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Effect of Atorvastatin on Survival of Covid-19 Patients a Retrospective Analysis of Hospitalised Patients

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Abstract:

- ***Background***

The Coronavirus disease 2019 (COVID -19) pandemic caused by severe acute respiratory syndrome, Corona virus 2(SARS-CoV-2) infection has affected millions of patients worldwide[1].

As we all know its impact is more alarming in patients with co morbidities like Hypertension, CAD, DM, Asthma, or many respiratory illnesses etc[2,3,4,5]. So, one should consider effective therapeutic approach from already existing drugs as a more efficient way to save lives. Statin group of drugs are well known lipid lowering agents and their well known pleiotropic effects are helpful in reducing mortality and length of stay in hospital with various respiratory infections, this triggered us to evaluate its usefulness in COVID-19 patients. So, our primary aim is to see reduction in mortality and thereby length of stay in hospitalised patients (statin users); which is our secondary aim of the study.

- ***Results***

After initial recruitment of 300 patients with COVID-19 and careful consideration of the exclusion criteria a total of 150 patients were actually studied, out of which 75 patients received statins, and hence were included in our retrospective study. Out of 75 patients 54 (72%) patients survived, who took atorvastatin and 47 patients (62%) survived in statin users. Odds Ratio is 1.53 (chance of survival are higherby 1.53 times in cases where Atorvastatin is given v/s where Atorvastatin is not given). Also, duration of stay in Atorvastatin users group patients is significant i.e. P value is <0.05 (significant).

- ***Conclusions***

Although we could not demonstrate a significant association between statin users and a reduction in mortality in patients with COVID 19 which was our primary outcome. We strongly recommend that to reach on the point of clinical significance one should study large number of population retrospectively. It can be a cheap and effective pharmacotherapy which is easily available and used by many patients. And who knows when next pandemic knocks the door of world as many variants are reportedly coming these days, hence we should be prepared with our easily available preventive armamentarium.

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I. INTRODUCTION

The Novel Corona virus (COVID -19) Pandemic caused by severe acute respiratory syndrome corona virus -2 (SARS COV – 2) has infected more than 5 million people and was responsible for lakhs of mortality till May 2020[1].So we must be aware of its etiologies pathophysiology mechanism of disease and course of action of virus. Then only we can plan preventive strategies to minimise its action in future. Several pathways are known to its pathogenesis. SARS COV-2 enters into human cells using angiotensin converting enzyme 2 (ACE 2) : and hence, ACE 2 plays key role in Renin Angiotensin System (RAS) by negatively regulating RAS activation hence attenuate its harmful effects of angiotensin II. Statins have their pleiotropic effect on heart, lungs, kidneys and vascular system. Some recently approved statins like pitavastatin could exert a direct antiviral effect by interacting with main protease enzyme of SARS COV 2[4].

Even with widespread vaccination for SARS COV-2, COVID-19 has settled into endemic phase of circulation. Severe cases often feature a cytokine storm intense immune activation where raised IL-6 drives NF -kB signaling leading to capillary leak, ARDS, multi-organ injury, sepsis and death [7,8]. Retrospective studies suggest that chronic use of statins reduce the risk of mortality, chances of invasive mechanical ventilation, and hospitalization duration i.e. length of stay in hospital [4].

By considering the effect of underlying conditions such as hypertension, diabetes, cardiovascular diseases and hyperinflammation associated with COVID-19, statins could affect the prognosis of the patients who have been hospitalised because of COVID-19. Therefore, we aimed to assess the effect of atorvastatin use in the outcomes of the patients with severe-to-critical COVID-19, as it is easily available and cheap drug. So, one should consider effective therapeutic approach from already existing drugs as a more efficient way to save lives. Statins are well known lipid lowering agents and are associated with reduced mortality in patients with various respiratory infections, this triggered us to evaluate its use in reducing mortality in COVID -19 patients.

II. METHODS

A Retrospective Analysis of COVID -19 laboratory confirmed RT-PCR patients admitted to the Dr Baba Saheb Ambedkar Hospital between 15 march 2021 to 15 July 2021 was performed.

Total number of patients in Atorvastatin group and in Non-Atorvastatin group are 75 each. Patients without positive reverse transcriptase-polymerase chain reaction (RT-PCR) results were excluded and data from patients with a diagnosis of COVID-19 based on RT-PCR test were included. The study was conducted based on the declaration of Helsinki and the institutional review board committee approved the study. The Clinical outcomes consist of in-hospital mortality, need for invasive mechanical ventilation and length of stay in hospital. COX regression analysis models were used to assess the association of independent factors to outcomes.

III. RESULTS

After initial recruitment of 300 patients with COVID-19 and careful consideration of the exclusion criteria a total of 150 patients : out of which 75 patients received statins, were included in our retrospective study. Out of 75 patients, 54 (72%) patients survived who took atorvastatin and 47 (62%) survived in non- atorvastatin users. Odds Ratio is 1.53 (chance of survival are higher by 1.53 times in cases where Atorvastatin is given vs where Atorvastatin is not given).

Also, length of stay in Atorvastatin users group patients is significant i.e. P value is <0.05 (significant). The data was collected and recorded in excel sheet. The quantitative parameters were recorded. Mean and standard deviation were calculated. The quantitative parameters were analysed using unpaired ‘t’ test. The qualitative parameters were recorded in terms of percentages. The statistical test was applied using SSPS version 18. The p value of < 0.05 is considered statistically significant.

IV. DISCUSSION

This document compares clinical outcomes between two groups of patients: those treated with Atorvastatin (75 patients) and those not treated with Atorvastatin (75 patients). Key findings include: In demographics Average age: Atorvastatin group (54.06 years), No Atorvastatin group (51.04 years). Gender distribution: Atorvastatin group (57.3% males, 42.6% females), No Atorvastatin group (65.3% males, 34.6% females). Patients with associated comorbidities like: Hypertension (HTN): Atorvastatin group (30.6%), No Atorvastatin group (24%). Diabetes Mellitus (DM): Atorvastatin group (42.6%), No Atorvastatin group (26.6%). Coronary Artery Disease (CAD): Atorvastatin group (17.3%), No Atorvastatin group (4%). Respiratory Disease: Atorvastatin group (8%), No Atorvastatin group (1.3%).

Survival rate: Atorvastatin group (72%), No Atorvastatin group (62.6%). Death rate: Atorvastatin group (28%), No Atorvastatin group (37.3%). Odds Ratio: Patients receiving Atorvastatin have 1.53 times higher chances of survival compared to those not receiving it.

Similarly, length of stay in hospital stay: Duration for survived patients: Atorvastatin group (29.01 days), No Atorvastatin group (13.2 days) -statistically significant ($P < 0.05$). Duration for expired patients: Atorvastatin group (23.14 days), No Atorvastatin group (13.03 days)-not statistically significant ($P = 0.06$).

In summary, Atorvastatin is associated with improved survival rates and shorter length of hospital stays for survived patients, with significant differences in outcomes compared to the group not receiving Atorvastatin.

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V. CONCLUSION

Although we could not demonstrate a significant association between statin use and a reduction in mortality in patients with COVID 19. We strongly recommend that to reach on the point of clinical significance one should study large number of population retrospectively. As in resource limited setup for investigations in oncology patients we could not exclude cancer patients. As diagnosis of cancer patients was not available in hospital and it takes time to diagnose and treat those patients accordingly.

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PARAMETERS	ATORVASTATIN (75 Patients)	NO ATORVASTATIN (75 Patients)
AGE (YEARS)	54.06 ± 13.4	51.04 ±12.8
MALES	43 (57.3%)	49 (65.3%)
FEMALES	32 (42.6%)	26 (34.6%)
COMORBIDITY		
HTN	23 (30.6%)	18 (24%)
DM	32 (42.6%)	20 (26.6%)
CAD	13 (17.3%)	3 (4%)
RESPIRATORY DISEASE	6 (8%)	1 (1.3%)

	ATORVASTATIN (75 Patients)	NO ATORVASTATIN (75 Patients)	Inferences
SURVIVAL	54 (72%)	47 (62.6%)	Odds Ratio is 1.53 (Chances of Survival are higher by 1.53 times in cases where Atorvastatin is given vs where Atorvastatin is not given)
DEATH	21 (28%)	28(37.3%)	
DURATION OF STAY IN HOSPITAL (SURVIVED PTS)	29.01 ± 17.6	13.2 ± 8.50	P value is <0.05 (Significant)
DURATION OF STAY IN HOSPITAL (EXPIRED PTS)	23.14 ± 18.14	13.03 ± 10.23	P value is 0.06 (Not significant)

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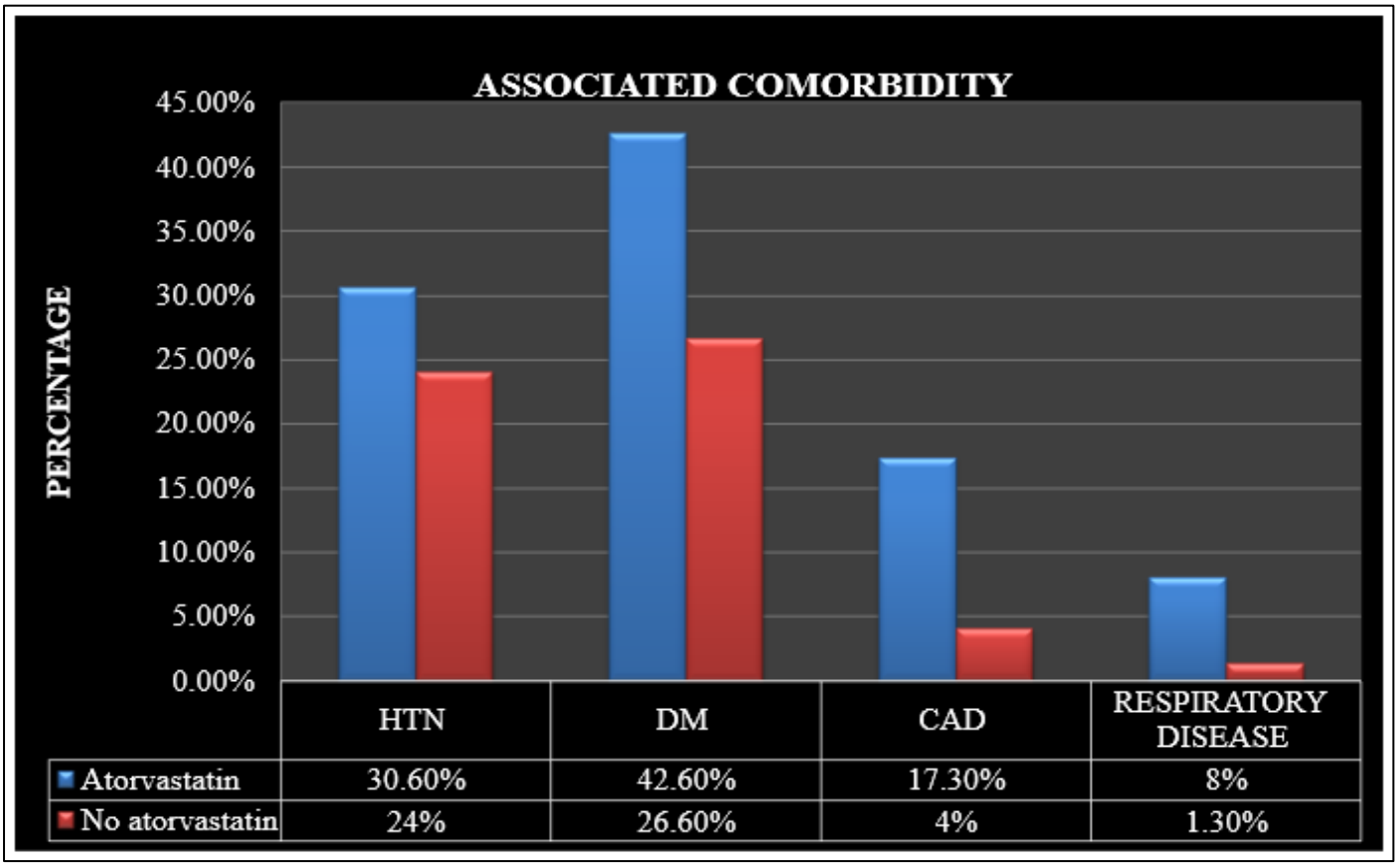

Fig 1Associated Comorbidity

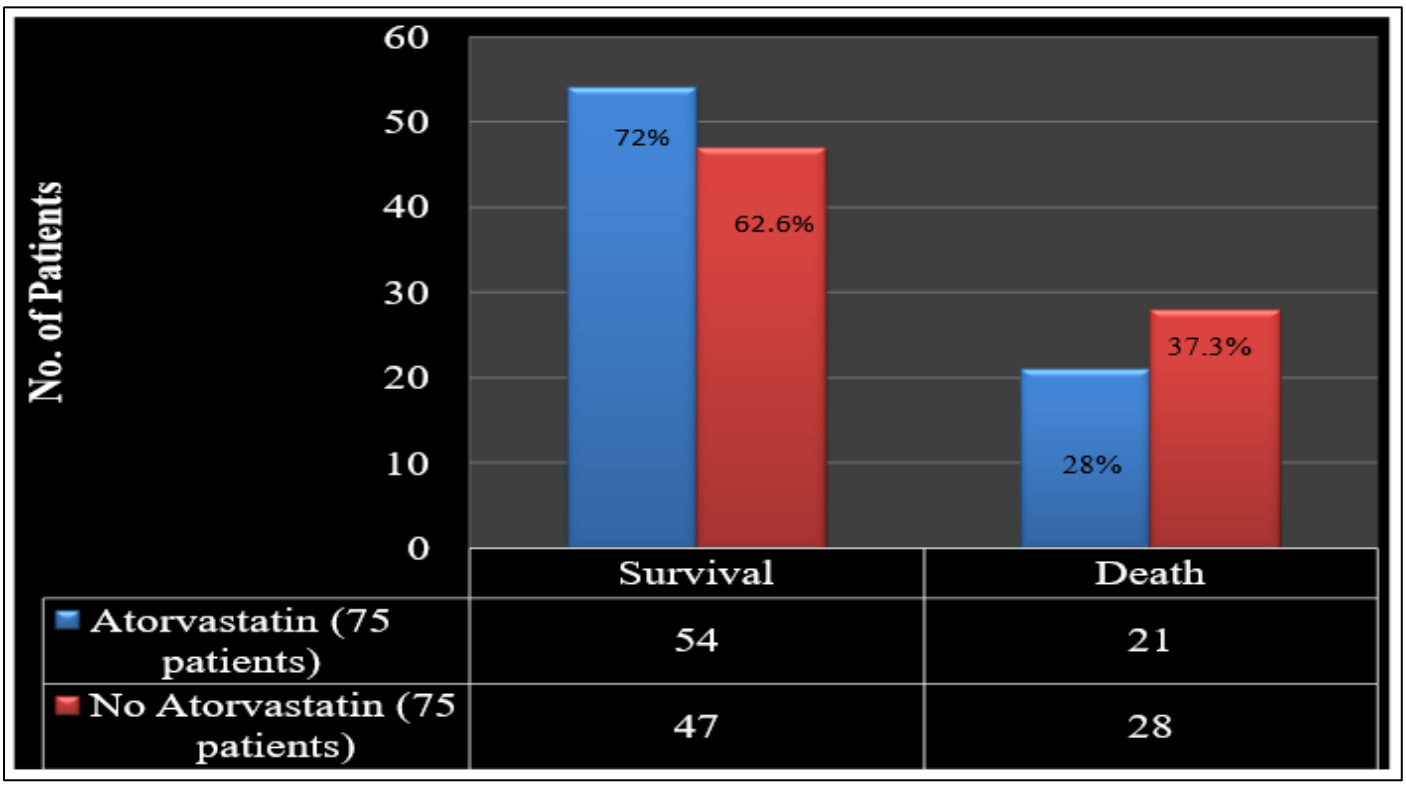

Fig 2 No. of Patients