distension	Followup	Post Distension	Followup
Excellent	4	22	8	44
Good	24	25	48	50
Fair	20	6	40	12
Poor	6	1	12	2

DISCUSSION:
In this study, a descriptive term "Frozen shoulder" issued to describe a clinical syndrome where the patient has restricted range of movement (both active and passive) for which no other cause can be identified[1].

1) Age incidence: In this study the average age documented was 54.16 years. 42 of the 50 cases were under 60 years. It was observed that frozen shoulder was common in 5th and 6th decades of life[1]. R.J. Neviaser, and T.J. Neviaser, has noted that frozen shoulder is very commonly affected the patients between the age group of 40 to 60 years[5].

2) Sex incidence: The female male ratio in this study is 1.50: 1 was established.

Most authors have documented an female predominance[1,5,6,7].

3) Side affected: In this study there was predominance of the non dominant arm.

Most authors have concluded that there is significant difference in the involvement of dominant arm and non dominant arm[8].

4)Associated diseases:
It is observed that association of diabetes mellitus is very common, particularly in insulin dependent diabetes mellitus.[4,6] In our study there were 8 cases of diabetes mellitus and these were non insulin dependent and were undercontrol.

Treatment of frozen shoulder:
All the patients were managed with hydraulic distension under local anaesthesia without using any sedatives. No complications were noticed and the procedure was well tolerated by the patients.

CONCLUSION

- Frozen shoulder is a clinical syndrome seen in the age group between 40 to 85 years with a mean age of 54.16 years.
- Slight predominance was noticed in female patients
- Excellent results were limited to shoulders treated in early stages of frozen shoulder but improvement was noticed in all shoulders treated by this method.
- About 14% of the diabetics had an associated frozen shoulder. Diabetics are at a relatively high risk, of developing frozen shoulder
- The hydraulic distension done at follow up had no additional advantage.
- The best improvement in their range of movements was observed in forward elevation, than in abduction with minimal to moderate improvement in external rotation.
- Concomitant home exercises program is a must and is the hallmark of success following hydraulic distension.
- Hydraulic distension is a safe, reliable, cost effective procedure without requiring specialized equipments in the management of frozen shoulder.

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