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Comparing the Effect of Nicotine Replacement Therapy, Bupropion and their Combination: An Interventional Approach in a Smoking Cessation Clinic

Jyothi vijayan[1*], Ambili.V[2], Aravind.S[3], Abdul Samad.M.V[4], Sareena Alungath[5]

[1,2,3] Pharm D, National College of Pharmacy, Department of Pharmacy Practice, KMCT Medical College Hospital, Kozhikode, Kerala, India.

[5]National college of pharmacy, department of pharmacy practice, KMCT Medical College Hospital, Kozhikode, Kerala, India.

[4]KMCT Medical College Hospital, Department of Pulmonary Medicine, Kozhikode, Kerala, India.

Abstract

Objectives:Pharmacologic therapy have a major role in smoking cessation.The study aims to compare the effect of NRT(Nicotine Replacement Therapy),Bupropion and their combination in a smoking cessation clinic.

Materials and methods:A prospective interventional study was carried out in 6 months enrolling 100 patients.During the first meeting with the patients,their FTND(Fagerstrom Test for Nicotine Dependence)score was used to access nicotine dependence.Pharmacologic therapies were done depending on the FTND score.Reviews were taken after two weeks using FTND.Data evaluated using SPSS version 2.0.

Results:Pharmacologic therapy were given to the patient depending on the FTND score.Patients were categorized into three groups:NRT(33 patients),Bupropion(33 patients) and combination of NRT and bupropion(34 patients).

Upon analysis of the scores,the smoking cessation rate of the groups were 57.5%(NRT),15.1%(Bupropion) and 29.4%(combination of NRT and

* Corresponding Author (Jyothi vijayan):
Pharm D, National college of pharmacy, Department of Pharmacy Practice,
KMCT Medical College Hospital, 673602, Kozhikode, Kerala, India.
Email ID: parvathyparvathy1995@gmail.com

bupropion)respectively,which were statistically significant($p<0.001$) and the overall success rate was 29%.

The highest relapse rate was for bupropion group(84.8%) followed by the group who had received combination of NRT and bupropion(70.5%).The main factors leading to relapse emerged to be lack of family support,lack of determination,stress and social inhibition.

Conclusion:Nicotine Replacement Therapy has been found to be more effective in promoting abstinence from smoking compared to other pharmacologic therapies.

Keywords: FTND,NRT,Bupropion,Pharmacologic therapy,smoking cessation.

INTRODUCTION

Smoking is the leading cause of preventable morbidity and mortality worldwide[1] . Smoking cessation significantly improves life expectancy, decreases morbidity and reduces healthcare costs associated with smoking-related conditions[1]. The Food and Drug Administration has approved seven medications for this purpose: 5 nicotine replacement therapies, bupropion, and varenicline. In addition, the antihypertensive medication clonidine and the tricyclic antidepressant nortriptyline are sometimes used as second-line agents for smoking cessation, but their use is not FDA approved for this indication[1]. The most widely used product in Europe and the United States is NRT, which increases smoking cessation rates at one year by approximately 70% [1].

Pharmacotherapy is appropriate in patients who are found to be nicotine dependent. Medicines are most effective when given in combination with behavioral support [2]. The most widely available pharmacotherapy based options are nicotine replacement therapy, varenicline, and bupropion. All these drugs have been shown to be effective in a range of patient populations including smokers with depression, schizophrenia and cardiac and respiratory diseases [2]. Moreover, no new medications have been approved by the FDA since varenicline in 2006 [3]. Head to head comparisons between bupropion and nicotine replacement immunotherapy showed equal efficacy. Clinical suitability and patient preference are important in guiding the choice of pharmacotherapy or combination of therapies [2]. Pharmacotherapy aims to reduce the intensity of withdrawal phenomena and probably works by reducing the frequency and/or intensity of urges to smoke [4].

Nicotine Replacement Therapy (NRT) is a smoking cessation aid used to ameliorate nicotine withdrawal symptoms by providing a nontobacco, controlled-release amount of nicotine [5]. NRT is the oldest and most widely used smoking cessation pharmacotherapy; it works by providing nicotine in a non-combustible form to alleviate nicotine withdrawal symptoms as a smoker quits [6]. This aims to reduce motivation to smoke and the physiological and psychological withdrawal symptoms often experienced during a quit attempt [7]. The treatment was first developed in the 1970s

and is widely available on prescription, or as an OTC purchase in many countries [7].Nicotine replacement therapy is available in a long-acting form (nicotine patch) and in several short-acting products (nicotine gum, inhalator, mouth spray, lozenge, micro tablet, nasal spray). Other forms are in development [6].Nicotine replacement therapy is generally safe and well tolerated [2]. Side effects, which can include nausea, headache, and dizziness are generally mild and improve over time [2]. Nicotine patches can cause skin irritation and disturbed sleep, and oral preparations can cause hiccups, sore mouth, and heartburn [2]. NRT comes in various formats but the most notable difference is between the nicotine patch and all other forms as it requires once daily application compared to others [4]. NRT helps smokers quit by three mechanisms: Reducing withdrawal symptoms, which can promote relapse, Partially satisfying cravings, Preserving effects such as desirable mood, attention states, and handling stressful or boring situations [8].

Nicotine gum is designed to release nicotine when chewed, allowing the drug to be absorbed through the buccal mucosa; Food and drink affect the absorption of the nicotine, and patients must be counselled to avoid food or drink for 15 minutes before using the gum [8]. This product is available over the counter in 2mg and 4mg products; The 4mg product is best for people who smoke more than 20-25 cigarettes per day. Patients should chew the gum slowly until they feel a mild tingling sensation, then park the gum between the cheek and gum till the sensation ends; This process should be repeated for around 30 minutes per piece of gum. Patients generally absorb 0.8 to 0.9 mg of nicotine from a 2mg piece of gum [8].

Bupropion was developed as a non-TCA and is sometimes preferred by smokers who do not wish to use a nicotine-based treatment, or who have already failed to quit using NRT [7]. Bupropion is an antidepressant that has both noradrenergic and dopaminergic activity; It is a weak blocker of the neuronal uptake of serotonin and norepinephrine and also inhibits the neuronal reuptake of dopamine to some extent [8]. The usual dose for smoking cessation is 150mg once a day for 3 days increasing to 150mg twice a day, continued for 7 to 12 weeks. The quit attempt is generally initiated a week after starting pharmacotherapy [7]. Nicotine stimulates the release of dopamine, norepinephrine, and other neurotransmitters, which become important in the development of nicotine dependence [8]. Bupropion was originally developed as an antidepressant. It reduces both the urge to smoke and symptoms of nicotine withdrawal [2]. There is a further modest increase in efficacy when it is combined with nicotine replacement therapy [2].Bupropion is contraindicated in patients with a history of seizures and eating disorders and patients taking monoamine oxidase inhibitors. The major safety concern with bupropion is a risk of seizure, a rare but serious complication that also occurs with other antidepressants[6].

METHODS

Study population

A minimum of 100 patients who visited KMCT smoking cessation clinic,who smoke

and wanted to quit were included in the study.They received pharmacological therapy and the 6 months follow-up was completed.Patients who skipped follow-up visits and who were not agreeing to use the medication regularly as prescribed were excluded from the study.

Study design

In this prospective interventional study,all necessary documentation was recorded which include demographic details,laboratory and clinical findings,FTND score for monitoring nicotine dependence and also treatment choices.

Categorized the patients into three groups:NRT,bupropion and combination of NRT and bupropion.Ethical clearance was obtained from the Institutional Ethics Committee of National College of Pharmacy,Manassery,Calicut(IEC/IRB No:NCP/IEC/2017/No:077).

Pharmacological regimen

In the NRT group,Nicotine gum was used to fight cravings.For the group which receive bupropion,patients were given sustained-release bupropion at 150mg/day for 3 days and then given 150mg twice daily for the remaining 12 weeks.In the group which received combination of NRT and bupropion,patients were given 150mg/day and then given twice daily depending on the score.

Statistical analysis

Data was evaluated using SPSS version 2.0.Data were expressed as percentage,mean,standard deviation and 95% confidence interval.Findings were found to be statistically significant at $p<0.001$.

RESULTS

A prospective interventional study was conducted in smokers for a period of 6 months.The study aimed to compare the effect of bupropion,NRT and their combination in a smoking cessation clinic.The patients' nicotine addiction was found out using FTND scale.They were given treatment according to the score.The score was assessed during each follow-up.

Table 1: Patient's characteristics at admission

Parameters	NRT	Bupropion	NRT + Bupropion
Age,years(mean+-SD)	56+-16.9	55+-17.1	54+-18.1
Smoking start age,years	23.59+-10.74	24.1+-9.81	23.4+-11.36
Cigarettes/day(mean+-SD)	20.9+-9.24	21.1+-18.39	20.8+-9.47
FTND score(mean +- SD)	5.85+-2.31	4.85+-3.31	5.62+-2.45

A 6 months study involving 100 patients were assessed using FTND.ut of these,33 patients received NRT,33 received bupropion and remaining 34 received combination of NRT and bupropion.The overall smoking cessation rate after 6 months was 29%.As mentioned in Table 2,the smoking cessation rates for NRT,bupropion and their combination were 57.5%,15.1% and 29.4% respectively and were statistically significant($p<0.001$).

The relapse rates for NRT,bupropion and their combination were 42.4%,84.8% and 70.5% respectively and were statistically significant($p<0.001$).The main factors causing relapse were lack of family support,patient's lack of determination,social inhibition,stress and short study period.

Table 2: Rates of success and relapse according to treatments at the end of six months

	Success		**Relapse**	
Treatments	**N**	**%**	**N**	**%**
NRT	19	57.5%	14	42.4%
Bupropion	5	15.1%	25	84.8%
NRT + Bupropion	10	29.4%	24	70.5%

DISCUSSION

A prospective interventional study was conducted in a tertiary care hospital to compare the effect of NRT,bupropion and their combination in smoking cessation clinic.100 patients were enrolled in the study.Patients were selected based on the inclusion and exclusion criteria stated in the protocol.

Patients' follow-up were conducted six times during the 12-week period.Follow-up was conducted once every 2 weeks.

Elif Yilmazel Ucar et al 2014 study showed that Nicotine replacement therapies were more effective at promoting abstinence compared to other pharmacologic therapies[1].

From our study,it is evident that NRT is highly effective in promoting abstinence with a success rate of 57.5% followed by combination of NRT and bupropion which had a success rate of 29.4%.

The relapse rate of bupropion was the highest(84.8%) followed by combination of NRT and bupropion(70.5%).Smoking cessation is both physically and psychologically challenging.The rate of success is very low without assistance.

Japuntich SJ et al 2011 study showed that NRT treatment shown to more effectively aid initial abstinence compared to bupropion[9].

The current study showed that the highest relapse rate was in the bupropion group(84.8%).

CONCLUSION

In conclusion,Nicotine Replacement therapy can be used as the first treatment of choice where contraindications are absent.

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