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Original Research

Evaluation of role of Rosuvastatin in COPD patients

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ABSTRACT:

Background: Chronic obstructive pulmonary disease is a chronic respiratory disease characterized by a decline in lung function over time and accompanied by respiratory symptoms, primarily dyspnea, cough, and sputum production. The present study was conducted to determine effect of rosuvastatin in patients of COPD. **Materials & Methods:** 56 patients of COPD of both genders were divided into 2 groups. Group I received rosuvastatin 10 mg orally once daily and group II received placebo matching the active drug. In all patients, forced vital capacity (FVC), forced expiratory volume at 1 second (FEV_1), FEV_1/FVC, and peak expiratory flow rate (PEFR) was recorded. **Results:** The mean age in group I was 61.2 years and in group II was 63.4 years, BMI was 19.2 kg/m^2 in group I and 18.7 kg/m^2 in group II, heart beat was 84.5 beats/minute in group I and 89.2 beats/minute in group II. The difference was non- significant (P> 0.05). There was significant increase in FEV1 and FEV1/FVC in group II as compared to group I (P< 0.05). **Conclusion:** Authors found that rosuvastatin found to be better in COPD patients in reducing FVC, FEV1, FEV1/FVC as compared to placebo.

Key words: COPD, Peak expiratory flow rate, Rosuvastatin

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a chronic respiratory disease characterized by a decline in lung function over time and accompanied by respiratory symptoms, primarily dyspnea, cough, and sputum production. Consequently, COPD is associated with a significant economic burden, including hospitalization, work absence, and disability. Current data suggest that COPD mortality is increasing, and by 2020, COPD is predicted to be the third-leading cause of death worldwide.[1]

The severity of COPD can be determined and classified by different methods. Incidence and prevalence estimates differ greatly, depending on the methods used for diagnosis and classification. It is important to understand the true epidemiology of COPD to monitor trends over time and to determine the effectiveness of potential treatments or preventive measures.[2]

The lipid-lowering drugs and statins improve the function of endothelium by decreasing vascular remodeling, inhibit vascular inflammation and oxidation, and thereby stabilize vascular plaques.[3]Systemic inflammation influences COPD and statins have shown to lower systemic inflammation through inhibition of guanosine triphosphatases and inhibit inflammation mediated by nuclear factor-kappa B and interleukin-6 (IL-6). Statins by their anti-inflammatory action can have a beneficial effect on COPD patients.[4] By stabilizing endothelial nitric oxide synthase (eNOS) mRNA, they enhance nitric oxide production and augment eNOS phosphorylation and catalytic activity. Such actions make them useful drugs in PH. Statins have shown the variable effects on lung functions and PH in various studies.[5] The present study was conducted to determine effect of rosuvastatin in patients of COPD.

MATERIALS & METHODS

The present study was conducted in the department of Pharmacology. It comprised of 56 patients of COPD of both genders. All were informed regarding the study and written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups. Group I received rosuvastatin 10 mg orally once daily and group II received placebo matching the active drug. In all patients, forced vital capacity (FVC), forced expiratory volume at 1 second (FEV_1), FEV_1/FVC, and peak expiratory flow rate (PEFR) was recorded. 6-min walk test was also done. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Parameters	Group I	Group II
Drug	Rosuvastatin	Placebo
Male	12	15
Female	16	13

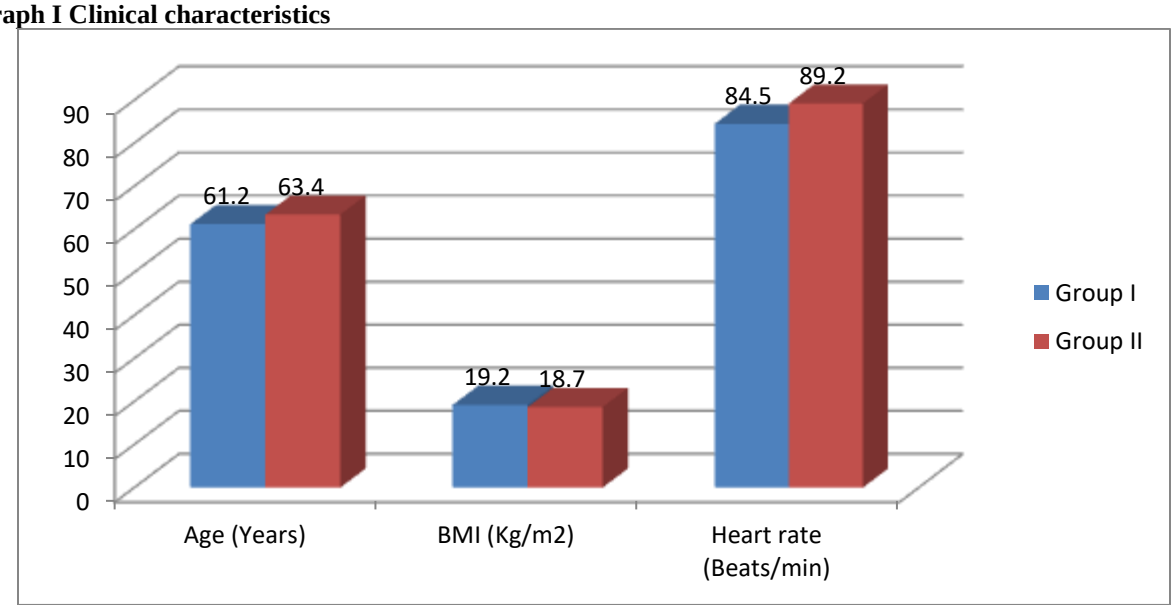
Table I shows that group I patients were given Rosuvastatin and group II patients were given Placebo. There were 12 males and 16 females in group I patients, and 15 males and 13 females in group II.

Table II Clinical characteristics

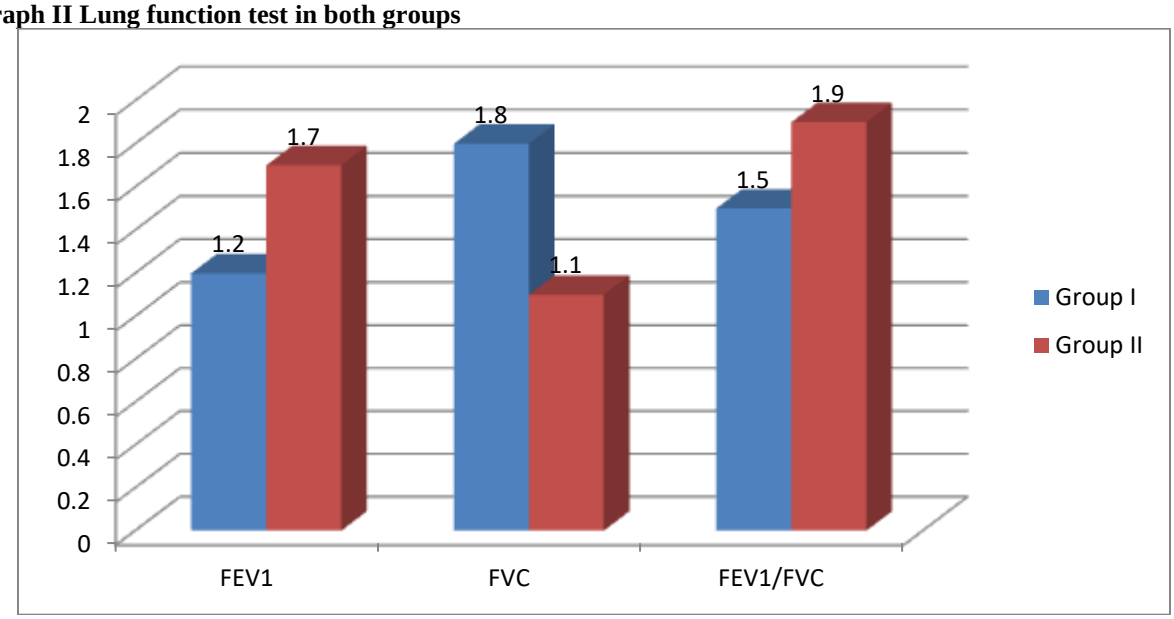
Parameters	Group I	Group II	P value
Age (Years)	61.2	63.4	0.82
BMI (Kg/m^2)	19.2	18.7	0.06
Heart rate (Beats/min)	84.5	89.2	0.71

Table II, graph I shows that mean age in group I was 61.2 years and in group II was 63.4 years, BMI was 19.2 kg/m^2 in group I and 18.7 kg/m^2 in group II, heart beat was 84.5 beats/minute in group I and 89.2 beats/minute in group II. The difference was non- significant (P> 0.05).

Graph I Clinical characteristics



Graph II Lung function test in both groups



Graph II shows that mean FEV1 in group I was 1.2, in group II was 1.7, FVC was 1.8 in group I and 1.1 in group II, FEV1/FVC was 1.5 in group I and 1.9 in group II. There was significant increase in FEV1 and FEV1/FVC in group II as compared to group I (P< 0.05).

DISCUSSION

Chronic Obstructive Pulmonary Disease (COPD) is a chronic disease and a major cause of disability. Although the disease primarily affects the respiratory system, there are also major systemic consequences. COPD causes an array of symptoms, one of which is the subjective sensation of fatigue.[6] There are several studies addressing this perception of fatigue in COPD. However, there are differences in definitions, interpretation and assessment of fatigue, resulting in confusion and making comparison between studies difficult. The sensation of fatigue may be defined in various ways as tiredness, lack of energy, exhaustion or weakness.[7] Studies identify fatigue in a variety of ways: as one of the symptoms of the disease, patients' complaint, a subjective multi-component experience, part of general health measure or an independent variable affecting many areas of a patient's health and function. [8]

Rosuvastatin is a new generation of methane-sulfonamide pyrimidine and N-methane sulfonylpyrrole-substituted 3, 5-dihydroxy-heptenoates.[9] It has low lipophilicity and strong interaction with 3-hydroxy-3-methyl-glutaryl-coenzyme A reductase enzyme. In comparison to atorvastatin, simvastatin, and pravastatin, rosuvastatin 10–40 mg is more efficacious in improving the lipid profile of patients with hypercholesterolemia. Rosuvastatin has shown to achieve a significant cholesterol reduction in 6 weeks.[10] The present study was conducted to determine effect of rosuvastatin in patients of COPD.

In present study, group I patients were given Rosuvastatin and group II patients were given Placebo. There were 12 males and 16 females in group I patients, and 15 males and 13 females in group II. The mean age in group I was 61.2 years and in group II was 63.4 years, BMI was 19.2 kg/m2 in group I and 18.7 kg/m2 in group II, heart beat was 84.5 beats/minute in group I and 89.2 beats/minute in group II. Chogtu et al[11] in its study conducted in patients with COPD and PH, a total of sixty patients were assigned to receive either rosuvastatin 10 mg or placebo once a day in addition to their conventional treatment for 12 weeks. Routine blood investigations, pulmonary functions, echocardiogram, exercise capacity, and QOL using a questionnaire were assessed at the baseline and after 12 weeks. In patients of rosuvastatin group, there was a statistically significant increase in peak expiratory flow rate (PEFR) (P = 0.04) but no significant change in other pulmonary functions: Forced vital capacity (FVC), forced expiratory volume at 1 s (FVC, FEV1, FEV1/FVC), and echocardiogram parameters. There was a significant increase in 6-min walk test (6-min walk distance) (P = 0.03) at the end of 12 weeks. On comparing with placebo, rosuvastatin showed a significant reduction (P = 0.045) in COPD exacerbations while adverse effects did not differ.

We found that there was significant increase in FEV1 and FEV1/FVC in group II as compared to group I (P< 0.05). The mean FEV1 in group I was 1.2, in group II was 1.7, FVC was 1.8 in group I and 1.1 in group II, FEV1/FVC was 1.5 in group I and 1.9 in group II. Rubinstein et al[12] showed that statin therapy in

hypercholesterolemic patients for at least 6 months resulted in a small decrease in myocardial function of lateral wall (measured by TDI), which could be possibly due to statin-induced myopathy of cardiac muscle. However, another study demonstrated a significant improvement in LV systolic and diastolic velocities after 6 months of atorvastatin therapy with no such change in LVEF. Few other TDI studies in nonheart failure patients and heart failure patients' favored that statins improve myocardial function.[13]

CONCLUSION

Authors found that rosuvastatin found to be better in COPD patients in reducing FVC, FEV1, FEV1/FVC as compared to placebo.

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