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Factors associated with bad outcome in conservative therapy of lateral epicondylitis

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ABSTRACT

Objectives: Lateral epicondylitis is an overuse syndrome that is one of the most common causes of elbow pain. The aim of this study is to determine the factors associated with bad outcome in conservative treatment of lateral epicondylitis in our population.

Methods: Patients who applied to our outpatient clinic with the diagnosis of lateral epicondylitis between August 2020 and August 2021; analyzed retrospectively. 52 patients who were treated conservatively and followed up for at least 12 months were included in the study. Elbow functionality and pain were evaluated with the "Patient-Rated Tennis Elbow Evaluation" (PRTEE) scoring. Occupation of the patients, antidepressant usage, body mass index(BMI), age and smoking were questioned.

Results: 7 (13.4%) patients stated that they fully benefited from conservative treatment. 29 patients (55.8%) expressed that they benefited from the treatment, but their complaints continued at low severity. 16 patients (30.8%) said that they did not benefit from the applied conservative treatment. While the mean PRTEE value was 46.57 in women, it was 32.34 in men. It was observed that female gender negatively affected clinical scores (p=0.004). Mean PRTEE score was 48.31 in physically active manual workers and 31.61 in desk workers (p=0.006). While the mean PRTEE value was 52.81 in patients using antidepressants, this value was 35.6 in patients not using antidepressants (p=0.037). No correlation was found between BMI and PRTEE scores by using Spearman correlation test.

Conclusions: Female gender, being a manual worker and using antidepressant medication are associated with poor outcomes in the conservative treatment of lateral epicondylitis.

Key words: *Lateral epicondylitis, conservative treatment, bad outcome, gender, occupation, antidepressant usage, mood disorder*

Introduction

Lateral epicondylitis is one of the most common overuse syndromes, and it affects 1% to 3% of the adult population each year [1]. The most common form of elbow pain in the outpatient clinic is lateral epicondylitis [2]. We know that 80% of lateral epicondylitis heals after 1 year, but symptoms persist in 20% of patients [3]. Frequent complaints of patients include pain in the region of the lateral epicondyle of the humerus, often accompanied by radiation towards the forearm. When conducting physical examination, significant tenderness is typically observed at the lateral epicondyle, which is the origin point of the extensor carpi radialis brevis (ECRB) [4,5].

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The exact etiology of lateral epicondylitis is not well-established, but it is often attributed to repeated microtrauma resulting from excessive gripping, wrist extension, and radial deviation [1,4,5]. It is known that the incidence is high among manual workers and athletes who perform some repetitive movements [3]. Collagen fibril rupture and activation of the innate immune system can occur as a result of repetitive microtrauma and overuse. When evaluated histologically, lateral epicondylitis shows an abundance of fibroblasts, vascular hyperplasia, and structurally irregular collagens, which are referred to as angiofibroblastic hyperplasia [6]. The most commonly affected muscle is the extensor carpi radialis brevis (ECRB), while the pronator and other extensor carpal muscles are also frequently affected .The activities we do in daily life and work by extending the wrist and grasping the objects tightly are adversely hampered [4,5].

NSAIDs, steroids and orthoses are recommended for the primary treatment of lateral epicondylitis. In addition to medical treatment, some physical therapy methods can be tried to accelerate healing in the lateral epicondyle area. Despite various treatment options suggested for it, there is currently no consensus on universally accepted therapeutic modalities. At the end of 1 year, surgical treatment methods may be applied to patients who do not benefit from conservative treatment [5]. In this long period until surgery, patients suffer from pain and serious problems in their daily life and work, and some of them may even lose their jobs. Lateral epicondylitis can cause a significant social and economic burden as it leads to lost workdays [5,7].

The primary aim of this study was to identify factors associated with poor outcomes in conservative therapy of lateral epicondylitis. We aimed to identify the patient groups in our population who have poor response to conservative treatment. Our hypothesis was that the patient's gender, mood and occupation would affect the outcome of conservative treatment. By defining the risk factors, labour losses and sick leaves will be reduced. A detailed treatment algorithm can be created according to the demographic characteristics of our patients. In patients who have risk factors, alternative treatment methods other than conservative treatment can be tried earlier without wasting time.

Patients and Methods

Patients who applied to our outpatient clinic with the diagnosis of lateral epicondylitis between August 2020 and August 2021; analyzed retrospectively. The study protocol was approved by the institutional Ethics Committee (İ05-265-22). The study was conducted in accordance with the principles of the Declaration of Helsinki. Patient lists were accessed from the hospital digital archive with the help of ICD-10 code. The physical examination notes in the hospital's electronic archive were retrospectively reviewed. Patients older than 18 years of age, patients with severe tenderness in the lateral epicondyle and origins of the extensor muscle on physical examination, patients whose pain increased with the dorsiflexion of the wrist and third finger against the resistance performed while the elbow was in extension were included in the study. Patients who had a positive Cozen test indicated in their physical examination notes in the hospital archive were included in the study. Patients with elbow instability, history of surgery in the same elbow, diabetes, arthritis in the joint, bilateral epicondylitis, systemic rheumatologic disease were excluded from the study. It was seen that 74 patients applied with the diagnosis of lateral epicondylitis within one year. Out of 74 patients, 10 were excluded due to follow-up period of less than 12 months. Twelve patients could not be reached. 52 patients with at least 12 months of follow-up were included in the study (Figure 1).

Conservative treatment with counterforce elbow brace and Nonsteroidal Anti-Inflammatory Drugs (NSAID) was applied to 52 patients who applied to our outpatient clinic with the diagnosis of lateral epicondylitis. Corticosteroid injection was performed to seven patients who did not benefit from conservative treatment.

Occupation of the patients, antidepressant usage,

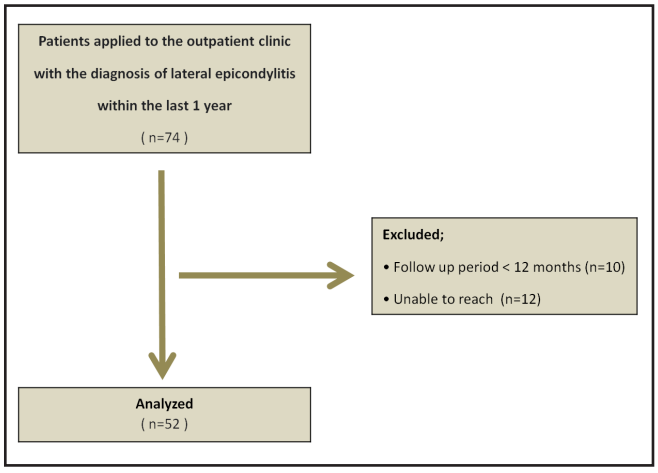


Figure 1. Flowchart for the selection of patients.

body mass index(BMI) and smoking were questioned. The patients were divided into groups according to these criteria and their clinical scores were compared. Pain intensity and elbow functionality of the patients were evaluated with the "Patient-Rated Tennis Elbow Evaluation" (PRTEE) scoring [8]. The patients were divided into two groups according to their age, as under 50 years old and over 50 years old. The patients were also divided into two groups according to their occupation; as manual workers and desk workers. We classified housewives as manual workers because they engage in physically demanding conditions while doing household chores. In order to investigate the effect of mood disorder on clinical score, patients were also grouped as antidepressant users and non-users. It was observed that occupation, antidepressant usage, body mass index (BMI), gender, age, dominant hand, and smoking are the influencing factors that have been most extensively studied in the literature. In our study, we examined the impact of these factors on conservative therapy of lateral epicondylitis [3,7,9,10].

Statistical analysis was performed using SPSS v.22.0 (SPSS Inc.,Chicago, IL). Descriptive statistics were used to characterize demographic variables of patients. Mean, standard deviation and median values were used to show descriptive statistics. The Mann-Whitney U test was used to see the effects of age, gender, dominant hand, occupation, smoking, and antidepressant usage on clinical scores. Spearman correlation test was used to determine whether there was a relationship between BMI, working hours and PRTEE score. P values < 0.05 were considered significant.

Results

Out of 52 patients included in the study, 27 (51,9%) patients were male, and 25 (48.1%) patients were female, resulting in a male to female ratio of 1.08. The mean age was 46.79 years. While the complaints of 38 (73.1%) patients were on the dominant side, it was seen that the complaints of 14 (26.9%) patients were on the nondominant side (Table 1).

Conservative treatment with counterforce brace and Nonsteroidal Anti-Inflammatory Drugs (NSAID) was applied to 52 patients included in the study. After at least 12 months of follow-up, 7 (13.4%) patients stated

Table 1. Demographic variables of patients.

Age		
Mean	46.79	
SD	10.08	
Gender (n,%)		
Male	27	51.90%
Female	25	48.10%
Working Hour		
Mean	8 hours	
SD	1.77	
Dominant Hand (n,%)		
Right	46	88.50%
Left	6	11.50%
Patients with the complaint on the dominant hand (n,%)	38	73.10%
Patients with the complaint on the nondominant hand (n,%)	14	26.90%
BMI		
Mean	27.42	
SD	3.71	
Smoking (n,%)		
Yes	21	40.40%
No	31	59.60%

that they fully benefited from conservative treatment. 29 patients (55.8%) stated that they benefited from the treatment, but their complaints continued at low severity. 16 patients (30.8%) expressed that they did not benefit from the applied conservative treatment. While injection was administered to seven of 16 patients who did not benefit from conservative treatment, it was observed that the other nine patients did not reapply to the outpatient clinic (Table 2).

The patients were divided into two groups according to their professions and their PRTEE scores were examined. Mean PRTEE score was 48.31 in physically active manual workers and 31.61 in desk workers (p=0.006). While the mean PRTEE value was 44.63 for those who thought that their complaints were related to their profession, it was 26.73 for those who thought they were not related to their profession (p=0.002) (Table 3).

Table 2. Conservative treatment (NSAID and Orthosis) results in the treatment of lateral epicondylitis.

	N (%)	PRTEE Score	Total
Patients who failed to benefit from conservative treatment			
Steroid injection after conservative treatment	7 (13.4%)	48.85 (±15.16)	16 (30.7%)
Without injection	9 (17.3%)	51.22 (±11.47)	
Patients benefited from conservative treatment			
Benefited but still complaining	29 (55.8%)	32.31 (±15.53)	36 (69.2%)
Fully benefited	7 (13.4%)	1.07 (±1.96)	
Total			52

Table 3. Predictive factors affecting the results of conservative treatment of lateral epicondylitis.

	Number	PRTEE Score	P Value*
Over the age of 50	19	32.29 (±14.49)	P=0.017
Under the age of 50	26	43.33 (±17.18)	
Patients with the complaint on the dominant hand	33	39.44 (±18.23)	P=0.92
Patients with the complaint on the nondominant hand	12	36.54 (±12.74)	
Patients using antidepressants	9	52.81 (±19.15)	P=0.037
Patients without antidepressants	36	35.6 (±14.89)	
Male	25	32.34 (±12.58)	P=0.004
Female	20	46.57 (±18.43)	
- Patients who thought that lateral epicondylitis was directly related to their profession	30	44.63 (±17.47)	P=0.002
- Patients who thought that lateral epicondylitis was unrelated to their profession	15	26.73 (±5.66)	
Manuel workers	25	48.31 (±18.83)	P=0.006
Desk workers	20	31.61 (±11.06)	
Smokers	18	34.86 (±22.19)	P=0.472
Nonsmokers	27	31.76 (±17.59)	

*The Mann-Whitney U test was used to assess the potential differences between groups. Differences were considered statistically significant for p value<0.05. **7 patients who applied injections were not included in this statistical analysis. The statistical analysis was performed on the other 45 patients out of a total of 52 patients.

The relationship between antidepressant usage and PRTEE score was examined. While the mean PRTEE value was 52.81 in patients using antidepressants, this value was 35.6 in patients not using antidepressants. It was observed that using antidepressants due to mood disorder negatively affected the treatment prognosis (p=0.037) (Table 3).

The effect of gender on clinical score was examined. While the mean PRTEE value was 46.57 in women, it was 32.34 in men. It was observed that there is a significant difference between males and females regarding clinical scores (p=0.004). While the mean PRTEE value was 43.33 under the age of 50, it was found to be 32.29 above the age of 50 (p=0.017). It was thought that the fact that the group under the age of 50 was working more physically might be effective in this situation (Table 3).

The relationship between smoking and PRTEE score was also investigated. While the mean PRTEE value was 34.86 in smokers, this value was 31.76 in nonsmokers. It was observed that there was no significant relationship between smoking and clinical scores (p=0.472) (Table 3). Spearman correlation test was used to investigate the relationship between BMI and PRTEE score. No correlation was found between BMI and PRTEE (p=0.27).

Discussion

A disease and its treatment process can significantly reduce a patient's quality of life. A subjective sense of wellbeing encompasses physical, psychological, social and spiritual dimensions. For this reason, we tried to reveal the most probable causes of decreased quality of life in non-surgical treatment of lateral epicondylitis. In the literature, there are studies determining the prevalence, determinants, risk factors, work related risk factors and physical and psychosocial risk factors of lateral epicondylitis [3,9,10]. We aimed to find the patient group diagnosed with lateral epicondylitis in our society and whose quality of life decreased. We found that being a manual worker, using antidepressant medication, and female gender were associated with poor prognosis in conservative treatment of lateral epicondylitis.

The PRTEE score was significantly higher under the age of 50. When we question this situation in detail, we attribute it to the fact that the patient group is active and has to undertake most of the physical work in the workplace. In the active working group under 50 years of age, tendon healing may be suppressed due to repetitive micromotion and as a result, tendon degeneration occurs. We have seen that over the age of 50 consists of the employee in the workplace control authority. The mean age of the patients included in the study was 46.79 years. This seems consistent with previous studies, as the age distribution of lateral epicondylitis is in the 4th and 5th decades [9, 11].

There were 25 females (48.1%) and 27 males (51.9%) in the study signifying males were more affected than females. This situation appears to be somewhat opposite to the female dominant distribution in the lateral epicondylitis, which is common in the literature [12]. However, in our study women had a significantly higher PRTEE score than men. The explanation for this is that women do strenuous tasks for long periods of time, including weightlifting and repetitive movements of the elbow, in both work-related and domestic activities. It is known that women are more prone to developing cumulative trauma disorders such as epicondylitis, tenosynovitis, cubital tunnel syndrome, and carpal tunnel syndrome [13-15]. Hormonal changes, weaker physical capacity, lower stress tolerance levels, and the repetitive nature of physical work are believed to play a role in this condition [14]. It has been emphasized in the literature that certain workplace features have failed to accommodate female anthropometrics [13,14]. In the study examining cumulative trauma disorders among housewives, Yip WY stated that due to the differences in performing housework and roles at home, musculoskeletal complaints are significantly higher among women [13].

Lateral epicondylitis was detected on the domi-

nant side in 73.1% of the subjects, and on the non-dominant side only in 26.9%. This is the same as the result of the study published by Shamsoddini et al., in which the dominant hand is more affected than the non-dominant hand in lateral epicondylitis [12]. This may be because the dominant hand is ubiquitously used in all occupational and daily life activities that lead to overuse of the wrist extensors of the forearm.

The mean body mass index of the patients in the study was 27.42±3.71. Lateral epicondylitis was not found to be associated with increased BMI in this study, just as in the study by Franceschi et al [16]. There was also no statistically significant relationship between smoking and lateral epicondylitis, as BMI. Although smoking and BMI was defined as a risk factors in the study of Shiri et al., it was not associated with failed treatment [9].

Seven out of 52 patients said that they fully benefited from conservative treatment and recovered. The quality of life of the remaining 45 patients had somehow decreased despite conservative treatment. We then tried to question some features of these 45 patients and find out why they were resistant to treatment.

The PRTEE score was significantly higher in patients treated for depression. Psychological factors such as depression have previously been shown to affect outcome measures in carpal tunnel surgery [17]. A similar study showed higher levels of anxiety and depression in patients with lateral epicondylitis compared with the healthy controls [18]. There are studies in the literature explaining the relationship between chronic pain and depression and pointing out possible neural mechanisms [19]. Research has demonstrated that the sensory pathways related to injury-induced body pain share common brain regions involved in mood regulation. These same brain regions establish a histological and structural basis for the simultaneous occurrence of pain and depression [20]. According to some studies, it has been suggested that chronic pain and depression may be based on common neuroplasticity mechanism changes [19,21].

Manual workers had significantly higher PRTEE scores than desk workers. In the study of Haahr et al., those with high levels of pain and manual laborers had no response to treatment at the end of one year [3]. Therefore, workload modification should be considered, especially for manual laborious tasks, to get a good response from treatment. In these workers, modification of physical factors can reduce the risk and improve prognosis of lateral epicondylitis [9].

Those who thought that lateral epicondylitis was directly related to their profession had a significantly higher PRTEE score. Although these patients did not file a workers' compensation claim, they complained of physical workplace factors and low social support at their work. In the study of Werner et al., the worker's compensation claim was emphasized as a strong risk factor for failure of conservative treatment [17].

A limitation of our study is the retrospective nature of our database. We studied a small group of patients in a single centre. Another limitation is on differential diagnosis. Nine patients who did not benefit from the treatment may have radial tunnel syndrome, intra-articular pathology or cervical radiculopathy at the same time. Lateral epicondylitis and radial tunnel syndrome (RTS) may exist concurrently, in which case they are often confused and misdiagnosed, with patients presenting with epicondylitis that can exacerbate symptoms of RTS [22,23].The study could be more powerful if other possible pathologies had been investigated again in the failed group.

Here, the fact that injections other than steroid have not been tried can be seen as a handicap in terms of the study. However, injections, whether corticosteroid, autologous blood, prolotherapy, platelet-rich plasma (PRP) , or botulinum toxin, have not been shown to be more effective than placebo in treating lateral epicondylitis [24,25]. In a review study of PRP vs corticosteroids at lateral epicondylitis, PRP injections had improved pain and function more effectively than corticosteroid injections at the long-term follow-up (24 weeks

post-treatment)[9]. A larger study comparing PRP and steroid injection would be helpful in this regard.

Another limitation was the absence of a second test to assess quality of life while measuring functional disability with the PRTEE questionnaire. Maybe in the future, we can explain our thesis more accurately by making an inquiry that also evaluates the patient's quality of life, such as SF-36, in a larger population.

Conclusion

Being a manual worker and attributing his/her illness to his job, using antidepressant medication and female gender are associated with poor outcomes in the conservative treatment of lateral epicondylitis. These patients can be followed closely. Alternative injection methods such as PRP or early surgical treatment can be considered in this patient group.

Conflict of interest statement

The authors have no conflicts of interest to declare.

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