

Pain, Disability and Sleep Quality in Patients With Rotator Cuff Tendinopathy and Concurrent Myofascial Pain

Morteza Nakhaei Amroodi,¹ Hadi Sedghi Asl,¹ Mostafa Salariyeh,^{1*} and Mir Bahram Safari²

¹Bone and Joint Reconstruction Research Center, Shafa Orthopedic Hospital, Iran University of Medical Sciences, Tehran, IR Iran

²Imam University Hospital, Urmia University of Medical Sciences, Urmia, IR Iran

*Corresponding author: Mostafa Salariyeh, Bone and Joint Reconstruction Research Center, Shafa Orthopedic Hospital, Iran University of Medical Sciences, Tehran, IR Iran. Tel: +98-9126212291, E-mail: m_salariye@yahoo.com

Received 2015 November 20; Revised 2016 February 26; Accepted 2016 April 03.

Abstract

Background: Rotator cuff tendinopathy and concurrent myofascial pain may result in sleep disturbances, poor quality of life, and social dysfunction along with chronic annoying pain and progressive physical disability.

Objectives: The present study aimed to assess severity of pain, physical disability, and sleep quality in patients with rotator cuff tendinopathy and concurrent myofascial pain.

Patients and Methods: This case-control study was conducted on 30 consecutive patients with rotator cuff tendinopathy without tear (impingement syndrome) and concurrent myofascial pain referred to the shoulder clinic in Shafa-Yahyaian Hospital during year 2014 (January to April). Eighteen gender and age-matched healthy individuals without any history of rotator cuff tendinopathy were included as controls. Along with baseline assessment, for determining the level of arm, shoulder and hand disability, the quick disabilities of the arm, shoulder and hand questionnaire was also used. Sleep quality was assessed by the pittsburgh sleep quality index (PSQI).

Results: Compared to healthy individuals, the mean shoulder disability score was significantly higher in the patient group ($P = 0.001$). Also, regarding sleep quality, the mean score was significantly higher in the patient group when compared with healthy subjects ($P = 0.002$).

Conclusions: Patients with rotator cuff tendinopathy concurrent with myofascial pain experienced low level of sleep quality along with severe pain and physical disability. In order to improve clinical outcome of these patients, improving physical function and sleep quality in these patients is necessary.

Keywords: Impingement Syndrome, Shoulder, Myofascial Pain, Sleep

1. Background

Pain and disabilities due to shoulder pathological abnormalities are very common musculoskeletal complaints (1). One of the common forms of these pathologies, is rotator cuff tendinopathy with an overall incidence rate of 0.3% to 5.5% and an overall prevalence rate of 0.5% to 7.4% (2, 3). The vast majority of orthopedic visits are specified to rotator cuff tendinopathy and its related complications (4). These problems are the main reasons of pain and disability affecting various physical, psychological and social aspects of life (5). Because of the multifactorial etiology for rotator cuff tendinopathy and the lack of a definitive treatment for this pathology, pain and disability may remain for a long-time leading to worsening of the patient's function and impaired quality of life (1). These functional disabilities and poor clinical consequences of rotator cuff tendinopathy may be more prevalent in some subgroups of patients including older individuals, patients with occupational states with poor postures, and athletes with ex-

cessive exercise programs (6). Furthermore, concurrent occurrence of this disease with other common pathologies such as myofascial pain may deteriorate long-term functional status, result in poorer quality of life, and lead to sleep diseases in the affected patients (7). In fact, this correlation is related to chronic annoying pain and progressive physical disability, sleep disturbances, poor quality of life and social dysfunction (7). Because of prolongation and continuity of pain in these two abnormal conditions, impaired sleep quality is a predictable consequence (8).

2. Objectives

The aim of the present study was to assess pain, disability, and sleep quality in patients with rotator cuff tendinopathy and concurrent myofascial pain. We reviewed and compared our findings in the patient and control groups. The findings were compared with other similar studies.

3. Patients and Methods

3.1. Patients

This case-control study was conducted on 30 consecutive patients with rotator cuff tendinopathy without tear (impingement syndrome) and myofascial pain, according to clinical evaluation and confirmation with plain radiography and magnetic resonance imaging (MRI) (1.5 Tesla), from January to April 2014. The possible trigger points around the shoulder on trapezius, superomedial border of scapula, infraspinatus, teres minor, deltoid, pectoralis minor, and scalene muscles were examined by a single shoulder subspecialist. Inclusion criteria of the study were a diagnosis of subacromial impingement syndrome and concurrent myofascial pain. Exclusion criteria were previous shoulder trauma, history of shoulder surgery, age \leq 18 years or \geq 60 years, diagnosis of cervical pathology, or other shoulder pathologies such as a frozen shoulder.

Furthermore, 18 gender and age-matched healthy individuals without any history of proven rotator cuff tendinopathy were included as the control group. The control group included volunteers from the normal population composed of healthy individuals accompanying the patients at our shoulder clinic who matched the inclusion and exclusion criteria. They could not have any symptoms or signs of rotator cuff tendinopathy in their history and shoulder examination. This study was approved by our institutional review board.

3.2. Assessments

Baseline characteristics of the participants were collected by face-to-face interviews and detailed physical examination. Demographic data such as pain radiation, triggering factors, history of physical or psychological diseases, results of electromyography if available, and the findings of shoulder examination were recorded.

The level of arm, shoulder and hand disability was assessed by the quick disabilities of the arm, shoulder and hand questionnaire (Quick DASH score). This tool is scored in two components including the disability/symptom section (11 items, scored 1 - 5) and the optional high performance sport/music or work modules (four items, scored 1 - 5). The assigned values for all completed responses are simply summed and averaged, producing a score out of five. This value is then transformed to a score out of 100 by subtracting one and multiplying by 25. This transformation is done to make the score easier to compare with other measures scaled on a 0 - 100 scale. A higher score indicates greater disability (9).

Sleep quality was assessed by the Pittsburgh sleep quality index (PSQI). This tool differentiates poor from good

sleep by measuring seven domains: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction over the last month. In scoring the PSQI, seven component scores are derived, each scored zero (no difficulty) to three (severe difficulty). The component scores are summed to produce a global score (range 0 to 21). Higher scores indicate worse sleep quality (10).

3.3. Statistical Analysis

Results were presented as mean \pm standard deviation (SD) for quantitative variables and were summarized by absolute frequencies and percentages for categorical variables. Continuous variables and data that did not appear to have a normal distribution or when the assumption of equal variances was violated across the groups, data were compared using the t test or non-parametric Mann-Whitney U test. Categorical variables were compared using the chi-square test or Fisher's exact test when more than 20% of cells with expected count of less than five were observed. Multivariate regression models were used to determine major predictors of the level of disability or sleep quality. For the statistical analysis, the SPSS software version 20.0 for windows (SPSS Inc., Chicago, IL) was used. P values of 0.05 or less were considered statistically significant.

4. Results

As shown in Table 1, the group with rotator cuff tendinopathy and myofascial pain and the healthy group were similar in mean age and gender distribution. However, with respect to occupational status, heavy and moderate manual jobs were more prevalent in the patient group ($P = 0.002$), while the healthy group contained higher frequencies of students and athletes ($P < 0.001$). Side of involvement and dexterity was not different between the two groups ($P = 0.090$). With regards to triggering factors, work injuries were more common in the patient group than in the healthy subjects ($P = 0.002$). Prevalence of pain on base of neck or trapezius region was considerably higher in the patient group ($P = 0.001$). Also, patients with rotator cuff tendinopathy experienced more pain during sleep than the healthy individuals ($P = 0.001$). There was no difference in the occurrence of sharp or vague pain, history of depression or history of neck problem; whereas appearance of burning pain ($P = 0.016$) and numbness ($P = 0.002$) in hands was more common in the patient group.

As shown in Table 2, in the patient group, a considerable reduction in both active and passive range of motions was observed. Mean range of active forward flexion was 157

Table 1. Baseline Characteristics and Clinical Data of the Study Population

Characteristics	Case Group (n = 30)	Control Group (n = 18)	P Value
Male gender	21 (70.0)	14 (77.8)	0.889
Age, y	50.48 ± 12.36	49.11 ± 14.97	0.775
Right dexterity	25 (86.2)	10 (83.3)	0.813
Occupational status			
Heavy- Manual Labor	5 (16.7)	0 (0.0)	0.002
Moderate labor	19 (63.3)	0 (0.0)	< 0.001
Student	2 (6.7)	8 (50.0)	< 0.001
Athlete	0 (0.0)	4 (25.0)	0.006
Others	4 (13.3)	4 (25.0)	0.123
Side of involvement			
Right	17 (56.7)	14 (87.5)	
Left	10 (33.3)	2 (12.5)	
Bilateral	3 (10.0)	0 (0.0)	
Triggering factor			
Sports injury	2 (6.7)	8 (50.0)	< 0.001
Work injury	12 (40.0)	2 (12.5)	0.002
Over use	11 (36.7)	6 (37.5)	0.776
Other	8 (26.7)	0 (0.0)	0.002
Previous similar problem			
	8 (26.7)	0 (0.0)	0.016
Location of pain			
Outer side (Deltoid region)	18 (60.0)	6 (33.3)	0.074
Back	4 (13.3)	2 (11.1)	0.822
Upper	6 (20.0)	6 (33.3)	0.302
Shoulder blade	6 (20.0)	2 (11.1)	0.424
Base of neck /Trapezius region	18 (60.0)	2 (11.1)	0.001
Etiology			
High work load	25 (83.3)	8 (44.4)	0.005
Overhead activity	19 (63.3)	8 (44.4)	0.202
Throwing exercise	2 (6.7)	2 (11.1)	0.590
Lifting	9 (30.0)	2 (11.1)	0.132
Pushing objects on the floor	4 (13.3)	0 (0.0)	0.106
Clothing	13 (43.3)	2 (11.1)	0.020
Take hand to the back	13 (43.3)	0 (0.0)	0.001
Pain during sleep			
	23 (76.7)	2 (11.1)	0.001
Knick out			
	12 (40.0)	2 (11.1)	0.033
Loose neck			
	3 (10.0)	0 (0.0)	0.166
Quality of problem			
Sharp pain	3 (10.0)	4 (22.2)	0.245
Vague pain	17 (56.7)	14 (77.8)	0.139
Burning pain	8 (26.7)	0 (0.0)	0.016
Numbness in hands	12 (40.0)	0 (0.0)	0.002
History of depression			
	6 (20.0)	2 (11.1)	0.424
History of corticosteroid injection			
	13 (43.3)	0 (0.0)	0.001
History of physiotherapy			
	23 (76.7)	4 (22.2)	< 0.001
History of trauma			
	8 (28.6)	2 (11.1)	0.034
History of neck problem			
	10 (34.5)	8 (44.4)	0.610

± 38 (versus 173 ± 5), and passive shoulder range of motion in forward flexion was 173 ± 9 (versus 178 ± 8).

The mean Quick DASH score in patients with rotator

cuff tendinopathy was significantly higher than in healthy individuals (38.58 ± 16.18 versus 21.19 ± 15.03, P = 0.001). Also the mean Pittsburgh sleep quality index (PSQI) score

was significantly higher in patients than the control group (17.75 ± 9.16 versus 9.95 ± 5.25 , $P = 0.002$).

Table 2. The Results of Range of Motion (ROM)

Characteristics	Case Group (n = 30)	Control Group (n = 18)
Total active shoulder ROM		
Forward flexion	157 ± 38	173 ± 5
Abduction	152 ± 41	171 ± 6
External rotation	45 ± 18	48 ± 10
Passive shoulder ROM		
Forward flexion	173 ± 9	176 ± 8
Abduction	161 ± 3	172 ± 5
External rotation	48 ± 16	53 ± 10

5. Discussion

There is no clear therapeutic strategy for surgical or nonsurgical treatment of rotator cuff pathologies. However, a few studies focused on patient's different physical, psychological and even social aspects of function (1). A few articles addressed sleep quality in patients who concurrently had tendinopathy and myofascial pain (7). We attempt to present a clear vision on level of disabilities and also sleep quality changes in patients who concurrently had rotator cuff tendinopathy and myofascial pain. Pain can limit range of motions, and affected patients may experience low level of sleep quality as well as daily life impairment that affects their routine physical, mental and social functions. In our study the mean Quick DASH score in patients with rotator cuff tendinopathy was significantly higher than in healthy individuals ($P = 0.001$).

In a similar study by Nakajima and colleagues (11) on 462 individuals (924 shoulders), not only those in the tear group showed significantly lower total simple shoulder Test scores than in the non-tear group, but also a significant difference was observed regarding the ability to sleep comfortably in the former group. In addition severe pain, disability and limitation of shoulder range of motions can alter the patient's quality of life. They concluded that the patients with rotator cuff tears experience night pain in the shoulder, and muscle weakness during shoulder elevation that can result in lowered sleep quality and thus lead to restriction of activities of daily living. Fahlstrom and coworkers (12) in a study on 88 international top-level badminton players during the world mixed team championships, revealed that the pain due to rotator cuff tendinopathy can be associated with shoulder stiffness that finally result in

sleep disturbances, changes in training and competition habits, and also impairment of the activities of daily living. In our study, compared to the control group, rotator cuff tendinopathy was associated with decreased range of motion and higher PSQI score indicating shoulder stiffness and sleep disturbances, respectively.

Largacha and colleagues (13) during a ten-year period on 2674 patients, showed that 81% of patients with deficits in shoulder function were unable to sleep on the affected side, and 71% were unable to wash the back of their opposite shoulder. Therefore, pain and deterioration of function can affect different components of patient's quality of life including physical, mental, and general health. In this regard, the best strategy is diagnosis and treatment of concurrent rotator cuff tendinopathy and myofascial pain in order to decrease dysfunctions and improve different living aspects such as sleep quality, and psychological problems. In another study, Smith et al. (14) analyzed a total of 191 patients with full-thickness tears documented by imaging tests and/or surgical observation; a functional deficit was the inability to sleep on the affected side (86%). The results of our study revealed that the presence of pain during sleep is more prevalent in patients with rotator cuff tendinopathy and concurrent myofascial pain than individuals without tendinopathy ($P = 0.001$).

Tekeoglu et al. (15) studied forty patients with shoulder impingement syndrome and forty-three of age and gender matched healthy subjects using the Pittsburgh sleep quality index (PSQI). There was a significant difference between the patient and control groups in PSQI scores ($P < 0.01$). They concluded that patients with shoulder pain due to subacromial impingement may benefit from painkillers and cognitive-behavioral interventions that specifically target sleep disturbances. In our study 30 patients with subacromial impingement were compared with 18 cases in the control group. Similar to the mentioned study, the mean Pittsburgh sleep quality index (PSQI) score was significantly higher in our patients than control group ($P = 0.002$).

In another study on 56 patients undergoing arthroscopic rotator cuff repair for full-thickness tears, Austin et al. (16) showed the presence of sleep disturbances in 89% of the patients. After arthroscopic repair, a statistically significant improvement in PSQI was achieved at three months ($P = 0.001$) and continued through six months ($P = 0.017$). They did not compare these disturbances with those in the healthy individuals. Our study showed that sleep quality is worse in patients with subacromial impingement and concurrent myofascial pain than individuals without shoulder disease ($P = 0.002$).

In conclusion, a notable number of patients with rotator cuff tendinopathy concurrently with myofascial pain

experienced low level of sleep quality along with pain and physical disability that can adversely affect different aspects of daily living. In order to improve clinical conditions of these patients, a focus on both physical function and treatment of possible trigger points and sleep quality can be helpful.

Footnote

Authors' Contribution: Study design, Morteza Nakhaei Amroodi; data acquisition, Morteza Nakhaei Amroodi, Hadi Sedghi Asl, Mostafa Salariyeh and Mir Bahram Safari; manuscript preparation and revision, Morteza Nakhaei Amroodi, Hadi Sedghi Asl, Mostafa Salariyeh and Mir Bahram Safari; study supervision, Morteza Nakhaei Amroodi, Hadi Sedghi Asl, Mostafa Salariyeh and Mir Bahram Safari.

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