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Original Research Article

Effects of smoking cessation on pulmonary function and quality of life

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ABSTRACT

Background: Cigarette smoking is a major public health problem and is the most important cause of chronic obstructive pulmonary disease (COPD). This study shows the importance of smoking cessation for improvement in respiratory function and quality of life and brings out the potential usage of pharmacological and behavioural therapy for the same.
Methods: This prospective study was conducted on 50 male smokers at Kilpauk Medical College, Chennai. During the treatment only 43 patients were continued till the end of follow up. During the period, varenicline treatment was given for three months as per schedule, regular periodic counselling was given to these patients and followed up for a period of 1 year. Forced expiratory volume at one second (FEV1), COPD assessment test (CAT) scoring, 6 min walk test (6MWD), BODE index, was taken before starting therapy and on 3rd month and at the end of one year of follow-up. All the values obtained were analysed statistically.
Results: The mean age of the 43 patients was 44.7±7.34, mean BMI was 22.27±4.24. The mean difference between pre and post treatment scores of CAT, 6MWD and BODE index were found to be statistically significant ($p<0.0001$).
Conclusions: Combined behavioural counseling and pharmacotherapy with varenicline significantly improved the odds of achieving tobacco abstinence in the participants by the end of one year of treatment.

Keywords: BODE index, COPD assessment test, Quality of life, 6MWD

INTRODUCTION

Smoking is an important public health aspect and it is a leading cause of premature mortality and disability.[1] It is the important risk factor usually in 50% of people with COPD (chronic obstructive pulmonary disease) and causes about 80% of all related deaths.[2] The fatality rate is about 90% of all lung cancer due to smoking.[3] Hence, the adverse effects of smoking and beneficial effects of it's quitting on quality of life have raised the attention.

Smoking cessation is a very important strategy to be implemented to reduce the adverse symptoms of COPD in case of smokers. This strategy was also associated with improvement of FEV1among sustained quitters (participants who were biochemically validated as abstinent at every annual visit) 1 year after enrolment.[4,5] However, very limited information is available concerning the time course of improvement in lung function and health-related quality of life (QoL) among COPD patients at initial time points in the same year resulting smoking cessation.

This study shows the importance of smoking cessation for improvement in respiratory function and quality of life and brings out the potential usage of pharmacological and behavioural therapy for the same. The present study was done with the aim, to evaluate the improvement in BODE index, CAT score, 6 min walk distance and FEV1 after smoking cessation and to evaluate the effectiveness of varenicline in smoking cessation.

METHODS

Authors conducted prospective cohort study with patients attending the smoking cessation clinic during the study period (from August 2016 to October 2017) at Kilpauk Medical College, Chennai after getting approval from institutional ethics committee. 50 smokers, all males of age 30 to 60 years with smoking index >10 who were motivated and willing to quit smoking and attended counseling and were started on varenicline drug therapy were included in the study.

During their period of treatment, regular periodic counselling along with pharmacological treatment using varenecline was given to these patients. Initial PFT, BODE index, 6 min walk test, CAT scoring was done at the time of initiating treatment. The above indices were again evaluated at the end of 3 months and at the end of 1 year.

Statistical analysis

All the collected data were analysed statistically and expressed as the mean and standard error of the mean. A P-value of less than 0.05 was considered statistically significant.

RESULTS

The study included data of 50 cases. The mean age of the patients was 44.7±7.34. The mean BMI was 22.27±4.24 with all 50 as males. 43 patients quit smoking and maintained it. 7 defaulted and did not return for treatment continuation. FEV1, CAT scoring, BODE index and 6minute walk distance were evaluated before therapy, at end of 3 months and at the end of one year. For these 43 patients, mean pre-treatment and post treatment FEV1 were 1.68±0.29, 1.67±0.29 (end of 3rd month) and 1.66±0.29 (end of 1 year) respectively (Figure 1).

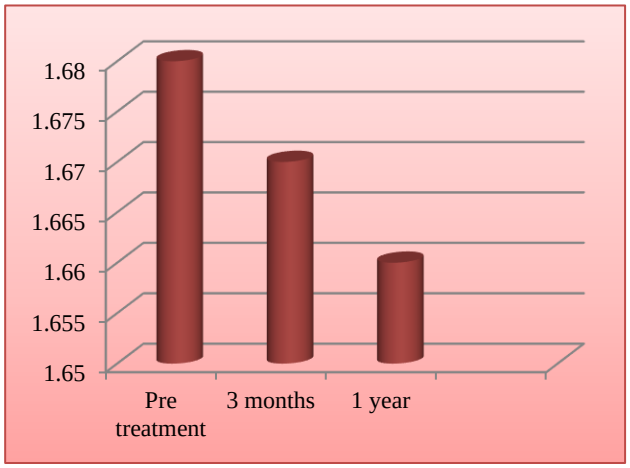

Figure 1: FEV1 comparison pre and post therapy (3 months and 1 year).

There was no accelerated decline in FEV1 and only age related decline was seen in majority. The mean pretreatment and post treatment CAT score were 22.84±4.6, 21.04±4.42 (end of 3 months) and 17.90±4.25 (1 year) respectively with a clinical as well as statistical significance (p<0.0001) (Figure 2).

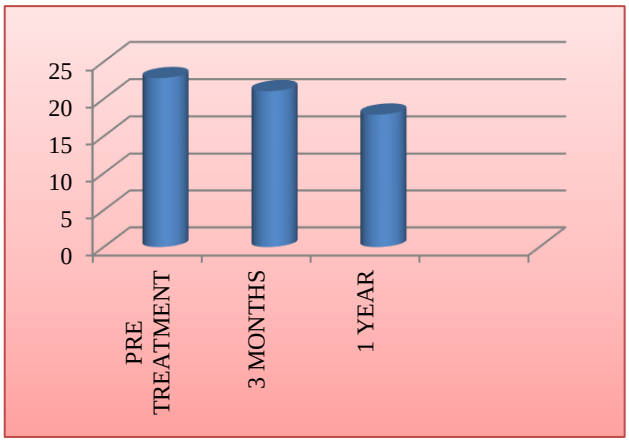

Figure 2: CAT score comparison pre and post therapy (3 months and 1 year).

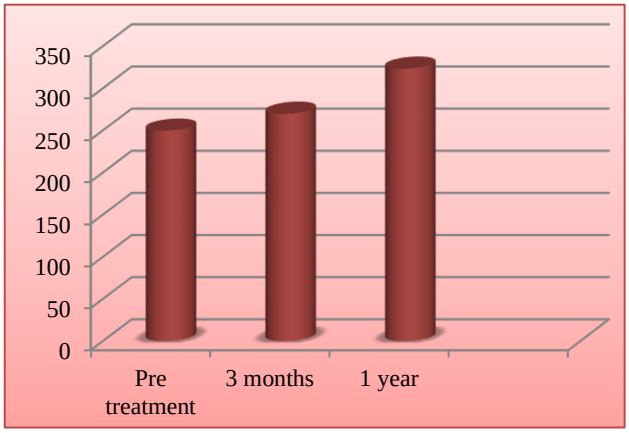

Figure 3: 6MWD comparison in pre and post therapy (3 months and 1 year).

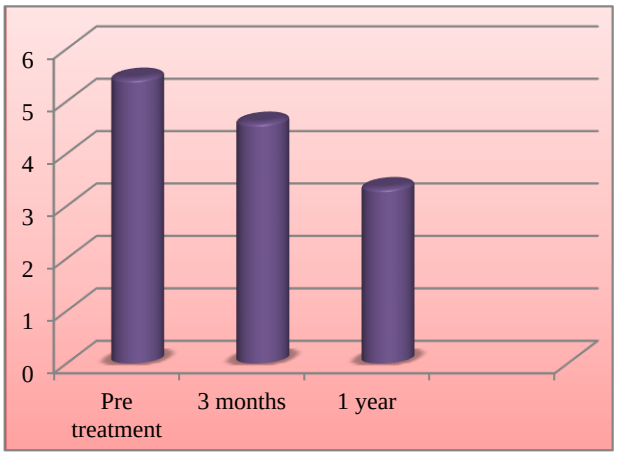

Figure 4: BODE index comparison in pre and post therapy (at 3 months and 1 year).

The mean pretreatment and post treatment 6 min walk distance were 249.34±41.99, 269.44±37.67 (3 months) and 322.95±39.41 (1 year) respectively (p<0.0001) (Figure 3). The mean pretreatment and post treatment BODE index were 5.44±1.38, 4.60±1.27 (3 months) and 3.35±1.13 (1 year) respectively (p<0.0001) (Figure 4). FEV1 didn't improve much with smoking cessation but symptoms reduced significantly with smoking cessation even at the end of third month itself which was statistically also significant.

DISCUSSION

The present prospective study on 50 patients determined that quality of life was improved in patients during the 3-months follow-up among smokers who participated in a smoking cessation programme. Smoking cessation is the most significant intervention to reduce the possibility of cardiovascular and respiratory diseases in smokers.[6] The improvement was assessed by using many simple evaluating methods.

A new system COPD assessment test (CAT) was implemented to evaluate the effect of health status of the COPD patients. This is a validated and standard test used for the evaluation of patient's health.[7] Measuring forced expiratory volume at one second (FEV1) is an important factor for evaluating and monitoring the pulmonary function of COPD patients.[8] The CAT and FEV1 are both reliable methods for measuring the management response and development of disease severity in COPD patients.[9,10]

BODE index is a multidimensional grading system (based on body mass index, airway obstruction, dyspnea scale, and exercise capacity), for evaluating the health-related quality of life in COPD patients which includes evaluating factors of subjective symptoms and impairment in which St. George's Respiratory Questionnaire (SGRQ) does not contain.[11-13]

Six minutes walking test (MWD) was developed to evaluate the functional capacity of the individual during different chronic diseased conditions like COPD, heart diseases, osteoarthritis, fibromyalgia etc.[14-17]

Varenicline is a partial nicotinic acetylcholine receptor agonist. This drug competitively inhibits the ability to bind nicotine at its receptor sites in the brain. It is recognized that this activation facilitates the withdrawal symptoms.[18] In this study, varenicline is used in smoking cessation therapy. Many studies reveal that varenicline, is more effective in terms of efficacy and cost than nicotine replacement therapy.[19,20]

In the present study, the findings of the study demonstrated a significant decline in CAT and BODE index and showed a significant improvement in 6 MWD in patients who quit smoking after smoking cessation counseling and varenicline usage.

Many longitudinal studies showed that smoking cessation reduces the rate of decline of FEVI almost equal to that of never smoker.[21,22] Significant decline in CAT score and improvement in 6 MWD after smoking cessation was supported by Polosa et al.[23] In his study the smoking cessation group received E-cigars (Electronic cigarettes) instead of drug therapy.

BODE score has a high value in evaluating COPD severity and predicting mortality of the affected patients.[24] A significant decline in BODEX score was observed in the present study. This reveals that a correlation existed between BODEX index and other associated investigations.

CONCLUSION

The finding of the study confirms that clinical and functional improvement was seen in patients who quit smoking. Not every attempt made by a smoker will be successful. But combined behavioural and pharmacotherapy significantly improves the odds of achieving tobacco abstinence. Clinician plays an important role in this venture as prevention is better than cure.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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