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Original Article

Assessment of impact of Rosuvastatin in patients with COPD: A Clinical Study

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ABSTRACT:

Background: It has become increasingly recognized that chronic obstructive pulmonary disease (COPD) is a systemic disorder characterized not only by pulmonary but also by systemic inflammation.Statins, also known as 3-Hydroxy-3-methylglutaryl (HMG)-CoA reductase inhibitors, are the most common medications used to treat hyperlipidaemia. Hence; we conducted the present investigation to assess the effect of rosuvastatin in patients with chronic obstructive pulmonary disease (COPD). **Materials & methods:** The present investigation included evaluation of effect of rosuvastatin in patients with chronic obstructive pulmonary disease (COPD). A total of 30 patients were included in the present study. Random distribution of all the patients was done into two study groups, with 15 patients in each group. The first group received rosuvastatin 10 mg orally once daily and the second group received placebo matching the active drug. Evaluation of the patients was done after 90 days for assessing the outcome. Following Pulmonary function indices were assessed for assessing the outcome:Forced vital capacity (FVC),Forced expiratory volume at 1 s (FEV1), and FEV1/FVC.Comparison of the results was done by SPSS software. **Results:** A total of 30 patients with COPD were included in the present study. Mean age of the patients of the placebo group and the Rosuvastatin group was found to be 60.5 years and 62.1 years respectively. We observed a significant alteration in the mean pulmonary functional indices while comparing the values in the placebo group and Rosuvastatin group (P-value < 0.05). **Conclusion:** A significant decrease in the COPD exacerbation was observed in patients on Rosuvastatin therapy.

Key words: Chronic obstructive pulmonary disease, Rosuvastatin.

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INTRODUCTION

During the past few years, it has become increasingly recognized that chronic obstructive pulmonary disease (COPD) is a systemic disorder characterized not only by pulmonary but also by systemic inflammation.[1- 3] The important pathophysiological role of comorbidities in the morbidity and increased mortality associated with COPD has also recently become clear. It has been proposed that the systemic inflammatory component is a link between COPD and its comorbidities, including cardiovascular disease (CVD).[4- 6]

Statins, also known as 3-Hydroxy-3-methylglutaryl (HMG)-CoA reductase inhibitors, are the most common medications used to treat hyperlipidaemia. Beside of their effectiveness in lowering cholesterol, the latest researches have highlighted the pleiotropic properties of statins, including antiproliferative and anti-inflammatory effects.[7, 8]

Hence; we conducted the present investigation to assess the effect of rosuvastatin in patients with chronic obstructive pulmonary disease (COPD).

MATERIALS & METHODS

The present investigation was planned in the department of pharmacology and pulmonary medicine of Govt. medical college, Jammu, and it included evaluation of effect of rosuvastatin in patients with chronic obstructive pulmonary disease (COPD). Screening of the patients with COPD was done. Exclusion criteria for the present stud included:

- Patients with history of any other respiratory disorder,
- Patients with history of any other associated co-morbidity,
- Patients with any know drug allergy
- Pregnant subjects

Complete investigations were performed in all the patients and baseline values were recorded. A total of 30 patients were included in the present study. Random of all the patients was done into two study groups, with 15 patients in each group. The first group received rosuvastatin 10 mg orally once daily and the second group received placebo matching the active drug. Evaluation of the patients was done after 90 days for

assessing the outcome. Following Pulmonary function indices were assessed for assessing the outcome. Following parameters were evaluated:

- Forced vital capacity (FVC),
- Forced expiratory volume at 1 s (FEV1),
- FEV1/FVC,

Comparison of the results was done by SPSS software. Chi-square test was used for evaluation of level of significance. P- value of less than 0.05 was taken as significant.

RESULTS

A total of 30 patients with COPD were included in the present study. Mean age of the patients of the placebo group and the Rosuvastatin group was found to be 60.5 years and 62.1 years respectively. Mean BMI of the patients of the placebo group and the Rosuvastatin group was 18.5 and 19.3 Kg/m^2 respectively. Mean haemoglobin levels of the patients of the placebo group and the Rosuvastatin group was 14.3 and 13.8 g/dL respectively. We observed a significant alteration in the mean pulmonary functional indices while comparing the values in the placebo group and Rosuvastatin group (P-value < 0.05).

Table 1: Demographic and clinical details of the patients

Parameter	Placebo group (n=15)	Rosuvastatin group (n=15)	P- value
Mean age (years)	60.5	62.1	0.25
Mean BMI (Kg/m^2)	18.5	19.3	0.51
Mean haemoglobin (g/dL)	14.3	13.8	0.77

Graph 1: Demographic and clinical details of the patients

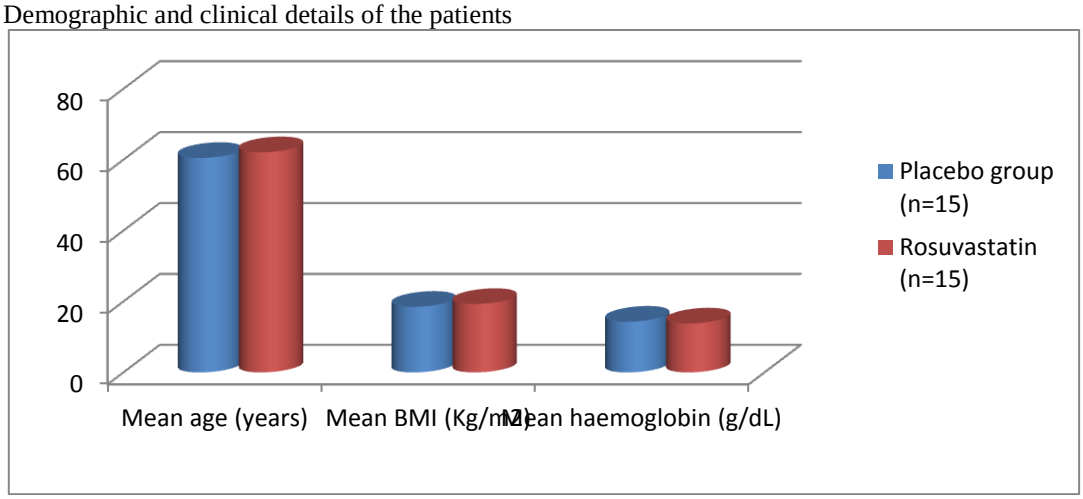
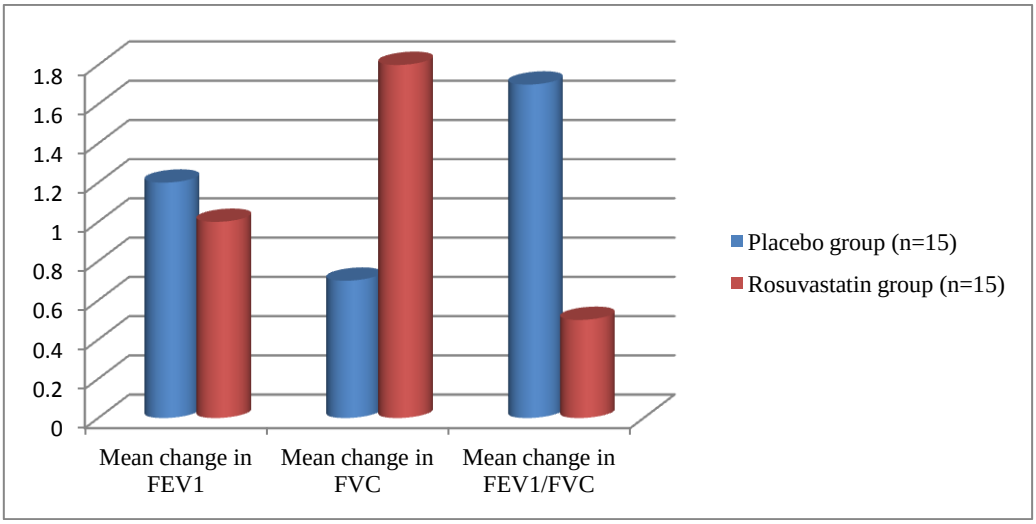


Table 2: Comparison of mean change in the pulmonary function indices

Parameter	Placebo group (n=15)	Rosuvastatin group (n=15)	P- value
Mean change in FEV1	1.2	1	0.02*
Mean change in FVC	0.7	1.8	
Mean change in FEV1/FVC	1.7	0.5	

*: Significant



DISCUSSION

In the present study, we analyzed a total of 30 patients with COPD. We observed a significant alteration in the mean pulmonary functional indices while comparing the values in the placebo group and Rosuvastatin group (P-value < 0.05). Neukamm A et al examined whether statin therapy is associated with enhanced endothelium-dependent vascular function, improved pulmonary function and reduced systemic inflammation in patients with chronic obstructive pulmonary disease (COPD). Patients with stable COPD (n = 99) were assigned randomly to receive rosuvastatin 10 mg (n = 49) or matching placebo (n = 50) once daily for 12 weeks. The primary outcome measure was change in endothelium-dependent vascular function measured using peripheral arterial tonometry and expressed as the reactive hyperaemia index. Secondary end-points were change in pulmonary function, as assessed by forced expiratory volume in 1 s (FEV1) and FEV1/forced vital capacity (FVC), and change in the circulating levels of the inflammatory markers interleukin-6 (IL6) and high-sensitivity C-reactive protein (hsCRP). In the overall study population, no significant between-group difference in change in endothelium-dependent vascular or pulmonary function was observed. Rosuvastatin therapy was associated with a reduction in hsCRP and an attenuation of the rise in IL6 concentration compared with placebo. In a prespecified subgroup analysis of patients with a supra-median circulating hsCRP concentration, rosuvastatin was associated with improved endothelium-dependent vascular function. In stable COPD patients without the standard indications for statin therapy, rosuvastatin treatment is associated with a significant attenuation of systemic inflammation and improvement in endothelial-dependent vascular function in patients with evidence of systemic inflammation.[9]

Rossi A et al evaluated in a post-hoc analysis of the GISSI-HF trial the prognostic effect of the use of rosuvastatin in patients with co-existing COPD and HF, assuming that the anti-inflammatory properties of these drugs may imply a potential beneficial effect in these associated chronic inflammatory conditions. They analyzed patients with chronic HF and history of COPD deriving from the GISSI-HF study. Of all 4574 patients eligible to statin, 1060 ambulatory patients with HF and concomitant COPD were enrolled and randomly assigned to rosuvastatin 10 mg daily (538 patients) or placebo (522 patients). The primary end-point was to compare all cause death rate in patients randomized to rosuvastatin or placebo. Further, we assessed the effects of rosuvastatin (10 mg daily) on cardiovascular (CV) death, non-CV death and hospital admissions. Median follow-up was 3.9 years with an interquartile range (IQR) of 3.0-4.4. During the follow-up 438 (41.3%) patients died, 304 (28.6%) for CV death and 687 (64.8%) had at least one hospitalization. The two patient groups had similar outcome, irrespective of randomization, in terms of all-cause mortality (log-rank test p = 0.30) CV, non CV-death (p = 0.88 and 0.09 respectively) and all-cause hospitalization (p = 0.82). Cox regression analysis did not show a favorable association between the use of statin and the examined end-points both on unadjusted and adjusted models. Statin use is not associated with a beneficial effects on all cause, CV, non CV mortality and hospitalization in patients with coexistent chronic HF and history of COPD.[10]Systemic inflammation influences COPD and statins have shown to lower systemic inflammation through inhibition of guanosinetriphosphatases and inhibit inflammation mediated by nuclear factor-kappa B and interleukin-6 (IL-6). 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.[11, 12]

CONCLUSION

Under the light of above results, the authors conclude that a significant decrease in the COPD exacerbation was observed in patients on Rosuvastatin therapy. However; future longitudinal studies are recommended for better exploration of this field of pulmonary medicine and pharmacology.

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