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ORIGINAL ARTICLE

Evaluation of the neuropathic pain in the smokers

Sigara kullanıcılarında nöropatik ağrının değerlendirilmesi

Sercan Bulut ÇELİK,[1] Hüseyin CAN,[2] Melih Kaan SÖZMEN,[3] Tijen ŞENGEZER,[4] Yusuf Cem KAPLAN,[5] Gökçenur UTLU,[2] Alp ŞENER,[2] Arzu AYBEK YILMAZ,[2] Olgu AYGÜN[6]

Summary

Objectives: Nicotine addiction is one of the most important causes of the general failure of treatment and keeping the habit of smoking. Peripheral neuropathy is a leading factor of smoking. This study aimed to analyze the association of neuropathic pain and addiction levels of individuals.

Methods: The study was performed on the day on which the smokers visited the hospital for any reason. The Douleur Neuropathique 4 (DN-4) Scale and Fagerström Addiction Survey were administered to the individuals after obtaining their consent.

Results: In total, 444 individuals were included in the study, and 57.2% of them were males (n = 254). The age average of the individuals with neuropathic pain (46.4±12.3 years) was significantly higher than that of those without pain. The individuals with pain smoked approximately 31.8±18.3 packet/year cigarettes, whereas those without pain smoked approximately 22.4 ± 15.5 packet/year cigarettes; the difference was significant statistically ($p<0.05$). According to multivariate logistic regression analysis with the backward elimination method, the existence of pain was found to be PR = 2.22 (95% GA, 1.26–3.91) in terms of sex, DM existence was found to be PR = 1.97 (95% GA, 1.02–3.81), and for each standard deviation increase (2.7) in Fagerström scale, PR was 1.29 (95% GA, 1.14–1.46).

Conclusion: Smoking is a risk factor for neuropathic pain. In our study, the possibility of neuropathic pain increases as the duration of smoking and addiction level increase, and with diabetes, this rate increases even more. It is extremely important that the smokers should be informed regarding these facts and possibilities.

Keywords: Addiction; cigarette; neuropathy; pain.

Özet

Amaç: Nikotin bağımlılığı sigara içme davranışının sürdürülmesinde ve tedavi girişimlerinin genel başarısızlığında en önemli nedenlerdendir. Periferik nöropatide, sigara kullanımı, önde gelen risk etkenlerindendir. Çalışmamızda sigara içen bireylerin bağımlılık düzeyi ile nöropatik ağrı açısından birlikteliğinin incelenmesi amaçlanmıştır.

Gereç ve Yöntem: Araştırma herhangi bir nedenle hastaneye gelmiş olan sigara içicileri üzerinde 1 günlük sürede yapıldı. Douleur Neuropathique 4 (DN-4) Anketi, Fagerström Bağımlılık Anketi kişilerin onamı alındıktan sonra yüz yüze görüşülerek uygulandı. Veri çözümlemede, ki kare testi ve çok değişkenli lojistik regresyon analizinden yararlanıldı. Regresyon analizi sonucunda elde edilen Olasılıklar oranları (OR) %95 güven aralıkları ile sunuldu. Anlamlılık düzeyi olarak $p<0.05$ alındı.

Bulgular: Çalışmaya 444 kişi katılmış olup, bireylerin %57.2'si erkek (n=254) idi. Nöropatik ağrısı olan bireylerin yaş ortalaması (46.4±12.3 yıl), olmayanlara göre (42.5±12.9 yıl) anlamlı olarak daha yüksek bulundu. Ağrısı olan bireyler ortalama 31.8±18.3 paket/yıl sigara kullanmış iken ağrısı olmayan bireyler ortalama 22.4±15.5 paket/yıl sigara kullanmıştır ve aradaki fark istatistiksel olarak anlamlı saptandı ($p<0.05$). Geriye doğru eleme yöntemli çok değişkenli lojistik regresyon analizine göre ağrı varlığını cinsiyet OR: 2.22 (%95 GA: 1.26–3.91), DM varlığı OR: 1.97 (%95GA: 1.02–3.81) ve Fagerström ölçek puanının her bir standart deviasyonluk (2.7) artışı için OR: 1.29 (%95 GA: 1.14–1.46) olarak bulundu.

Sonuç: Sigara kullanımı nöropatik ağrı gelişimi için risk faktörüdür. Çalışmamızın sonuçlarında sigara içim yılı ve bağımlılık düzeyi arttıkça nöropatik ağrı gelişme olasılığı da anlamlı düzeyde artmış olarak saptandı. Diyabet tanısı olan kişilerde ise bu oran daha da artmaktadır. Sigara içen bireylerin bu konuda da bilgilendirilmesi son derece önem arz etmektedir.

Anahtar sözcükler: Bağımlılık; sigara; nöropati, ağrı.

[1]Family Health Center Number 11, Batman, Turkey
[2]Department of Family Medicine, Katip Çelebi University Faculty of Medicine, İzmir, Turkey
[3]Department of Public Health, Katip Çelebi University Faculty of Medicine, İzmir, Turkey
[4]Department of Family Medicine, Numune Training and Research Hospital, Ankara, Turkey
[5]Department of Pharmacology, Katip Çelebi University Faculty of Medicine, İzmir
[6]Karabağlar Community Health Center, İzmir, Turkey

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Correspondence: Dr. Sercan Bulut Çelik. Merkez 11 Nolu Aile Sağlığı Merkezi, Batman, Turkey.
Phone: +90 - 505 - 483 16 95 **e-mail:** bulutum07@yahoo.com

Introduction

Cigarettes, which have been used widely all over the world since the 19th century, became one of the most important health problems at the present time. In the etiology of cigarette addiction, genetic and enviromental factors are seen responsible. However, the most important cigarette component which causes addiction is nicotine. Nicotine addiction is accepted as the most important cause for keeping the smoking habit and the general failure of the treatmet attempts.[1] Nicotine, which causes strong physical and mental addiction, could also cause heavy abstinence syndrome.

Cigarette components cause negative effects on the organ systems in the whole body. One of those effects is development of neuropathies on the peripheric neuro system. In the peripheric neuropathy, smoking is one of the leading factors.[2] It is seen that smokers occasionally complain about burning in their hands and feet. In the present study in which we think similar complaints may inrease as the smoking addiction increases, it is aimed to analyze the association of neuropathic pain and individuals' addiction levels.

Material and Methods

The research was made for one day on the smokers who came to the hospital for any reason. DN-4 Scale Scale and Fagerström Addiction Survey were conducted face to face after taking the approvements of the individuals. Informed consent was obtained from all participants. The Ethical Committee Approval of the study was from Katip Celebi University Noninvasive Clinic Researches Evaluation Commission.

DN4 survey, which was developed by the French Neuropathy Pain Group, was used in a prospective study in which 160 patients with pain related to distinct neurologic and somatic were involved. In the 10 question survey, seven questions deal with symptoms and three questions are answered with clinical examination. Examined symptoms are burning pain, feeling cold with pain, electric shock, tingling, pins and needless, numbness and itching. The feelings examined are light touch hypoesthesia, pinning hypoesthesia and brushing allodynia. One point is given for the each question answered as 'Yes'. All of the points gained with symptom questioning and clinic examination are gathered in order to calculate the total point. The maximum score of total point is 10. For the cases of which score is 4 or above, neuropathic pain diagnosis is made.[3] The Turkish validity and reliability of the DN4 survey was made by Çevik et al. in 2010. Of the survey, the sensitivity was found as 95% and specifity was found as 96.6%.[4]

Difficulty in quitting smoking proved the need for measuring nicotine addiction. Therefore, Fagerström and Schneider developed a survey form in order to measure the nicotine addiction risk. This test is the most common test which is used to evaluate the nicotine addiction. Fagerström nicotine addiction test consists of six questions.[5] The Turkish validity and reliability of this test was made by Uysal et al. and Cronbach's Alfa ratio was found as 0.56.[6]

Statistical analysis

For the statistical evaluation, SPSS (Statistical Package for the Social Sciences Inc; Chicago, IL, ABD) 15.0 for Windows statistics demo packet programme was used. Measuremental variables were presented with average±standard deviation (SD), and categoric variables were presented with numbers and percentage. In the data analysis, Chi-Square Test and Multivariate Logistic Regression Analysis were used. The Probabilistic Rates (PR) acquired as a result of regression analysis were presented with 95% confidence interval. The significance level was taken as $p<0.05$.

Results

444 people participated in the study and 57.2% of those were male (n=254). The age average was 43.4±14.0 years for male and 42.9±11.2 years for female. There was no significant difference between the genders in terms of age average ($p>0.05$).

12.3% of the males and 18.1% of the females had diabetes (DM) ($p<0.05$). The age average of the individuals with neuropathic pain (46.4±12.3 years) was found significantly higher than the ones without pain (42.5±12.9 years). 33.8% of the individuals with DM and 14.8% of the ones without DM had pain ($p<0.05$). Whereas the individuals with pain used approximately 31.8±18.3 packet/year cigarettes, the individuals without pain used appriximately 22.4±15.5 packet/year cigarettes and the difference is significant ($p<0.05$). According to the multivariate logis-

tic regression analysis with backwards elimination method, pain existence was found as PR:2.22 (95% GA:1.26–3.91) in terms of gender; as PR:1.97 (95% GA:1.02–3.81) in terms of DM existence and for each standard deviation increase in Fagerström scale point (2.7), it was found as OR:1.29 (95% GA:1.14–1.46).

Discussion

Smoking is still one of the most leading and preventable causes of morbidity and mortality in the world.[7] In the study by Öncel et al.,[8] the development rate of peripheral neuropathy in the patients with chronic obstructive pulmonary disease (COPD) was found as 15–93.8%. In other studies, it was shown that peripheric and central neuro systems are affected with nicotine in the actively smoking patients with COPD. In those studies, for the patients with COPD, long term exposition to hypoxemia and advanced age were shown as risk factors.[9,10]

The studies show that smoking in the DM1 and DM2 patients is a risk factor for the development of microvascular complications like diabetic peripheral neuropathy (DPN).[11]

Distal symmetric sensorimotor polyneuropathy (DSPN) is the most common neurological disorder in diabetes.[12] In another study focusing on the development of peripheral neuropathy in the DM2 patients, the risk of neuropathy development in the smoking patients was found higher.[13] Effective management of the diabetes could decrease the complication risk of the disease. When it is not managed well, the complications of diabetes such as heart disease, stroke, blindness, kidney problems and amputations can develop. Diabetes could result in loss of sense by preventing blood from reaching feet. As a result, feet injuries cannot be treated well and the individual cannot feel that his foot is burning or hurt.[14] In 25 diabetes patients with autonomous neuropathy, heat changes in leg skin during smoking and after smoking were analyzed. It was found out that autonomous neuropathy affects vasoconstriction associated with smoking in the cases with diabetes. It was thought that vasoconstriction associated with smoking is also smoking addicted since vasoconstriction is stronger in the group that use cigarettes with high nicotine level.[15]

In a prospective study performed with voluntary smokers and non-smokers in Havana, it was searched whether there is a difference between two groups in terms of metabolic and diet parameters or not. Thus, it was shown that the real leading cause of epidemic neuropathy found in Cuban smokers beforehand is smoking and low carotenoid and riboflavine resulted from low diet. Smoking accompanied with protein loss and iron deficiency, exposition to sunshine, physical activity level and high cigarette consumption and Vitamin B deficiency in diet are accepted as other precipitating factors.[16]

Cigarette smoke has about 4000 components most of which are toxic. Some of them are poisonous to ocular tissues and essentially affect eyes with ischemic and oxidative mechanisms. The list of ophthalmologic disorders associated with smoking keeps extending. The cataract development and age related macular degeneration, which are the leading causes of serious sight loss and blindness, are increasing directly in relation to smoking. Smoking irritates the conjuctival mucosa seriously. Exposition to passive smoking affects the eyes of the non-smokers as well.[17] Moreover, it was shown that there is a relation between smoking and optic neuropathy development.[18] In a meta-analysis study on the relation between smoking and carpal tunnel syndrome, it was found out that there is a relation in the cross sectional studies; and there is not a relation between case-control and cohort researches.[19]

In a clinical and electrophysiological study, conducted to define neuropathy frequency and features associated with arteriosclerosis, 29 male patients with arteriosclerosis were involved and causes of polyneuropathy were excluded. The clinical and electrophysiological findings of the one third of the patients with arteriosclerosis lead us consider sensorial axonal polyneuropathy. In some cases, paresthaesia was found but no change was seen in physical or electrophysiological examinations. Stimulated potentials showed diffuse changes in the central neuro transmisson. In some cases, this situation was associated with focal lesion findings.[20]

Smoking, affects the progress of the accompanying disease. Since the patients with an accompanying disease may have different features, it is important

to consider those differences while treating the tobacco habit. It was found that the smokers with an accompanying disease were more eager to respond to quit cigarette and evidence based quitting cigarette treatment.[21]

In the study by Benbow et al.[22] which is about the evaluation of the relation between diabetic neuropathy with chronic pain and smoking, 49 DM patients with smoking stories and 23 DM patients without chronic pain were compared. Their nicotine levels at that time were measured with an urine cotinine which is a nicotine metabolite and the result was given as cotinine/creatine rate. The amount of the cigarette used in a whole life was given as packet/year (20 cigarettes a day in a year equals to one packet year). The pain density at that time was evaluated by using visual analog scale. The existence of diabetic neuropathy with chronic pain was found with clinical story and examination. There was found no relation between smoking level at that time or beforehand and diabetic neuropathy with serious and long term chronic pain.

Limitations

Research is done in a day's time and we did not use a sample account for our research.

Conclusion

Smoking is a risk factor for neuropathic pain development. In the results of our study, it is seen that the probability of neuropathic pain development increases as smoking duration and addiction level increase. This rate increases even more in the individuals with diabetes diagnosis. It is quite important that the individuals who smoke should be informed about this matter.

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