

Clinical Research

The Role of Psychological Stress in the Development of Chronic Pain Syndrome in Patients with Osteoarthritis

Alexander V. Karnitsky, PhD^{a*}, Dmitry Y. Sagin^b

^aOmsk State Medical Academy, ^bCenter of Rehabilitation Therapy "Rus",
Omsk, Russian Federation

Abstract

Background. Osteoarthritis has been identified as the commonest cause of chronic pain. Chronic pain syndrome significantly limits the functionality of patients with osteoarthritis and reduces their quality of life. Besides the organic changes in the joints, a large part of the development of chronic pain is due to psychological factors. Psychological stress can manifest itself as neuropsychic tension and negative emotional experiences. Psychological stress is accepted today as an important factor leading to the development of chronic pain syndrome in patients with joint disorders. The **purpose** of this study is to identify and assess the severity of psychological stress in those patients with osteoarthritis and chronic pain syndrome in the Rehabilitation Department. **Methods.** The study included 50 patients, ranging in age from 24 to 73 years (the average age being 58 years), suffering with osteoarthritis, showing degeneration of the lower extremities (coxarthrosis, gonarthrosis). All the patients underwent x-rays of the affected joints. Joint mobility was assessed by the orthopedist. Assessment of the pain syndrome was conducted, both at the time of admission and at discharge, on the digital and visual analog scales. Right at the beginning of treatment psychological testing was performed using the PSM-25 questionnaire. (The scale of PSM-25 is designed to measure the nature of the stress experienced. It is a translation and adaptation of the Russian version of testing techniques performed by NE Vodopyanova.). **Results.** The presence of a statistically significant correlation between the psychological stress levels and the intensity of pain syndrome in patients with osteoarthritis in the Rehabilitation Department was observed. **Conclusions.** Psychological stress is one of the important factors leading to the development of chronic pain syndrome in patients with osteoarthritis. IJBM 2011;1(2):84-86. © 2011 International Medical Research and Development Corporation. All rights reserved.

Key words: stress; psychological; pain; osteoarthritis.

Introduction

Pain syndrome is the main factor limiting the activity of patients with osteoarthritis [1]. Therefore, chronic pain syndrome becomes a serious problem, significantly limiting the possibilities of rehabilitation treatment of such patients [2].

Interestingly, no correlation appears to exist between the x-ray phase and clinical manifestations of the disease, including the severity of pain syndrome with

osteoarthritis: On X-ray studies, manifestations of osteoarthritis are observed in approximately 30% of the adult population whereas the pain syndrome develops only in 10-12% of them [2].

Chronic pain often represents the inadequately high, long-term and stable response to those or other damaging factors [3].

Pain perception depends not only on the site and type of damage, but also on the patient's psychological status. Both psychological and social issues have been duly recognized to significantly impact pain management [4-14].

The biopsychosociocultural concept of pain is currently gaining popularity, in treating pain as a living bilateral interaction of biological, psychological and social factors [15].

Psychological stress can manifest itself either as a state of neuropsychic tension or negative emotional

*Corresponding author: Alexander V. Karnitsky, PhD,
Department of Rehabilitation Medicine, Omsk State Medical
Academy, 1, Leningradskaya sq., apt. 102, 644010, Omsk, Russian
Federation Tel: 7-905-9424103. Fax: 7-3812-659727
E-mail: karn1961@mail.ru

experiences. Therefore, psychological stress is accepted as an important factor that leads to the development of chronic pain syndrome in patients with joint diseases [16].

PSM-25 is the scale of psychological stress designed to measure stress in the physical, behavioral and emotional indicators [17]. It is a translation and adaptation of the Russian version of test procedures designed by Vodopyanova N.E. [18].

In this study, the PSM-25 scale was employed to identify the psychological stress in patients with osteoarthritis and chronic pain syndrome.

The study purposed to identify and assess the severity of the psychological stress in patients with osteoarthritis and chronic pain syndrome in the Rehabilitation Department.

Methods

The study included 50 patients, 41 of whom were women and 9 men, who were receiving inpatient treatment in the Department of Rehabilitation Treatment Center of Rehabilitation Therapy "Rus". The patients ranged in age from 24 to 73 years, with the average age being 58 years.

The primary diagnosis for 13 patients was one-sided coxarthrosis, for 13 others it was two-sided coxarthrosis; 5 patients showed one-sided gonarthrosis, while 19 had two-sided gonarthrosis. Interestingly, 35 patients had undergone surgical treatment (total joint endoprosthesis). Moderate restriction of joint movements was detected in 47 patients, significantly so in 3 patients.

X-ray studies were performed to ascertain the stage of the osteoarthritis (according to the classification of Kellgren et al., 1957). It showed that 41 patients were at stage III (moderate narrowing of the joint space, multiple osteophytes), whereas 9 showed stage II (slight narrowing of the joint space, single osteophytes).

Pain intensity was assessed in scores using the digital and visual analog scales in the range from 0 to 10, performed both at the time of admission and at discharge. Most patients (35 out of 50) upon admission in to the hospital revealed intensity of the pain syndrome between 4 and 6 points. In 12 patients, the pain intensity was less than 4 points, whereas in 3 patients it was greater than 6 points.

Psychological stress was evaluated using the PSM-25 questionnaire (the Lemyr-Tessier-Fillion scale of psychological stress [17] employing the translation and adaptation of the testing techniques of Vodopyanova N.E. [18], including 25 statements describing the psychological status of the patient. Patients were asked to estimate the relevance of each of the 25 statements in terms of their psychological status for the week prior to their testing. The assessment was based on an 8-point scale, on a scale of 1 to 8, where 1 indicated "never" and 8 indicated "constantly, every day". The total point count of all the answers was an integral indicator of mental tension (IIMT); the greater the IIMT value, the higher the level of psychological stress. An IIMT score of less than 100 points is indicative of a state of psychological adaptation. An IIMT score in the range of 100- 154 points corresponds to an average stress level. An IIMT score above 155 points reflects a high stress level. Psychological testing was performed only once, on the very first day of inpatient treatment.

Patients admitted to the hospital received standard treatment, including drug therapy, physiotherapy, exercise therapy and massage. Given the small group under study, nonparametric methods of statistical analysis were employed.

Results

During the inpatient period of treatment most patients noted an improvement in their health status (47 of 50 patients), a decrease in the intensity of the pain syndrome (45 out of 50 patients). Assuming an average pain score on admission into the hospital up to 4.5 points (with standard deviation (SD) = 1.46, the standard error of the mean (SEM) = 0.21), and at discharge, a score of 2.66 points (SD=1.44, SEM=0.21), the differences noted in the Wilcoxon matched pairs test and Sign test are highly significant ($p=0.000$).

The Integral Indicator of Mental Tension (IIMT) in patients ranged from 46 to 161 points, with an average value of 94 points (SD=26.4, SEM=4). It was found that 32 patients had a low level of psychological stress (the state of psychological adaptation), 17 patients showed an average level of psychological stress, whereas only 1 patient revealed a high level of psychological stress.

During the inpatient period of treatment, it was observed that a majority of the patients (32) failed to achieve an improvement in joint movements.

The presence of a correlation of a weak force existing between the level of psychological stress and intensity of pain syndrome in patients with osteoarthritis in the Rehabilitation Department was noted. The Spearman's rank correlation coefficient between the level of psychological stress and intensity of the pain syndrome prior to treatment was noted to be 0.29 ($p=0.04$). The Spearman rank correlation coefficient between the level of psychological stress and intensity of pain syndrome following treatment was 0.37 ($p=0.008$).

However, this study has been unable to identify a statistically significant correlation between the severity of the psychological stress and patient age, sex, localization of the pathological process (coxarthrosis or gonarthrosis), X-ray stage of osteoarthritis, and the manifestation of restrictions in joint movements.

Discussion

From this study it was concluded that the Rehabilitation Department of was not an ideal location to study psychological stress. Osteoarthritis patients seek treatment without acute exacerbation, long after surgical treatment had been performed. The data of the re-search conducted reveals that a majority of patients (32 out of 50) have a low level of psychological stress.

However, a correlation of weak force between the severity of the pain syndrome and manifestation of psychological stress has been observed in these patients.

Further, the severity of the psychological stress was the only one of all of the symptoms to show significant correlation with the severity of the pain syndrome.

The average duration of hospitalization of the patients in the Rehabilitation Department was between 12 and 14 days. The fine nuances of the dynamic changes in a patient's psychological state cannot be estimated using the PSM-25 questionnaire, within such the short time period available; therefore, re-testing was not conducted.

The data obtained confirmed the assumption that psychological stress is one of the significant factors leading to the development of chronic pain syndrome, in patients with osteoarthritis.

Treatment of the chronic pain syndrome in patients with osteoarthritis therefore, should necessarily include measures to correct the psychological stress (using psychotherapy or methods of psychological self-regulation, as necessary, and in accordance with the indications of psychopharmacotherapy).

References

1. Chichasova NV. The problem of pain in osteoarthritis. *The Doctor* 2007; 2:50-56.
2. Smith MM, Ghosh P. Osteoarthritis: Current status and future directions. *APLAR J Rheumatol* 1998; 2:27-53.
3. Sturov NV. Pharmacotherapy of chronic pain syndrome non cancerous origin. *Difficult Patient* 2001; 5:21-24.
4. Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D. Survey of pain in Europe: Prevalence, impact on daily life, and treatment. *European Journal of Pain* 2006; 10:287-333.
5. Kukushkina ML. Chronic pain syndrome. *The Doctor* 2010; 4:20-23.
6. Tunks ER, Weir R, Crook J. Epidemiologic Perspective on Chronic Pain Treatment. *The Canadian Journal of Psychiatry* 2008; 53:235-242.
7. Bair MJ, Robinson RL, Katon W, Kroenke K. Depression and pain comorbidity. *Arch Intern Med* 2003; 163:2433-2445.
8. Bisschop ML, Kriegsman DMW, Beekman ATF, Deeg DJH. Chronic diseases and depression: the modifying role of psychosocial. *Soc Sci Med* 2004; 59:721-733.
9. Levenson JL. Psychiatric issues in rheumatology. *Primary Psychiatry* 2006; 13:23-27.
10. Nicassio PM. The problem of detecting and managing depression in the rheumatology clinic. *Arthritis & Rheumatism* 2008; 59:155-158.
11. Ozcetin A, Ataoglu S, Kocer E, Yazici S, Yildiz O, Ataoglu A et al. Effects of depression and anxiety on quality of life of patients with rheumatoid arthritis, knee osteoarthritis and fibromyalgia syndrome. *West Indian Med J* 2007; 56:122-129.
12. Parker J, Wright G. The implications of depression for pain and disability in rheumatoid arthritis. *Arthritis Care Res* 1995; 8:279-283.
13. Sheehy C, Murphy E, Barry M. Depression in rheumatoid arthritis -underscoring the problem. *Rheumatology* 2006; 45:1325-1327.
14. Van Puymbroeck CM, Zautra AJ, Harakas PP. Chronic pain and depression: twin burden of adaptation. *Depression and chronic illness*. Cambridge: Cambridge University Press; 1999.
15. Danilov A. Biopsychosociocultural model of pain. *Physician* 2009; 12:5-8.
16. Herrmann M, Scholmarich J, Straub R. Stress and rheumatic diseases. *Rheum Dis Clin North Am* 2000; 26:737-763.
17. Lemure L, Tessier R, Fillion L. Psychological Stress Measurement (PSM): A translation. Quebec, PQ: Universite Laval; 1991.
18. Vodopyanova NE. Psychodiagnostics of stress. St. Petersburg; 2009.