CASE REPORT

The Reduction in the Demand for Nicotine Due to Pregabalin and Gabapentin: Two Cases

ME Ceylan[1], A Evrensel[1], BÖ Ünsalver[1], G Cömert[2]

ABSTRACT

Pregabalin and gabapentin are a new-generation anti-epileptic drugs. They show their effects through voltage-gated, calcium channels. Sedation and cognitive dysfunctions are among their side effects. There are some investigations which show that pregabalin and gabapentin may help in quitting smoking. In this study, two patients are presented: one who smoked 60 cigarettes per day for 10 years and her urge to smoke decreased after pregabalin treatment and she quitted smoking; and the other who smoked 40 cigarettes per day for 20 years and his urge to smoke decreased after gabapentin treatment and he quitted smoking. The use of pregabalin and gabapentin in the treatment of smoking cessation is discussed as well as their side effects.

Keywords: Gabapentin, nicotine, pregabalin, smoking

INTRODUCTION

Pregabalin and gabapentin are gamma-aminobutyric acid (GABA) analogues. They show their effects through voltage-gated, calcium channels (1). Only four studies that investigated the effect of pregabalin and gabapentin on the urge to smoke were found by searching MEDLINE (2–5). In these studies, some methodological problems, such as small sample size, short duration of treatment and a higher dropout rate, were present. In these studies, it was found that gabapentin and pregabalin decrease the urge to smoke compared to baseline studies. In this article, two long-time smokers—one who quitted smoking after the use of gabapentin and the other who quitted after the use of pregabalin—are presented.

CASE 1

A 39-year-old college graduate, married for eight years, and a mother of one female patient applied to the clinic with panic disorder symptoms. She was treated for panic disorder for 12 years. Despite the fluoxetine (40 mg/day) and alprazolam (3 mg/day) treatment, she had panic attacks a few times per month. Therapeutic drug monitoring (TDM) of fluoxetine and alprazolam was measured. The fluoxetine level was determined as 59.39 ng/mL (a therapeutic reference range: 120–500 ng/mL) and the alprazolam level was determined as 523.04 ng/mL (5–50 ng/mL) (6). According to these results, the fluoxetine level was evaluated as very low, and the alprazolam level was evaluated as very high. Due to the ineffective treatment, venlafaxine (75 mg/day) and pregabalin (300 mg/day) were initiated to her. Two weeks later, TDM of venlafaxine was determined as 123.78 ng/mL (100–400 ng/mL) and TDM of pregabalin was determined as 3.82 μg/mL (2–5 μg/mL) (6). Although the patient smoked 60 cigarettes per day for 10 years, she claimed in the fourth month of her treatment that she no longer had the urge to smoke, and quitted smoking. She said that she tried to quit smoking in the past but could not because she liked smoking. Due to the venlafaxine and pregabalin treatment, her anxiety scores decreased from 33 to 8. Her alprazolam (3 mg/day) treatment was terminated.

CASE 2

A 44-year-old college graduate, married for 10 years, and the father of a child patient, was admitted to the clinic for the treatment of alcohol dependence. He was hospitalized and escitalopram (20 mg/day), gabapentin (1200 mg/day) and diazepam (15 mg/day) treatment were initiated. Two weeks later, TDM of escitalopram

From: [1]Department of Psychiatry and Pharmacology, Üsküdar University, Etiler Clinic, Istanbul, Turkey and [2]Department of Psychology, Üsküdar University, Istanbul, Turkey.

Correspondence: Dr A Evrensel, Department of Psychiatry and Pharmacology, Üsküdar University, Etiler Clinic, Nisbetiye Cad. No: 19, Besiktas, Istanbul, Turkey. Email: alperevrensel@gmail.com

was determined as 33.46 ng/mL (15–80 ng/mL) and TDM of diazepam was determined as 148.75 ng/mL (200–2500 ng/mL) (6). Although he smoked 40 cigarettes per day for 20 years, in the fourth month of his treatment, he quitted smoking. He also currently continues to stay away from alcohol.

DISCUSSION

Nicotine stimulates the mesolimbic dopaminergic system and creates the effect of reward by increasing dopamine release in the nucleus accumbens (7). The nucleus accumbens contains GABAergic synapses (8). Vigabatrin (a new generation of anti-epileptic which prevents nicotine-dependent dopamine release in the nucleus accumbens of rats by inhibiting the GABA transaminase enzyme and thereby reducing the degradation of GABA), reduces the level of GABA and reduces nicotine self-administration (9, 10). Similarly, the baclofen, a $GABA_B$ receptor agonist, reduces nicotine self-administration (11). Baclofen was examined in 30 smokers for nine weeks. In this double-blind, placebo-controlled study, the incidence of daily smoking among the subjects who used baclofen was significantly lower than the placebo group (12). Positron emission tomography (PET) and limbic $GABA_A$ receptor levels were not high in the subjects who quitted smoking. These findings show that, in nicotine dependence, there are irregularities in the limbic $GABA_A$ receptor system (13). In light of these studies, drugs which increase GABAergic transmission may be useful in the treatment of nicotine addiction. However, there are a few studies which investigate drugs acting on the GABA in the treatment of nicotine addiction. In a recently published review study, new drug possibilities in the treatment of smoking cessation and the effects of glutamatergic and GABAergic systems in nicotine addiction are discussed (14). According to this study, the nicotine-dependent reward system is blocked and nicotine-seeking behaviour is prevented, due to the suppression of the glutamatergic transmission and increase of the GABAergic transmission. The authors emphasized the effects of the glutamatergic and GABAergic drugs in the treatment of nicotine addiction.

One of the two cases presented in this paper quitted smoking after the pregabalin treatment and the other, after gabapentin—a pharmacological-like drug treatment. It is remarkable that each of the cases quitted smoking in the fourth month of their treatment. In the studies which investigate the effects of pregabalin, gabapentin and other GABAergic drugs on smoking, the duration of treatment is less than 16 weeks. Therefore, in these studies, the difference, compared to placebo, may not be detected. Placebo-controlled and double-blind studies which investigate the use of pregabalin and gabapentin in a wide sampling, and observe for more than 16 weeks, are needed.

REFERENCES

1. Sills GJ. The mechanisms of action of gabapentin and pregabalin. Curr Opin Pharmacol 2006; **6:** 108–13.
2. White WD, Crockford D, el-Guebaly N, Patten S. A randomized, open-label pilot comparison of gabapentin and bupropion SR for smoking cessation. Nicotin Tob Res 2005; **7:** 809–13.
3. Sood A, Ebbert JO, Schroeder DR, Croghan IT, Sood R, Vander Weg MW et al. Gabapentin for smoking cessation: a preliminary investigation of efficacy. Nicotine Tob Res 2007; **9:** 291–8.
4. Sood A, Ebbert JO, Wyatt KD, Croghan IT, Schroeder DR, Sood R et al. Gabapentin for smoking cessation. Nicotine Tob Res 2010; **12:** 300–4.
5. Herman AI, Waters AJ, McKee SA, Sofuoglu M. Effects of pregabalin on smoking behavior, withdrawal symptoms, and cognitive performance in smokers. Psychopharmacology 2012; **220:** 611–17.
6. Hiemke C, Baumann P, Bergemann N, Conca A, Dietmaier O, Egberts K et al. AGNP consensus guidelines for therapeutic drug monitoring in psychiatry: update 2011. Pharmacopsychiatry 2011; **44:** 195–235.
7. Olmstead TA, Sindelar JL, Easton CJ, Carroll KM. The cost-effectiveness of four treatments for marijuana dependence. Addiction 2007; **102:** 1443–53.
8. Mansvelder HD, Keath JR, McGehee DS. Synaptic mechanisms underlie nicotine-induced excitability of brain reward areas. Neuron 2002; **33:** 905–19.
9. Dewey SL, Brodie JD, Gerasimov M, Horan B, Gardner EL, Ashby CR Jr. A pharmacologic strategy for the treatment of nicotine addiction. Synapse 1999; **31:** 76–86.
10. Paterson NE, Markou A. Increased GABA neurotransmission via administration of gamma-vinyl GABA decreased nicotine self-administration in the rat. Synapse 2002; **44:** 252–53.
11. Paterson NE, Froestl W, Markou A. The $GABA_B$ receptor agonists baclofen and CGP44532 decreased nicotine self-administration in the rat. Psychopharmacology 2004; **172:** 179–86.
12. Franklin TR, Harper D, Kampman K, Kildea-McCrea S, Jens W, Lynch KG et al. The $GABA_B$ agonist baclofen reduces cigarette consumption in a preliminary double-blind placebo-controlled smoking reduction study. Drug Alcohol Depend 2009; **103:** 30–6.
13. Stokes PR, Benecke A, Myers J, Erritzoe D, Watson BJ, Kalk N et al. History of cigarette smoking is associated with higher limbic $GABA_A$ receptor availability. Neuroimage 2013; **69:** 70–7.
14. Li X, Semenova S, D'Souza MS, Stoker AK, Markou A. Involvement of glutamatergic and GABAergic systems in nicotine dependence: Implications for novel pharmacotherapies for smoking cessation. Neuropharmacology 2014; **76:** 554–65.

© West Indian Medical Journal 2025.
This is an article published in open access under a Creative Commons Attribution International licence (CC BY). For more information, please visit https://creativecommons.org/licenses/by/4.0/deed.en_US.