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Evaluation of conservative treatment of frozen shoulder: A clinical study

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Abstract

The frozen shoulder (adhesive capsulitis) is a clinical syndrome complicated by a surfeit of synonyms. The true mechanism has been the grist of innumerable scholarly effort. Strangely the diagnosis is not difficult although the precise cause may be elusive. The present study was conducted upon 100 patients. The inclusion criteria was to consider patients with gradual onset with classical phasic character of the disease, pain in the shoulder joint, limitation of movements which may only be slight in the beginning and objective signs of diffuse tenderness, muscle spasm or wasting of muscles. Once the diagnosis was established, the patients were divided in to three groups which were then managed accordingly with only physiotherapy, steroid and local anaesthesia injection with physiotherapy and manipulation under anaesthesia with local steroid injection. The observations were based on a twelve week follow up study of these cases. Most of the patients were in their sixth decade of life. The mean age of the patients were 50.96 years. In our study, 58% were females whereas 42% were males. 50% of the patients had involvement of right shoulder and in the remaining 50% left shoulder was involved. Only one patient had involvement of both the shoulder joint. In our series, most of the patients came to seek medical advice after some interval from the onset. The majority of them reported between 2-4 months since the onset of symptoms, average duration being 4.3 months. There was appreciable wasting of deltoid and supraspinatus in 57 cases and muscle spasm was there in 43 cases. All the patient had pain at limits of motion. The combined results at the end of 12 weeks follow-up were; out of 100 patients and 101 shoulders (one case bilateral involvement) treated, 44 graded as excellent, 39 as good, 14 as fair and remaining four as poor. The authors believe that the patients with frozen shoulder should be diagnosed promptly and regular follow up is needed for better evaluation of their response to treatment.

Keywords: Adhesive capsulitis, manipulation under anaesthesia, steroid injection, lignocaine

Introduction

The frozen shoulder (Periarthritis shoulder) is a clinical syndrome complicated by a surfeit of synonyms. It may represent the final result of any painful lesion of the shoulder, as well as the most yet to be described. The multifactorial etiology marks the frozen shoulder, for its onset can be occasioned by almost any painful shoulder derangement as well appearing as "Idiopathic adhesive capsulitis", in the absence of any recognizable cause. The common denominator of this syndrome are generally a stiff and painful shoulder, insufficient activity or frank disuse. The true mechanism has been the grist of innumerable scholarly effort. Strangely the diagnosis is not difficult although the precise cause may be elusive. The skiagram shows glenohumeral osteoporosis with high riding humerus and decrease in joint space. The arthrography reveals a contracted capsule, the capacity being reduced to half the normal, with the loss of normal redundant inferior capsular folds.

The present study was prompted, not only by the frequency with which the syndrome is encountered, but is also an attempt to study the clinical picture of the condition and its most common presenting symptoms and to evaluate the various conservative methods of its management at our disposal.

Materials and Methods

The present study was conducted upon 100 patients attending the Orthopaedic Outpatient Department of the Hamidia Hospital, Bhopal with the complains of pain and loss of motion at

glenohumeral joint. After taking a detailed history of the patients, every patient was subjected to proper clinical examination and necessary investigations like blood, urine, skiagram of shoulder joint and cervical spine. Attention was paid to inquire about any trauma around the shoulder or any septic focus in the body. The inclusion criteria was to consider patients with gradual onset with classical phasic character of the disease, pain in the shoulder joint, limitation of movements which may only be slight in the beginning and objective signs of diffuse tenderness, muscle spasm or wasting of muscles.

The patients complaining of gradual onset of pain and limitation of movements at shoulder joint with no obvious history of trauma preceding it were suspected of frozen shoulder. A thorough clinical examination was done in respect of age, sex, occupation and its association with other diseases. The detailed examination of the affected shoulder joint was performed. Movements of the affected shoulder joint were noted before the treatment was started and compared with the normal shoulder joint. Thus, when the case had been fully suspected on clinical grounds the patients were subjected to routine and radiological investigations. Complete haemogram with blood sugar levels was done. Xrays of the shoulder joint was done with the standard technique in anteroposterior and lateral view to find any pathology in and around the shoulder joint. Xray of cervical spine anteroposterior and lateral view were taken to rule out the possible causative factor of the referred pain from various conditions affecting the cervical spine. Thus, when the case history, clinical examination, routine investigations and radiological finding favoured the diagnosis of frozen shoulder the patients were subjected to the presented study.

Once final diagnosis was established the patients were then divided into the following functional groups according to their clinical status at their first consultation.

Group-I: Patients with limitation of abduction and rotational movements mainly, with pain at rest.

Group-II: Patients with severe limitation of movements with pain at rest.

Group-III: Patients with severe limitation of all movements with no pain at rest or on sleeping on the affected shoulder joint.

The management of the various groups was done accordingly

Group-I: Which included sixty of the hundred cases, was subjected to; Physiotherapy treatment supported by medical treatment.

Group-II: It comprised of twenty cases, treated by local injections of; Steroids (Hydrocortisone acetate – 25 mgs.) and lignocaine 2% plus physiotherapy and medical treatment.

Group-III: Which formed the remaining 20 cases, was subjected to; Manipulation under general anaesthesia with local

Hydrocortisone injection in the same sitting into the intra-articular and peri-articular tissues plus physiotherapy and Medical treatment.

Medical treatment

It consisted of analgesics, anti-inflammatory drugs and anti-inflammatory drugs in combination with steroids. Tranquilizers containing 5 mgs. of Diazepam was given to few patients the same night who were taken up for

manipulation, if very painful.

Physiotherapy: Physiotherapy included remedial exercises like pendulum movements in stooping position with arm hanging loose from the shoulder, to draw small to bigger circle by stooping down, exercises on inclination board, crawling the wall with finger tips, and exercises assisted by towel in rubbing the back. Auto-assisted exercises were provided by means of rope and overhead pulley relief from the spasm.

Local Infiltration

The local infiltration with steroids (Hydrocortisone acetate 25 mgs.) and lignocaine 2%, 2ml was done sub-acromially from lateral approach (Lateral border of the acromion) or anterior approach (just lateral to the coracoid process). Hydrocortisone with lignocaine was injected intra-articularly and in some both in intra-articular and periarticular tissues. The autoclave syringe was charged with 25 mg of hydrocortisone and 2ml. of 2% lignocaine hydrochloride, and the needle was pushed into the joint by the side of the coracoids process and half the contents were injected inside the joint. The remaining half were injected into the surrounding tissues by withdrawing the needle from the joint. Strict aseptic precautions were undertaken prior to such injections were given in operation theatre. Lignocaine sensitivity was done in every patient. Three such injections of hydrocortisone and lignocaine were given patients at weekly interval.

Manipulation

Manipulation was done under general anaesthesia. The mainly affected motion of abduction and external rotation were achieved by this method. Lignocaine was given immediately after manipulation. No plaster cast or splint was given to any patient, and physiotherapy began from the very next day.

Follow up:

The patients were routinely followed up at the end of 4, 8 and 12 weeks interval. The final results were evaluated at the end of 12 weeks.

Grading of Result

The efficacy of treatment after 3 months was inferred as follows:

- 1. Excellent:** No pain, no limitation (abduction 135° - 180°) no disability.
- 2. Good:** No pain, some limitation of movement (90° - 135°) and some or no disability.
- 3. Fair:** Some pain, limitation of movement, (45° - 90°) disability present.
- 4. Poor:** Pain and limitation of movement not improved (below 45°)

Observations

In the present study 100 cases of frozen shoulder were included which were treated by various conservative methods. The observations were based on a twelve week follow up study of these cases. Most of the patients were in their sixth decade of life. The mean age of the patients were 50.96 years. In our study, 58% were females whereas 42% were males. 50% of the patients had involvement of right shoulder and in the remaining 50% left shoulder was involved. Only one patient had involvement of both the shoulder joint. Thus, the disease did not have an affinity for any particular side. The majority of the patients in the present series were sedentary workers (35%). In our study, 82 patients had no predisposing factor, ten patients had sustained injuries to the affected limb

some time or the other. The incidence of diabetes mellitus and pulmonary tuberculosis was 2 each. In our series, most of the patients came to seek medical advice after some interval from the onset. The majority of them reported between 2-4 months since the onset of symptoms, average duration being 4.3 months. In all the cases, patients came to hospital with the complaint of pain around the shoulder joint with limitation of movements of the affected shoulder. There was a definite history of radiation of pain down the arm and forearm in majority of cases. In our studies, there was appreciable wasting of deltoid and supraspinatus in 57 cases and muscle spasm was there in 43 cases. All the patients had pain at limits of motion. Tenderness at or around the shoulder joint was present in 85% of the cases. The results with physiotherapy alone, were not very satisfactory as only 50% could be categorized as good result at the end of 12 weeks follow-up and 25% as excellent. None of the patients could reach the category of excellent within 4 weeks of treatment. The results of treatment were satisfactory in patient placed in Group- II treated by intra-articular injection of hydrocortisone and lignocaine plus Group-I. Twelve out of 20 patients had excellent shoulder movements and 7 were placed as good after 12 weeks follow-up. In 1 case there was bilateral involvement of shoulder. Excellent results were achieved in greater percentage of cases in much shorter with manipulation under general anaesthesia than with any other form of treatment. In our study, out of 20 cases manipulated, in 7 patients, excellent results were achieved within 4 weeks, in 15 patients within 5 weeks and in 17 within 12 weeks. Only 3 could not reach the criteria to be grouped as excellent. No complication like fracture neck humerus occurred after manipulation. The combined results at the end of 12 weeks follow-up were; out of 100 patients and 101 shoulders (one case bilateral involvement) treated, 44 graded as excellent, 39 as good, 14 as fair and remaining four as poor.

Discussion

Frozen shoulder is one of the most serious disabilities commonly encountered in Orthopaedics practice and the condition remains constant a challenge. It has been the most observed and puzzling condition of all the common shoulder lesions. Various theories have been propounded by different workers regarding the etiopathogenesis of the disease, but exact nature is yet to be found.

In our series the majority of the cases (36%) were between 50 to 60 years of age and the range was from 25 years to 80 years. Godman, Bechtol and Hitchcock^[1], and Withers^[3] also reported the age incidence to be maximum between 50 to 60 years. In Harmon Paul^[2] series, the common age group was in between 45 to 60 years whereas in Sinha's^[4] series it was 50 to 54 years. The mean age in our series was 50.9 years. Withers^[3] and Sinha *et al.*^[4] found mean age to be 52 years and 49.3 years respectively. In Harmon Paul^[2] series the median age in idiopathic group was 54 years and in secondary group was 49 years. Quigley^[21], DePalma^[5] and Moseley^[20] did not specify any age group but mentioned it to be common in middle age. In DePalma's^[5] series the age ranged from 18 to 74 years. The affection seems to be common in elderly patients because of the sedentary nature of work associated with degenerative changes in the tissues around the shoulder joint. The sex distribution in our series was not very appreciable although in females the incidence was found to be higher (58%). Our finding simulated those of Codman^[6], Lippmann^[7], Sinha *et al.*^[4], Shrivastava^[8], Booth^[9] and Marvel, Codman reported an incidence of 60 to 65%. The

females being commonly affected may be because of less use of the limb at the shoulder joint by them as compared to males. Howarth^[10], Armstrong^[11] (1947), McLaughlin^[12], DePalma^[5], Merca and Duthie and Thakur found incidence to be higher in males. Withers's in DePalma's series the incidence was as high as 72% in males. There exists a difference of opinion among various authors regarding the side of the shoulder affected and each has given an explanation in his favour. In our analysis, the ratio between right and left side affection was 50:51, in one case affection being bilateral. Sinha *et al.* (1962) found left to be commonly involved and thought it to be due to less functional use of the limb. According to them the involvement of right shoulder maybe due to over-work. It is here where Neirager's and Coventry's^[13] hypothesis of 'Disuse' fails. Thakur^[14] detected frozen shoulder more on right side and supported his findings by saying that males are exposed to greater trauma and right shoulder is subjected to greater strain.

The occupation has as important bearing on the development of this clinical entity. The people doing very little manual work suffer invariably. In our series of 100 cases 75% were sedentary workers which included 39 house wives, who were elderly and did very little manual work as they had other female members to look after the house-hold activities. Sinha *et al.*^[4] reported an incidence of 94% in sedentary workers.

Trauma seems to be an important predisposing factor which leads to frozen shoulder. In our series, 10% of the cases had sustained injury to the affected limb at sometime or the other. Sinha *et al.* in their series found history of trauma in 22% of cases. DePalma's analysis of 72 patients revealed direct trauma (minor) in 11 patients and indirect trauma (injuries to wrist etc.) in 14 patients. Frozen shoulder is said to be more frequent when associated with certain diseases. In our series, the incidence of pulmonary tuberculosis, diabetes mellitus and hypertension was 2% each and that of cervical spondylosis and myocardial infarction 1% each respectively 82 patients had no predisposing factor and associated diseases. Codman^[6] and Lippmann^[7] stated that frozen shoulder syndrome is more common when there is coincident cardiovascular disease. Nevaier^[15] also emphasized the occurrence of frozen shoulder as secondary complication of myocardial infarction. He gave an explanation that patients in many instances have severe chest pain as well as referred pain down the left arm and forearm. This, coupled with the fear that may activity will aggravate the already seriously damaged heart, results in frozen shoulder. DePalma, Nevaier and many others recorded greater incidence of frozen shoulder with cardiovascular disorders, pulmonary tuberculosis and metabolic diseases, since emphasis was laid on bed rest while treatment these patients. An association between frozen shoulder and diabetes mellitus has been suggested. Bridgman found in his series of shoulder syndrome. Frykholm^[16] and Wilkinson^[17] consider cervical spondylosis as one of the important causes of frozen shoulder. The symptomatology of frozen shoulder is very characteristic and diagnosis of the frozen shoulder depends upon the lack of both active and passive motion with the scapulothoracic joint allowing the remaining motion. The patient is usually not seen unless the condition is well established. In our series, majority of the patients (41%) reported between 2 to 4 months from the onset of symptoms, the average duration being 4.3 months. Only minority (10%) of the cases reported before two months. In Sinha *et al.* series, average duration was 4.62 months, majority (25%) attended hospital between 4 to 5 months and none reported before two months.

The syndrome exhibits a characteristic cycle of events. The outstanding symptoms in our series were pain in the shoulder region sometimes with distal radiation, and limitation of movements to variable degrees, abduction and rotation being mainly affected. Aching at times increased to the extent that lying on the affected side became uncomfortable and soon impossible. Pain awakening them at night was the common complaint. The patients became aware of the disease only when they were unable to perform certain routine activities like, combing the hair, putting on a shirt, hanging the washed clothes for drying and inability to reach the wallet pocket etc. once the disease was established, weakness of the affected limb was common. The severity of the symptoms slowly and steadily increased while the arc of painless motion at the scapula humeral joint became progressively smaller until little or no motion was demonstrable in the joint. On examination the atrophy of deltoid and supraspinatus muscles is discernible, deltoid being greatest. Only 15% of cases in our series did not have tenderness whereas rest 85% had tenderness over the acromion tip, greater tuberosity of humerus, bicipital groove, along the deltoid insertion, commonest being at the bicipital groove. In the cases reported early, muscle spasm was present. All the patients had pain at the limits of motion. In none of the cases any rise of local temperature or swelling was demonstrable. The clinical picture which DePalma describes resembles what is commonly known as subacromial bursitis or periarthritis of shoulder. In his view the onset is usually insidious but sometimes may be precipitated by strenuous activity. Pain starts at front of shoulder radiating to deltoid insertion usually, and tenderness is elicitable over the bicipital groove. Fowler^[18] found tenderness over the greater tuberosity and generalized sensitiveness around shoulder joint radiating pain was noticed extending upto neck in relation to trapezius, to the occipital region, down the forearm and wrist. Nevaizer describes that as a rule, there are no points of tenderness around the shoulder joint. Moseley^[19] mentions that patient may notice a toothache like pain deep in the area of humeral head and occasionally there may be tenderness along the long head of biceps. In our series of 100 cases 60 were treated by physiotherapy and medicinal treatment. The results at the end of 12 weeks follow up were as follows- excellent 25%, good 50%, fair 18.33%, and poor 6.66%. Twenty cases were taken up for intra-articular therapy combined with physiotherapy and analgesics and after 12 weeks the results were excellent in 54.14%, good in 36.33%, fair in 9.52%. With manipulation combined with intra-articular therapy and physiotherapy the results were most satisfactory, excellent 85%, good 10%, and fair in 5%. In two patients manipulation was done twice. In our series of 20 cases manipulated, 7 had excellent results within 4 weeks, 15 within 8 weeks and 17 in 12 weeks time. With intra-articular therapy, out of 20 cases, only 4 had excellent results in 4 weeks, 9 in 8 weeks and 12 in 12 weeks. By physiotherapy alone out of 60 cases treated none had excellent results in 4 weeks time, 3 were excellent in 8 weeks and 15 by 12 weeks. On comparing the results by different conservative methods, it is seen that manipulation under general anaesthesia combined with intra-articular therapy and physiotherapy, is the method of choice and good results are obtained in greater number of cases in much shorter duration. Withers^[3] in his series treated 26 patients by physiotherapy with radiant heat and achieved full range motion and normal function in 23 cases within 3 and a half months duration. In our series the results were not as good as those of Withers treated by physiotherapeutic measures. In Harmon Paul's

(1958) series of 803 cases – 436 patients (54.3%) were subjected to manipulation and immediate beneficial results were observed in 90% of cases, in which there was sudden snap and release to full passive range, follow up studies 2 to 3 years later to manipulation showed full painless motion in 64 to 94% of cases, lower percentage beyond 60 years of age and cardiac patients. The remaining 367 patients (45.7%) were treated by physiotherapy and excellent results were obtained in 75% cases after a more prolonged time

Sinha *et al.* (1962) in their series of 100 cases, treated 25 by manipulation along with intra-articular injections and got excellent results in 80% and good in 20%. Next satisfactory results were by means of intra-articular hydrocortisone and physiotherapy, combined. Of 20 patients 50% had excellent shoulders, 30% good and 20% poor. Nevaizer (1963) is also of the opinion that manipulation is the treatment of choice and his results had been very satisfactory. Moseley^[19] does not suggest manipulation and has given it up. He recommends physiotherapy with heat and systemic steroids. On the other hand Lee *et al.*^[21] recommends local injection of hydrocortisone combined with physiotherapy as the treatment of choice. Thakur^[14] in his series of 75 cases obtained best results by manipulation combined with intra-articular therapy and 2nd best by intra-articular and periarticular infiltration of hydrocortisone and lignocaine. Our results with manipulation are very much similar to those obtained by Withers, Quigley^[20], Harmon Paul, Roberts and Sullivan, Sinha *et al.* Thakur, Shrivastava and others.

Keeping in mind that the disease (Frozen shoulder) runs a self limiting course the time taken for cure become a prime factor is assessing the results with various conservative methods. In our opinion manipulation combined with intra-articular hydrocortisone and lignocaine is the method of choice. The pain factor which was earlier thought to be severe after manipulation can be much reduced by locally injecting anaesthetics like Lignocaine. The reformation of adhesions after manipulation in post manipulative period is prevented by the hydrocortisone given intra-articularly.

The anesthesia to which the patients were subjected was Thiopentone sodium or Epontol. Epontol was found to be more appropriate as it was short acting (3 to 5 minutes) which is sufficient for manipulating shoulder and no hospitalization was necessary as patient could be sent home soon after manipulation, no side effect whatsoever was encountered after this form of anesthesia.

Summary and Conclusion

A detailed study of frozen shoulder was conducted on 100 patients attending the Orthopaedics out Patient Department of Hamidia Hospital, Bhopal. The literature on the subject (Frozen shoulder) was studied and reviewed in detail. The incidence of the disease in relation to age, sex, occupation and its association with other diseases was determined. Radiological examination was done in every case to exclude it from other conditions resulting in stiff and painful shoulders. The patients were divided into three groups on the basis of presenting symptoms and were treated by different conservative methods accordingly end their end results were assessed. The following conclusions were made- the disease occurs past 40 years of age mostly in the 6th decade of life, more in females and sedentary workers. Pain is usually the presenting symptom, limitation of movement mainly abduction and rotation is the next common complaint. Clinically a triad of signs in the form of (i) limitation of abduction and external rotation in initial stage and in all

planes, in later stage (ii) tenderness mostly over the bicipital groove and (iii) pain at the limits of motion is present in all cases. The treatment is aimed at the relief of pain and increase in the range of motion. The cortisone therapy is a definite advance in the treatment of frozen shoulder. It has reduced the duration of treatment. The manipulation with intra-articular hydrocortisone has further shortened the period of disability by months. The best results were obtained by the method of manipulation under anaesthesia along with intra-articular hydrocortisone. The second best results were by means of infiltration of the joint with hydrocortisone Lignocaine plus physiotherapy. With physiotherapy alone our results had not been very satisfactory.

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