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Is Chronic Pain Related with the Postsurgical Scar Tissue in Women?

Kadınlarda Kronik Ağrı Cerrahi Sonrası Skarlarla İlişkili Midir?

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ABSTRACT

Aim: *Chronic persistent pain (CPP) is an important public health problem and its pathophysiology and the risk factors are still not clear. Scar tissues forming after any type of injury, trauma, and surgery may lead to chronic pain. In this case-control study, we aimed to evaluate surgical scar tissues can be related to forming CPP in our patient population.*
Methods: *To assess the relation between surgery and CPP, two common chronic pain diseases were examined; fibromyalgia (FMS) as the most common non-mechanical CPP, and chronic low back pain (CLBP) as the most common mechanical CPP. For this purpose, 75 FMS, 57 CLBP patients and 47 healthy controls were recruited. All of the participants were examined, their demographic characteristics, symptoms, medical history of surgeries, and comorbid diseases were reported.*
Results: *The frequency of surgical procedures was similar in both patient groups (p>0.05), but were higher than the controls in both patients' group (p<0.001). The mean pain VAS score was similar in both patient groups (p=0.825). These scores were higher in the patients with history of the multiple surgical procedures than the patients with history of single surgical procedure (p=0.043) which was not related to the type of surgical procedure (p>0.05).*
Conclusion: *Scar tissues after surgery may cause a local or distant chronic pain. Chronic pain was more frequent in patients who experienced multiple operations.*

Keywords: *Interference fields, neural therapy, scar tissue, chronic pain*

ÖZ

Amaç: *Kronik ağrı patofizyolojisi ve risk faktörleri hala net olmayan önemli bir halk sağlığı sorunudur. Her türlü yaralanma, travma ve ameliyat kronik ağrıya yol açabilir. Vaka kontrol çalışmamızda, kronik ağrı şikayeti ile başvuran hastalarda ameliyat sonrası oluşan skar dokusu ile kronik ağrı arasındaki ilişkiyi değerlendirmeyi amaçladık.*
Yöntem: *Cerrahi ve kronik ağrı arasındaki ilişkiyi değerlendirmek için iki yaygın kronik ağrı hastalık incelendi. En sık non-mekanik kronik ağrı nedeni olan fibromiyalji (FMS) ve en sık mekanik kronik ağrı nedeni olan kronik bel ağrısı (CLBP) ile başvuran hastalar çalışmaya alındı. Çalışmaya 75 FMS, 57 CLBP ve 47 sağlıklı kontrol dahil edildi. Tüm katılımcıların demografik özellikleri, semptomları, cerrahi öyküsü ve komorbid hastalıkları incelendi.*
Bulgular: *Her iki ağrılı hasta grupta da cerrahi işlemlerin oranı benzerdi (p>0,05), bu oranlar her iki grupta da kontrol grubundan yüksekti (p<0,001). VAS skor ortalamaları her iki hasta grubunda da benzerdi (p=0,825). Bu skorlar, çoklu cerrahi işlem öyküsü olan hastalarda, tek cerrahi işlem öyküsü olan hastalara göre daha yüksekti (p=0,043) fakat bu yükseklik uygulanan cerrahi işleme bağlı değildi (p>0,05).*
Sonuç: *Cerrahi sonrası skar dokusu lokal veya uzak bir kronik ağrıya neden olabilir. Kronik ağrı, çok sayıda operasyon geçiren hastalarda daha sıktı.*

Anahtar kelimeler: *Girişim alanları, nöral terapi, skar dokusu, kronik ağrı*

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INTRODUCTION

Chronic persistent pain (CPP) is a common healthcare problem all around the world. Chronic pain can emerge or may be persistant after surgical procedures, and it can affect the quality of life and it is also an economic burden both to the patient and the society. The clinical risk factors and pathophysiology of chronic pain are still not clear. Surgical scars can cause CPP. According to the neural therapy integrates me-

dicine diagnosis and treatment methods, scar tissues are identified as the interference fields. According to the hypothesis of neural therapy, interference fields disrupt the electrochemical communication between different tissues within the body. This disruption can lead to a long-standing miscommunication in pain pathways, and in time, this miscommunication may result in chronic pain[1-3]. The pain can be limited to the surgical area or can occur far away where it can not be anatomically related[1,4,5]. The interference fields can be created by any damaged tissue other than surgical scars. Damaged tissues chronically damage afferent neurons in the autonomic nervous system, resulting in persistent autonomic reflex activity such as pain[2]. The neural therapy (NT) improves the local disturbances of the autonomic nervous system. NT uses different precise injections of local anesthetics for diagnosis and treatment and is based on the theory that, any trauma, whether related to injury or surgical procedure, can cause chronic pain.

In this study, we evaluated the most common two clinical pain-related diseases, fibromyalgia syndrome (FMS) as a non-mechanical and chronic low back pain (CLBP) as a mechanical pain disease. FMS is a complex central sensitization syndrome that it is characterized by a chronic widespread body pain as well as fatigue, functional symptoms, sleep disturbances, headaches, paresthesia, hyperalgesia at specific tender sites, morning stiffness, and depression[6-8]. Etiopathogenesis of FMS which is the second most common “rheumatic” disorder is still not clear. Some genetic predispositions, environmental triggers, and neuromodulations are being considered to be involved in the onset and course of the disease like the chronic postsurgical pains[8]. Chronic low back pain (CLBP) is another common chronic pain syndrome. It is defined as a continuous pain, tension, and/or local rigidity below the marginal ribs and above the lower gluteal fold as a result of strain, degeneration, irritation or damage in any part of the regional network of muscles, nerves, bones, discs or tendons in the lumbar spine within the last three consecutive months. Its underlying etiologic factors include structural, neurophysiological, and biopsychosocial pathologies[9-11].

In the present study, we made the hypothesis that surgical scar tissue can become an interference field and be related with FMS and postsurgical CLBP. The relation between history of surgery and these two common disorders is investigated.

MATERIAL and METHOD

A total of 179 females (75 FMS patients, 57 CLBP patients, and 47 healthy controls) were recruited. The study was designed as observational, case-control study. All of the participants were admitted to the Physical Medicine and Rehabilitation Outpatient Clinic. The control group consisted of healthy volunteer workers in the hospital. The FMS cases fulfilled the diagnostic criteria for the 2010 American College of Rheumatology (ACR)[12]. The CLBP cases had lower back pain persisting at least three consecutive months. Patients with neurological defects in the lower extremity, malign diseases, inflammatory rheumatic diseases, systemic infection or the localized infection in the lumbar region, previous spinal fractures, and disk surgery were excluded.

All of the patients and the controls were surveyed in terms of the baseline demographic characteristics, medical history, comorbid diseases, number of hospital visits in the last year, onset and diagnosis time of the disease and surgeries performed (number, time, and type including appendectomy, gallbladder, and stomach operation; gynecological surgery, mastectomy, and other types such as orthopedic operations, vascular surgery, kidney stones operation, and thoracic surgery), smoking and alcohol usage as well as the symptoms of the FMS and CLBP.

The patients and controls were given verbal information before obtaining their written informed consent form. The study protocol was approved by the Ethics Committee of University Hospital (SB Istanbul Medeniyet University Göztepe Training and Research Hospital Ethics committee for Human Studies, 30.12.2014, 2014/0194).

Statistical Analysis

Data were expressed as mean±standard deviation if normally distributed and frequencies were used to describe categorical variables. The Kolmogorov-Smirnov and Shapiro-Wilks tests were used to analyze the normality of the distribution depending on the number of cases (<50 or >50). Univariate comparisons of sociodemographic variables (education, occupation, marital status, smoking) were performed using one-way analysis of variance (ANOVA) or chi-square tests. Normally distributed variables were compared with the t-test, the other data were compared with the Mann-Whitney U test. The correlations were investigated by using the Spearman Correlation Analysis. Wilcoxon signed rank test was used for intragroup comparisons of quantitative parameters without a normal distribution. The p-value of <0.05 was considered significant. Statistical analysis of data was performed using Statistical Package for Social Sciences (SPSS) for Windows 17.0 software package (IBM, New York, USA).

RESULTS

A total 179 cases consisted of 75 FMS (41.9%), 57 CLBP (31.8%) patients, and 47 (26.3%) healthy controls were included in the study. The mean age of patients and control cases were 44.2±6.8, 46.6±8.6, 44.5±8.2 years, respectively. There were no statistically significant differences between the demographic characteristics of three groups except for the dif-

Table 1. Clinical and demographic features of the study groups.

	Fibromyalgia % (n=75)	Chronic Low Back Pain % (n=57)	Healthy Controls % (n=47)
Age (years) (mean±SD)	44.2±6.8	46.6±8.6	44.5±8.2
Education			
• Literate	4	15.8	2.1*** (a)
• Primary School	52.0	54.4	53.2
• High School	32.0	21.1	23.4
• College	12.0	8.8	21.3
Marital Status			
• Single	9.3	10.5	14.9
• Married	90.7	87.7	85.1
Occupation			
• Housewife	70.7	77.2	53.2
• Retired	5.3	3.5	2.1
• Active Worker	24	19.3	44.7
Smoking	28	17.5	17
Visual Analog Scale (mean±SD)	6.3±1.6	6.3±1.6	0.825
Hospital visit in a year (mean±SD)	8.9±7.9 (m)+	7.1±6.1	0.9±0.8
Age at onset (years) (mean±SD)	41.8±7.1 (m)	43.1±9.3	---
Time from disease onset (mean±SD)	8.4±7.2* (w)	10.2±9.3*	---
Diagnostic Delay after Onset (years) (mean±SD)	6.7±6.1 (m) +	3.6±4.3	---
Medical history of surgeries			
All surgeries (non-surgery)	77.3 (22.7)	80.7(19.3)	34.0(66.0)
• Abdominal	8.0	8.8	4.3
• Gynecological	50.7	45.6	25.4
• Abdominal+ Gynecological	5.3	10.3	0
• Other Surgeries	13.3	15.8	4.3
The pain onset time			
• Before the surgery	24.7	35.7	---
• In the first year	2.7	3.6	---
• Between the 1-10 year	26.0	23.2	---
• After 10 year	46.6	37.5	

*p<0.05 (*between FMS and CLBP, **between FMS and controls, ***between CLBP and controls)*
p<0.001 (+between FMS and CLBP, ++between FMS and controls, +++between CLBP and controls)
SD: Standard deviation, (w):Wilcoxon Signed Rank Test, (m): Mann Whitney U Test, (X): Pearson Chi-square test, (a): Anova

ference in education status between CLBP and the control groups (Table 1).

Among 179 cases, 120 (67%) had a history of surgical procedures, and 104 (86.7%) of the 120 patients had pain (p<0.001). The pain manifested after the surgery in 92 (88.5%) patients of these 104 patients. The frequency of surgical procedures were similar in the FMS and CLBP groups (p>0.05), but it was significantly higher than the control group (77.3% FMS 80.7% CLBP patients, and 34% of the controls; p<0.001). The frequency of history of a single or multiple surgeries were higher in the CLBP group than the FMS, but these differences were not significant. Comparing the subgroups of surgical procedures, the rates of the history of abdominal surgery were similar in each group, while the rate of the history of gynecological surgery was higher in the FMS group than the CLBP group (Table 1).

The VAS scores were higher in the patients with history of the multiple surgical procedures than the patients with history of the single surgery procedure (p<0.05). However, these VAS scores were not related to the type of surgical procedures (p>0.05). The mean VAS pain score during the rest was significantly higher in the FMS than the CLBP group (5.2±1.8 vs 3.2±1.9, respectively) (p<0.001), while the mean scores of pain VAS scores in activity were similar in both of the patient groups (p=0.825).

Evaluating the pain onset time after the surgery there was a difference betwee the FMS and CLBP groups. However, this difference was not statistically significant (p≤0.05). Subgrouping was done among the patients according to the duration of pain within the first year, 1-10 and >10 years after surgery; (corresponding number of patients were 2, 19, and 34 patients with FMS, and 2,13,21 patients with CLBP). The delay of the diagnosis was 6.7±6.1 years vs 3.6±4.3 years for the FMS and CLBP groups (p<0.001) (p=0.869) (Table 1).

There was a positive correlation between the VAS pain scores of patients number of surgeries experienced (single surgery, multiple surgeries), time after surgery and gynecologic surgery (Table 2).

Table 2. Correlation of VAS pain and surgical history fibromyalgia and chronic low back pain.

	CLBP		CLBP	
VAS pain	**r**	**p**	**r**	**P**
Time after first surgery	0.966	<0.001*	0.937	<0.001*
Multiple surgeries	0.603	<0.001*	0.459	<0.001*
Gynecologic surgery	0.504	<0.001*	0.381	<0.001*

*p<0.05**
VAS: Visual analogue scale
FMS: Fibromyalgia
CLBP: Chronic low back pain

The number of hospital visits was higher in the FMS and CLBP groups than the controls. However, the number of hospital visits was similar in the FMS and CLBP groups (p>0.05) (Table 1). When the comorbid diseases were evaluated, the prevalence of diabetes mellitus and hypertension was higher in CLBP than the FMS. (p=0.01, p=0.05).

DISCUSSION

In the present study we evaluted the relation between surgery and two common CPP: CLBP and FMS. There was no difference in mean VAS scores between onset of CLBP and FMS after surgery but it was higher in both groups than the control group. VAS score was higher in the CPP patients with multiple surgeries independent of the type of the surgery.

The risk factors and the pathophysiology of chronic pain, which is an important public health problem, are not clear yet. The emergence of the pain may be explained by gate-control mechanism at spinal cord level. Peripheral interference field may be inhibited by the control mechanism (gate-control mechanism) at spinal cord level. According to the neural therapy which is one of the technics of the integrative medicine diagnosis and treatment methods, scar tissues after any surgery can cause chronic pain. In this study, we investigated the association between the

history of surgery and the chronic pain. We included patients with two common clinical pain diseases in the study as FMS which is the most common non-mechanical pain disease, and CLBP is one of the most common mechanic pain disease.

In a publication of the International Association for The Study of Pain; postsurgical chronic pain has been defined as a continuing pain formed at least two months after the surgery after ruling out all of the other indications of chronic pain. This definition is criticized to be extremely simple, especially the two-months time period has been questioned because we can not be sure whether the pain is chronic pain at the end of two months after surgery. We know that some inflammatory processes can continue more than two months after some surgical procedures[13]. Therefore the time point that the pain starts after the surgery can change from person to person[14,15]. In this study, the relation between the onset time of pain and its timing after surgery was evaluated. The chronic pain frequency had a positive correlation with the time after the surgery (p=0.00). This positive correlation was similar in both patient groups (p=0.55), and it was also independent of the age of the patient.

The preoperative risk factors, age, and gender were found responsible for chronicity of the pain after the surgery[16,17]. Some of the studies have found that there is relation between CPP and the age at the time of surgery or the type of the surgery[18-21]. Kristensen AD. et al.[18] reported that younger patients had an increased risk of developing persistent postsurgical pain, although this trend is not true for postherpetic neuralgia, and pain related to knee arthroplasty[21]. In our study, mean age at the time of the surgery was 30.1. Age is not the only etiologic factor for the occurence of pain. Kehlet H. et al.[16] revealed that there is a relation between the chronic pain and the type of the surgery. They reported that acute postoperative pain may result in permanent chronic pain in 10-50% of the cases especially after the inguinal hernia repairment, breast and thoracic surgery, leg amputation, and coronary artery bypass surgeries. In our study, gynecologic surgery was the most frequent procedure. As an etiologic factor for persistent pain gynecologic surgery was detected in 50.7%, 45.6%, and 25.5% of the controls. Brooks L. et al.[22] revealed that the history of gynecologic procedure was higher among the FMS patients similar to our study. However, there was difference between the history of abdominal surgery in the FMS and CLBP groups. When the surgical procedures were evaluated, we couldn't find any difference between the FMS and CLBP groups. However, all type of surgery were significantly higher in the FMS and CLBP groups than the control group. Gender is another risk factor and in literature females have an increased incidence of most chronic pain syndromes, and developing persistent postsurgical pain[23]. In our study all of the patients were females.

When the relation between the onset of the pain and the time of the diagnosis was evaluated, the diagnostic delay was found significantly longer in the FMS group than the CLBP group in our study. However, surgical history had no relation to this diagnostic delay. Beside the low awareness of the disease among clinicians, the heterogenecity of the clinical symptoms of FMS may be the cause of this clinical diagnostic delay[24].

The location of the chronic pain is not related to the surgical site. Johansen et al.[25] reported that in only 51% patients, chronic persistent pain is seen in the anatomical area of the surgery. This anatomical variation of the pain can be explained by the hypothesis of the interference field. According to the neural therapy, the interference fields can be silent, on the scar area or far from the surgical site. The locations of pain may not be related to the scar areas. In a recent study, the symptoms of CLBP were relieved with local analgesic injection into the scar tissues in patients who underwent different surgical procedures[26]. Also, Fleckenstatin J. et al.[27] reported a patient with plantar fasciitis with persistent heel pain despite surgery and after the local analgesic injection into the scar tissue, their pain at that area was relieved. Two other cases reported by Chung MK. et al.[28] had chronic

abdominal pain, nausea, and vomiting not relieving with multiple medications. Neural therapy was applied to scar tissue on the tongue after realizing that their pain began after tongue piercing implantation. After neural therapy patients' symptoms disappeared. In order to achieve optimal improvement in neural therapy applications for the treatment of chronic pain, detection of scar tissue is important and it is necessary to inject into precise area.

CONCLUSION

Chronic pain is a common problem that affects quality of life, that is difficult to diagnose and manage and imposes an economic burden to health system of countries. The scar tissues can cause chronic pain.

Limitations:
The limitations of our study were the limited number of patients and the control subjects.

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