

# Adhesive Capsulitis among Patients Seen in Prince Hashem Military Hospital

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## Abstract

**Objective:** This study was conducted to explore the etiological factors and some clinical profile of patients with Adhesive Capsulitis (AC).

**Methods:** The study was conducted in Prince Hashim Military Hospital at the Physiotherapy department and Rheumatology clinic. Eighty patients fulfilling the criteria for the diagnosis of adhesive capsulitis were included in this study. They suffered from shoulder pain, the range of shoulder movements and the presence of various etiological factors for Adhesive Capsulitis (AC) were examined.

**Results:** Age of the subjects ranged from 20-60 years and the duration of symptoms averaged four months; the left shoulder was more commonly involved (60%), (7.5%) had bilateral involvement and (66%) of the subjects were sedentary workers. Adhesive capsulitis was seen most commonly in patients with diabetes mellitus (39%). Other risk factors included previous myocardial infarction (7.5%), stroke 4%, COPD (5%) and immobilization (7.5%).

**Conclusion:** Adhesive Capsulitis (AC) mostly affects people in the forth up to sixth decade. The majority of the affected individuals have sedentary life style at the time of the sickness and patients with diabetes mellitus may be at a particular risk. Further, detailed studies are needed in this regard for a complete understanding of this painful, disabling and protracted clinical syndrome.

**Keywords:** Chronic Obstructive Pulmonary Disease ( COPD) (chronic bronchitis or emphysema).

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## Introduction

The shoulder is a complex anatomic structure that allows movement in many planes. Physicians, physiotherapists and patients don't often think about the importance of the shoulder joint until its function becomes compromised.

It then becomes obvious how crucial it is for many essential activities. The expression "If you don't use it, you lose it" applies perfectly to diseases of the shoulder because any voluntary or involuntary guarding of the shoulder may result in loss of mobility.

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The term "frozen shoulder" has been loosely applied to conditions when the shoulder is working at less than its optimal range. Diagnosis is usually based only on history and physical examination.

The prevalence of AC is not known in Jordan. Adhesive Capsulitis/(AC) is an important disease because it may lead to severe Capsulitis resulting in prolonged severe disability before resolution occurs, limiting effect on work capacity and its frequent resistance to treatment, disease may follow a variety of conditions including myocardial infarction, diabetes mellitus, pulmonary tuberculosis, trauma and Thyrotoxicosis. Our study examined the clinical characteristics of patients with Adhesive Capsulitis (AC) and the various etiological risk factors associated with AC were also identified.

### **Methods**

Eighty patients with Adhesive Capsulitis (AC) attending the Physiotherapy Department and Rheumatology Clinic at Prince Hashim Military Hospital between Jan, 2002 and December, 2004 were included in this study. Adhesive capsulitis was diagnosed according to Reev's criteria consisting of: 1. Spontaneous shoulder pain persisting for more than 3 weeks, 2. Limitation of shoulder movements especially external rotation by at least 50%, and 3: No clinically or radiographically identifiable lesion of the shoulder.<sup>15</sup> All the 3 criteria were necessary for inclusion in the study.

Severity of pain was categorized as mild (feeling of pain without restriction of daily activity or disturbance of sleep), moderate (pain severe enough to cause restriction of daily activity but no disturbance of sleep), or severe (pain severe enough to restrict daily activity as well as disturb sleep).

Local examination of shoulder included recording of any drop, wasting, weakness, deformity, tenderness, and painful or restricted movements of abduction, external rotation, internal rotation, flexion, and external rotation. The range of individual movements was measured by physiotherapist with respect to sagittal plane of the body. Abduction and external rotation were measured with a universal goniometer. The overhead abduction was taken as 180° and when the arm was by the side of the trunk. External rotation was measured from central position such as arm by the side of the trunk with forearm in mid pronation and elbow flexed to 90°. Internal rotation was quantified by the ability of the patient to touch from behind with the dorsum of the hand: 1. Same side of/ the buttock (score 1); 2. Opposite buttock (score 2);-3. Space between opposite buttock and shoulder across the trunk (score 3); or 4. Opposite scapula across the trunk (score 4).5

The patients were examined for history of diabetes: mellitus, ischemic heart disease hypertension, thyrotoxicosis, chronic bronchitis and pulmonary tuberculosis. Investigations carried out included complete blood count, fasting and post-prandial blood glucose, calcium, phosphorus, uric acid, and alkaline phosphalase. Oral glucose tolerance test was carried out on merits in 50 patients. Plain radiograms of chest, cervical spine, shoulder and 12 lead surface electrocardiograms were taken in ever patient. Immunological tests like rheumatoid factor, antinuclear antibody and immunoglobulin were estimated whenever indicated and subjects with suspected hypothyroidism were subjected to thyroid function tests.

**Results:**

The mean age at the time of presentation was  $46.62 \pm 7.71$  years with the majority of subjects being in their fourth up to fifth decades (Table 1). Mean duration of illness in the subjects was  $4.66 \pm 3.36$  months. Forty-seven of the eighty patients were females with a female to male ratio of 1.2:1. There was no significant difference between males and females with respect to the age at onset of symptoms of AC. Out of the 80 patients, 53 were sedentary workers, 22 were manual laborers, and 5 were supervisory. 48 patients had left shoulder involvement, right shoulder was involved in 26 patients, and 6 patients had bilateral involvement. Mild, moderate, or severe shoulder pain at rest was present in 39, 23 and 18 patients at the time of initial presentation. Females, on the average, more often complained of severe pain than males (53% versus 41.1%; females  $p < 0.05$ ). Internal rotation was affected in all the patients with 4, 46, and 30 patients, having mild (rotation score 3), moderate (score 2), or severe (score 1) limitation of internal rotation. The other joint movements involved more often were those of external rotation and abduction (Table 2).

Twenty percent of the patients (20%) had history of a previous rheumatic disorder in the form of shoulder pain (15%), nuchal pain (6%), osteoarthritis of knee (8%), or non-specific rheumatism (4%). Sixty subjects had no other identifiable associated disease. Non-insulin dependant diabetes mellitus was the most common among the identifiable factors (Table 3). 31 patients had diabetic, 23 were females, all had well-controlled blood sugars (8 patients on oral hypoglycemic agents, one patient on diet therapy alone), and none had any major diabetic complication. The mean age at the time of onset of symptom of AC was  $54.75 \pm 3.4$  years in diabetic males and  $55.65 \pm 5.73$  in diabetic females. The corresponding age in non-diabetic subjects was slightly lower ( $45.5 \pm 6.5$  and  $43.5 \pm 7.15$  years), but the difference between diabetic and non-diabetic subjects was not statistically significant. Overall, diabetic patients tended to have more frequent left sided (31 patients, 38.75%) or bilateral (6 patients 19.3%) involvement compared to non diabetics (49 patients, 61.25%); the difference was not statistically significant.

**Table 1: Age and sex distribution of patients.**

<i>Age Group ( Years)</i>	<i>Male n=33</i>	<i>Female n= 47</i>	<i>Total n= 80</i>
20- 30	4 ( 12.1)	6 ( 12.7)	10 ( 12.5)
31- 40	8 ( 24.2)	14 ( 29.7)	22 ( 27.5)
41- 50	13 ( 39.4)	19 ( 40.4)	32 ( 40)
51- 60	8 ( 24.2)	8 ( 17.02)	16 ( 20)

**Table 2: Range of motion at shoulder joint in patients.**

<i>Movement</i>	<i>Angle of mevement</i>	<i>Refernce standard</i>
	<i>Mean ± SD</i>	<i>( Angle degree)</i>
<i>Flexon</i>	120.50 ± 18.26	0 up to 180
<i>Extension</i>	44.80 ± 09.66	0 up to 90
<i>Abduction</i>	95.44 ± 20.19	0 up to 180
<i>External rotation</i>	34.23 ± 8.12	0 up to 90
<i>Medical rotaion</i>	30.5 ± 12.4	0 up to 90

**Table 3: Associated conditions of adhesive capsulitis in the 80 patients.**

<i>Associated disease</i>	<i>Males n= 33</i>	<i>Females n= 47</i>	<i>N= ( %)</i>
	<i>N= ( %)</i>	<i>N= ( %)</i>	
<i>Diabetes mellitus</i>	8 ( 24.24)	23 ( 40.3)	31 ( 38.75)
<i>Idiopathic</i>	13 ( 39.4)	17 ( 36.1)	30 ( 37.5)
<i>Immobilization *</i>	5 ( 15.1)	14 ( 1.8)	6 ( 7.5)
<i>Myocardial infarction</i>	3 ( 9)	3 ( 5.3)	6 ( 7.5)
<i>COPD</i>	2 ( 6)	1 ( 1.8)	3 ( 3.7)
<i>Stroke</i>	2 ( 6)	2 ( 3.5)	4 ( 3.7)

\* *immobilization due to humeral and elbow fracture*

## Discussion

Shoulder pain is a common complaint in primary care. Shoulder conditions that are characterized by a painful restriction of the passive range of motion, particularly of lateral rotation and abduction, are usually referred to as painful stiff shoulder or capsular syndrome.<sup>2, 8, 15</sup> Diagnosis is usually based only on history and physical examination. The clinical profile of adhesive capsulitis in our study is, at large, consistent with the published literature regarding the problem.

Slight female preponderance, brief duration of illness (4.66 + 3.36 months), and the more frequent involvement of the left shoulder observed in the present study have been reported previously as well.<sup>8- 10</sup> Although our patients had the onset of their illness between fourth and sixth decade of life as is generally true of AC, the mean age of our patients at the time of onset of symptoms (49.62 + 9.71 years) is somewhat lower than noted in the Western literature.

The predominance of sedentary workers as compared to manual laborers in our series of AC patients is, likewise, not in agreement with the published data.<sup>11,12</sup> The small number of patients in our study may account for some of these discrepancies.

Adhesive capsulitis is a clinical description with pathogenic implications as suggested by the alternative designations like frozen shoulder, periarthrititis, pericapsulitis, and obliterative bursitis. The disease is characterized by thickening and contraction of the joint capsule that becomes attached to the humeral head.<sup>4</sup> The pathology does not appear to affect joints other than the shoulder.

A triphasic natural history is characteristic; an initial phase of shoulder pain, a second phase of shoulder immobility, and the last phase of gradual improvement (thawing phase). After passing through the stages of pain, stiffness and recovery, it does not leave any disability after an average period of 30 months from the period of onset,<sup>5,10,14,15</sup> most of our patients had just completed the first phase. Although pain was mostly mild or moderate in intensity, the movements of shoulder were limited in all the planes. Internal rotation, external rotation, and abduction were the predominant areas of limitation with the degree of limitation not significantly correlating with the age or sex of the patient. Such observations regarding AC have been made previously as well though occasional notes of dissent cannot be ignored.<sup>5, 6, 11</sup> Many patients of AC may have preceding non-specific rheumatic symptomatology.<sup>4</sup> However, only a small number of patients (27%) in our study admitted having had previous joint pains, mostly in the same shoulder, before they actually developed pain and limitation of movements related to AC.

Certain disease states are more often than others associated with the tendency to develop AC.<sup>7, 16</sup> We found diabetes mellitus of non-insulin dependent type to be the most common disease associated with AC especially in females.

Most of such patients had well controlled diabetes of more than 5 years duration. Association of AC with diabetes mellitus is well known although the exact etiological link between the two is poorly understood. A tendency to increased fibrosis of shoulder capsule in diabetics may be related to the increased collagen synthesis by fibroblasts or to increased resistance of glycosylated collagen to degradation<sup>4,16</sup> or both.

Diseases that predispose to frozen shoulder probably do so by inducing prolonged shoulder immobilization, such as cerebrovascular accidents, myocardial infarctions, and upper limb fractures can all lead to prolonged shoulder immobilization during their acute and convalescent phases and thereby predispose to AC.<sup>3,5,6</sup> Three of our patients developed AC following prolonged arm immobilization due to placement of central venous line on that side for 3 weeks. Association of chronic lung diseases like chronic bronchitis or emphysema with AC is poorly understood. Probably, immobilization or degenerative lesions of the rotator cuff may be playing some role in the pathogenesis.<sup>13</sup> Despite these well documented disease associations, the causal relationship of any of these to the etiopathogenesis of AC is not entirely clear. This is substantiated by the fact that the majority of our patients had no identifiable risk factor for the development of the syndrome of frozen shoulder. Normal immune marker studies and immunoglobulin profile of these patients dictate against any immune mechanism as the cause.

In conclusion, Adhesive Capsulitis (AC) mostly affects people in the fourth up to sixth decades. The majority of the affected individuals have sedentary life style. Further detailed studies are needed in this regard for a complete understanding of this painful, disabling and protracted clinical syndrome. Until that time, early mobilization and careful physical therapy of the immobilized shoulders may be the only reliable method of prevention and rehabilitation.

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