Original Article

Pain and Disability in Patients Suffering from Adhesive Capsulitis of Shoulder

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Abstract

Study design: Cross-sectional study.
Set up: Department of Physical Medicine and Rehabilitation (PMR), Regional Institute of Medical Sciences, Imphal.
Duration of study: Two years October 2011- September 2013.
Aims and objects: To measure the pain and disability in patients suffering from adhesive capsulitis of shoulder and its relation with stages of adhesive capsulitis.
Study population: Idiopathic adhesive capsulitis patients attending PMR Department who fulfilled the inclusion criteria.
Results: Fifty-six patients suffering idiopathic adhesive capsulitis of the shoulder were included in the study. The mean age of the study population was 56.30±8.17 (range 40-70) years, male comprised 57.1% while female 42.9%. Shoulder ROM showed rotation most restricted followed by abduction, flexion and extension. Mean VAS pain score was highest in stage 1 (80.36±8.42) and lowest in stage 4 (38.33±7.42) and it was found to be statistically significant ($p< 0.001$). Mean SPADI disability score was highest in stage 3 (68.56±5.79) and lowest in stage 1 (41.14±7.90) and found to be statistically significant ($p<0.001$).
Conclusion: Stages of adhesive capsulitis are found to be closely related to pain and functional disability of the patient. SPADI can be used in recording pain and disability in patients suffering from adhesive capsulitis and can be useful in planning the treatment of such patients in local context.

Key words: **Adhesive capsulitis, Shoulder pain and disability index, Visual analogue scale pain.**

Introduction:

Adhesive capsulitis is a painful restriction in shoulder range of motion in a patient with normal radiographs[1]. It has been divided into 4 stages depending on the duration, symptoms and signs[1,2]. The quantification of pain and disability is necessary not only for treatment of the condition, but also for evaluation of outcome measures of impairment and disability. Adhesive capsulitis has a significant impact on the quality of life of the patient and causes functional limitation at every stage of the disease.

A valid and reliable shoulder disability questionnaires: the shoulder pain and disability index (SPADI)[3] was used in this study. It is a self administered questionnaire consisting of two dimensions, pain (5 items) and disability (8 items) and requires 5-10 minutes for a patient to complete. The pain dimension measures the severity of the pain, disability dimension measures the degree of difficulty an individual has with various activities of daily living (ADL) that require use of upper extremity.

As limited studies have been carried out in this part of the country to assess the pain and functional disability in adhesive capsulitis patients, the present study carried

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out in our clinical settings to measure the pain and functional disability pattern on patients suffering from idiopathic adhesive capsulitis of shoulder.

Materials and Methods:

In this cross-sectional study carried out during October 2011- September 2013, a total of 56 patients diagnosed as idiopathic adhesive capsulitis of the shoulder, the age group being 40-70 years were included. Approval from Institutional Ethics Committee (IEC), RIMS, Imphal was taken before starting the study.

We exclude adhesive capsulitis patients resulting from trauma, surgery, bony metastasis, rheumatoid arthritis, etc. All the patients recruited for the study were subjected to detailed history along with stages of the disease, clinical examination including VAS pain and shoulder range of motion (ROM), laboratory, radiological investigations and SPADI questionnaire. The SPADI was translated into local language and pre-testing of the SPADI Manipuri version was done in 10 patients in a target population by using the probe technique.[4] The final accepted Manipuri version was then used for the study purpose. Pain was measured by visual analogue scale (VAS), ROM of shoulder by universal goniometer, shoulder pain and disability index (SPADI) questionnaire was administered and data was recorded in pretested proforma for each of the patient.

Two of the disability questionnaire ie, 'Putting on your pants' was modified to 'putting on your sarong' (garment consisting of long piece of cloth wrapped round the body and tucked round the waist) and 'removing something from your back pocket' was also modified to 'reaching back of waist by back of hand' for female patients.

The SPADI pain score, SPADI disability score were calculated separately from the two sub-items. Then the means of the two subscales were averaged to produce a total SPADI score ranging from 0 (best) to 100 (worst).

Statistical Analysis:

Data collected were recorded in microsoft excel and analysed by using SPSS version 16. The mean difference between the scores of ROM of shoulder, VAS pain, SPADI pain score, SPADI disability score, SPADI total score and stages of adhesive capsulitis were analysed by using analysis of variance(ANOVA) test and post hoc analysis. $P<0.05$ was taken as significant for all tests.

Results and Observations:

Out of 56 patients included, the mean age of the patients was 56.30± 8.17 years. Male comprised 57.1% and female 42.9% (Table 1). Between the age group 40 and 70years, 51-60 years group contributed 44.6% (Fig 1).

Table 1: *Demographic Profile of the Study Subject*

Parameters		Mean ± SD	No. of cases (%)
Age in years		56.30 ±8.17	
Sex	Male		32 (57.1%)
	Female		24 (42.9%)
Duration of illness (in months)		4.05 ± 3.06	
Side	Right		29 (51.8%)
	Left		27 (48.2%)

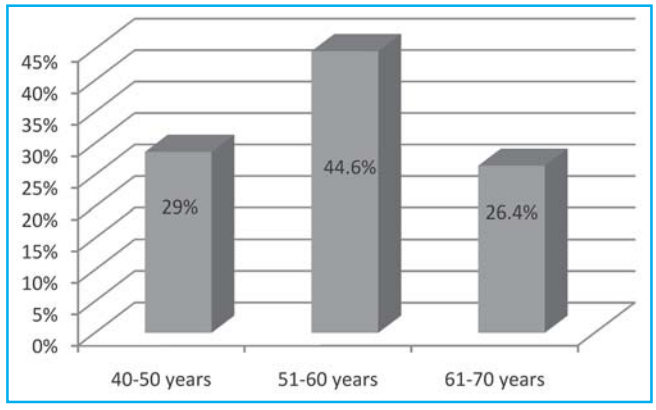

Fig 1- *Showing Age in Years*

ROM of shoulder was restricted in all the ranges; rotation was found to be most restricted followed by abduction, flexion and extension. The percentage of restriction calculated from full range was internal rotation 69%, external rotation 67%, abduction 44% and flexion 28%, with internal rotation showing the maximum restricted range.

Mean SPADI pain score was 61.52±9.74 and mean SPADI disability score was 54.46±11.93. Mean total SPADI score was 57.25±8.15 indicating moderate amount of pain and disability in our study population.

Distribution of mean scores of ROM, VAS pain, SPADI pain, SPADI disability, SPADI total score in relation to stages of adhesive capsulitis were calculated by ANOVA test.

Mean score shoulder ROM- flexion/extension arc (240 degrees), IR/ER arc (160 degrees), abduction (180 degrees), in relation to different stages of adhesive

Table 2: *Distribution of Mean Score ROM, VAS Pain, SPADI Pain, SPADI Disability, SPADI Total Score in Relation to Stages of Adhesive Capsulitis by Analysis of Variance(ANOVA) Test*

Variable	Stage 1	Stage 2	Stage 3	Stage 4	F value	P value
#Flex/ Ext arc	194.29±37.151	170.00±29.221	178.89±51.586	165.00±42.308	2.178	0.146
## IR/ER arc	58.57±25.603	39.63±28.787	65.00±53.151	75.00±40.866	1.656	0.204
Abduction	110.71±37.512	95.19±28.335	106.67±32.404	108.33±34.303	0.001	0.977
VAS pain	80.36±8.42	62.78±8.35	57.78±12.01	38.33±7.42	94.111	0.000***
SPADI pain score	66.36±7.821	58.30±10.178	66.22±8.393	57.67±7.421	1.336	0.253
SPADI disability score	41.14±7.90	58.81±6.75	68.56±5.79	44.83±6.85	17.628	0.000***
SPADI total score	51.86±7.04	58.41±5.97	67.22±5.54	49.67±5.53	3.150	0.082

Flexion/ extension arc in degrees; ## Internal rotation/ external rotation arc in degrees; *** p <0.001

capsulitis (Table 2). Among the 4 stages, maximum restriction from full range in terms of shoulder ROM was observed in stage 2 and stage 4. In IR/ER arc and abduction, stage 2 showed the most restricted range. The mean score difference between flexion/ extension arc, IR/ER arc, abduction and stages of adhesive capsulitis were found to be statistically not significant.

In the distribution of mean VAS pain score and SPADI scores (viz, SPADI pain, SPADI disability, total SPADI) in relation to stages of adhesive capsulitis, we observed that only mean VAS pain score and SPADI disability score were significant($p<0.001$). Post hoc analysis showed significant differences between mean VAS pain score, mean SPADI disability score and stages of adhesive capsulitis ($p<0.001$) (Table 3).

Discussion:

In this study, the mean age of the study population was 56.30±8.17 years (range: 40-70 years) similar to studies reported by Marx *et al*[5], Quraishi *et al*[6], Tveita *et al*[7], Vora[8] where they stated that adhesive capsulitis was most common during 4th to 7th decades of life. Frequency of males were more than females in contrast to earlier study conducted by Binder *et al*[9]. This may be due to the small sample size in this study. But similar results were also found by Vora[8] and Siraj *et al*[10], where the frequency was more in males compared to females. In this study limitation of shoulder ROM was found in all the ranges. The finding was in agreement with that Marx *et al*[5] and Kivimaki and Pohjolainen[11].

The mean scores of SPADI pain, SPADI disability and total SPADI score were 61.52±9.74, 54.46±11.93, 57.25±8.15 respectively. Our findings showed similar results observed by Tveita *et al*[7] and Oster *et al*[12]. It also showed that different stages of adhesive capsulitis were responsible for different pain score, disability score and total SPADI score.

Table 3: *Difference of Mean VAS Pain Score, Mean SPADI Disability Score among Stages of Adhesive Capsulitis*

Variable	Stage	Stage	Mean difference±SE	P value
VAS pain	Stage 1	Stage 2	17.579±2.952	.000
		Stage 3	22.579±3.830	.000
		Stage 4	42.024±4.374	.000
	Stage 2	Stage 3	5.000±3.450	.920
		Stage 4	24.444±4.046	.000
	Stage 3	Stage 4	19.444±4.725	.001
SPADI disability score	Stage 1	Stage 2	-17.672±2.284	.000
		Stage 3	-27.413±2.963	.000
		Stage 4	-3.690±3.384	1.000
	Stage 2	Stage 3	-9.741±2.669	.004
		Stage 4	13.981±3.130	.000
	Stage 3	Stage 4	23.722±3.655	.000

VAS pain score was highest in stage 1 (80.36±8.42), decreased in 2nd and 3rd stages and lowest in stage 4 (38.33±7.42). Also observed by Hannafin and Chiaia[2] in their study, pain was more in stage 1 and gradually decreased as the duration of illness increased. This was also found to be statistically significant in the present study ($p<0.001$).

Mean SPADI pain score was highest in stage 1(66.36±7.821) and stage 3 (66.22±8.393). This showed that some activities can still produce pain irrespective of stages of the disease. But the above findings were found to be statistically not significant. Mean SPADI disability score was highest in stage 3 (68.56±5.79) and lowest in stage1 (41.14±7.90). This was found to be statistically significant ($p<0.001$). Our findings was in agreement with that of Hannafin and Chiaia[2] where they also stated that patients in stage 3 presented with significant limitation of motion with rigid end feel. Mean SPADI total score was highest in stage 3 (67.22±5.54) when compared to other stages. As noted earlier by Hannafin and Chiaia[2], in presence of pain, limitation in ROM was maximum in stage 3. However, the above finding was not statistically significant.

Few limitations of SPADI were noted when analyzing the data collected in our study. Certain functional items seemed to be related with pain items that included 'reaching' and 'carrying heavy weight' component. However, it was uncertain whether the two could be assessed separately in this way since pain and disability might be very closely related to the daily functional activities performed by these patients. Difficulty in doing activities involving above items might be related to pain that is difficult to differentiate from the stiffness component while performing these activities. Tveita *et al*[7] also shared such limitations where they also reported the difficulty in differentiating between the two factors.

Conclusion:

From the present study we found that adhesive capsulitis can be a persistent and often disabling condition affecting both sexes in their 4th to 7th decades of life. Pain and restriction of shoulder was found in all the stages of adhesive capsulitis. Shoulder pain and disability index serves an useful tool for measuring pain and disability in patients with adhesive capsulitis. It measures the extent of pain and how it affects an individual on activities of daily living.

We also found that stages of adhesive capsulitis were closely related to amount of pain and disability in our study population. SPADI can be used in recording pain and disability in patients suffering from adhesive capsulitis and can be useful in planning the treatment of such cases.

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