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Study of Co-Relation between CRP Value in COVID Patients and Vaccination

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ABSTRACT

The world saw great devastation due to the dreadful COVID 19 pandemic, whose first case was reported in December 2019 in Wuhan, China. The virus responsible for the pandemic i.e., Coronavirus is a novel virus. Hence, no previous data on the type of antigen or the virulence of the virus was initially available. Also, the virus kept on undergoing mutations and new variants developed in the due course. An exponential surge of the cases took place in April 2021 which marked the 'second-wave' of COVID 19. India prepared its citizen for second wave by initiation of mass-vaccination drive on 16th January 2021. Initially, there were two vaccines approved by the Government of India and Indian Council of Medical Research i.e., COVISHIELD & COVAXIN. C-Reactive protein, an acute phase reactant synthesized by liver, played a major role in determining the severity of the disease. CRP levels were persistently high in cases with severe clinical presentation.

This study was conducted to establish the comparison in CRP values of vaccinated and unvaccinated COVID 19 patients. It was conducted retrospectively in a tertiary care hospital over a period of two months i.e., April-May 2021. Data were taken from the patient's file after taking proper permission from the concerned authority. All the patients who were over 45 year of age and have tested positive on Rapid Antigen Test or RT-PCR were included in the study. In our study, it was found that the patients who took both doses of vaccination either COVISHIELD or COVAXIN have lower CRP levels and low mortality compared to unvaccinated or single dose vaccinated group. Vaccination drive implemented by the Government of India has played a pivotal role in decreased severity and mortality due to COVID 19 in India.

KEYWORDS: COVID, COVISHIELD, COVAXIN, CRP

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INTRODUCTION

The world saw great devastation due to the dreadful COVID 19 pandemic, whose first case was reported in December 2019 in Wuhan, China¹. The first case reported in India was in January 2020 in Kerala². Since then, India has seen over 4 crores of total cases and over 5 lakh deaths due to this disease³.

The virus responsible for the pandemic i.e., Coronavirus is a novel virus. Hence, no previous data on the type of antigen or the virulence of the virus was initially available⁴. Also, the virus kept on undergoing mutations and new variants developed in the due course⁵. An exponential surge of the cases took place in April 2021 which marked the 'second-wave' of COVID 19⁶. India prepared its citizen for second wave by initiation of mass-vaccination drive on 16th January 2021. Initially, there were two vaccines approved by the Government of India and Indian Council of Medical Research i.e., COVISHIELD & COVAXIN. Vaccine was prioritised for front-line workers in the initial age, later, citizens over 50 years were also included⁷.

C-Reactive protein, an acute phase reactant synthesized by liver, played a major role in determining the severity of the disease. CRP levels were persistently high in cases with severe clinical presentation⁸. Severe cases, especially the cases which presented with low oxygen saturation and required intensive care, had significantly high levels of CRP. There is a phenomenon called 'the cytokine storm'. Severely affected cases showed sky-high cytokines level which included IL-6⁹. IL-6 along with other cytokines is known to stimulate the production of CRP which adds-up to the existing grave status of the patient¹⁰.

AIMS

1. To study and establish the severity of COVID 19 with the help of CRP.
2. To study the correlation between status of vaccination and levels of CRP.
3. To compare the duration of stay of the unvaccinated and vaccinated patients.
4. To compare mortality in unvaccinated and vaccinated patients.

METHODOLOGY

This was a retrospective study done at MGM Hospital, CBD Belapur, Navi Mumbai over a period of 2 months i.e.- April and May 2021.

All the pertinent details about the patient demographics and vaccination details were obtained from the patient's assessment forms at the time of admission. Laboratory investigations values were obtained from the Lab inbuilt HIMS software. Patient's transfer to ward/ICU or

discharge/death status was taken from the patient's file kept in Medical Record Department after taking permission from the concerned authority through proper channel.

Patients were divided into three categories i.e.- Unvaccinated, Single Dose Vaccinated (Those who have not completed 14 days post vaccination were placed in Unvaccinated category) and Double Dose Vaccinated. C – Reactive Protein (CRP) values were noted at time of admission (D1) and second day (D2). Duration and outcome of hospital stay were noted. Data in each category were compared with each other and analysed.

RESULTS

The study showed that a total admission of 96 cases.

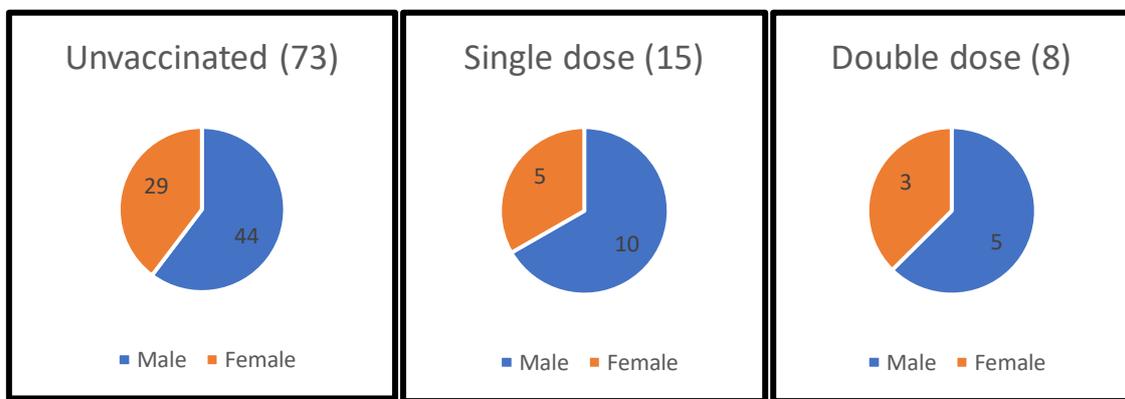


Fig 1: Gender-wise distribution of the cases

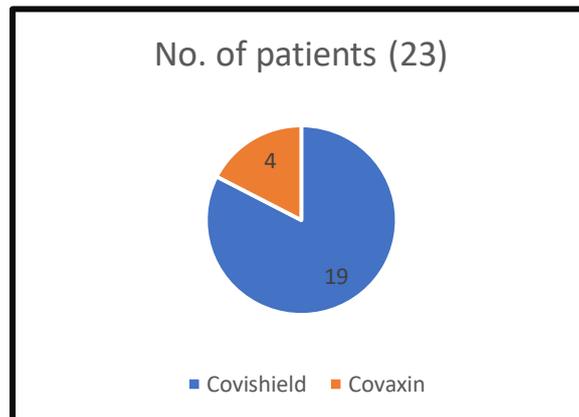


Fig 2: Type of Vaccine among vaccinated cases.

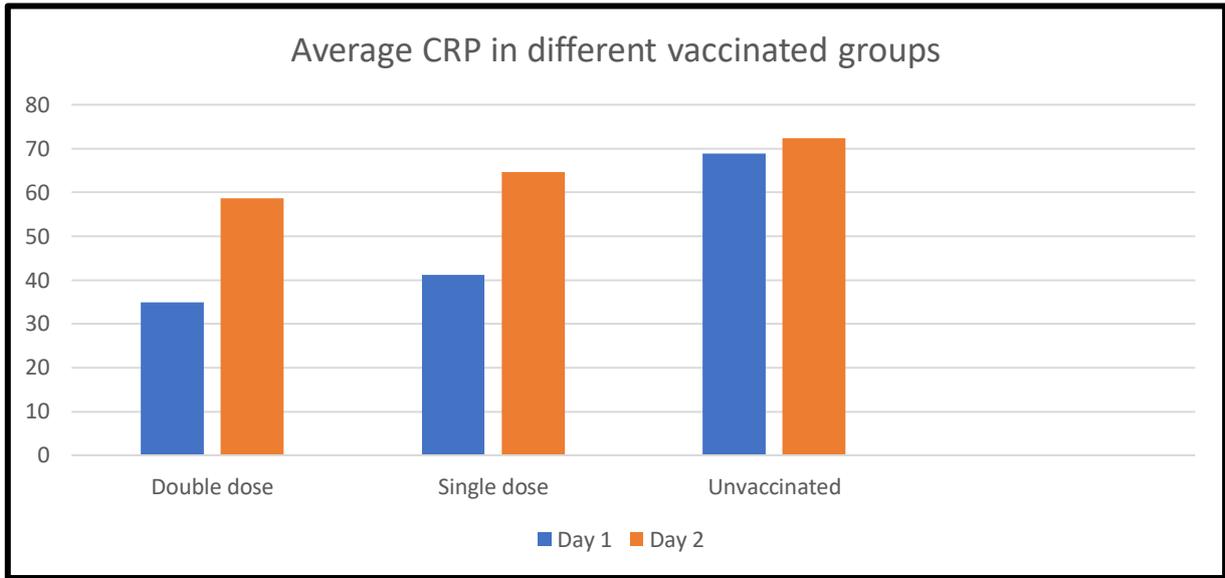


Fig 3: Average CRP value in different vaccinated groups.

ICU Admission needed	Double Vaccinated	Single dose vaccinated	Unvaccinated
Yes	2	3	37
NO	6	12	36

Fig 4: ICU admission in different categories.



Fig 5: Outcome of Patients. Fig 6: Nature of admission of patients.

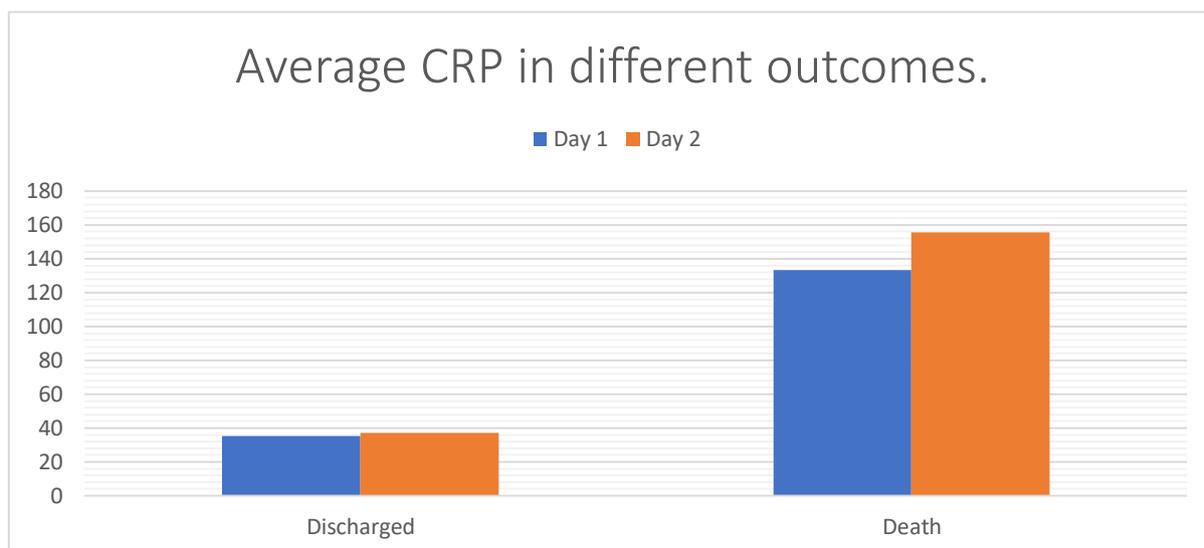


Fig 7: Average CRP among death and discharged cases.

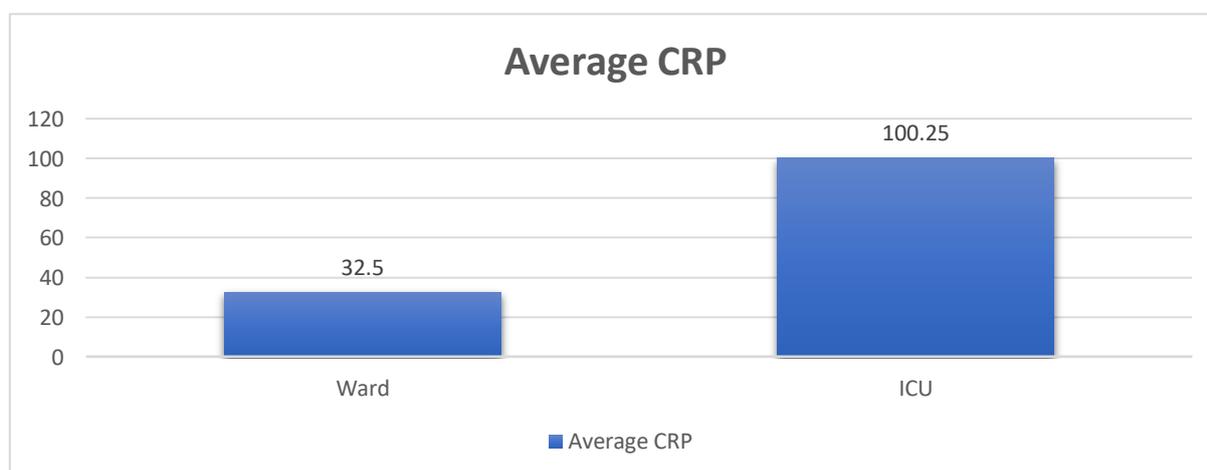


Fig 8: Average CRP among ward and ICU patients.

DISCUSSION

In the current study, it was found that most of the patient who presented to the tertiary care were unvaccinated (76%). Only 30% of the patients were vaccinated among which only 8.3% were fully vaccinated with both the dosage (Fig: 1). Among the vaccinated patients, 82.6% had taken COVISHIELD and rest 17.4% took COVAXIN (Fig: 2). Average CRP in fully vaccinated patients was 35 MG/L on Day 1 and 58.7 mg/L on Day 2 compared to unvaccinated patients 68.8 mg/L on Day 1 and 72.4 mg/L on Day 2 (Fig: 3). Average CRP among ward patients was 32.5 mg/L and ICU patients was 100.25 mg/L. A study by Ali et al also concluded that elevated CRP levels were found in ICU patients when compared to ward patients.

Patients who required ICU admission comprised 44% (42) of the total number (96) (Fig: 6). Only 4.8% of ICU admissions were vaccinated by double doses (Fig: 4). This highlights the fact that

vaccination reduces the severity of the disease. All the patients who were admitted in ICU had a common symptom of breathlessness and all of them required oxygen support.

There were 25 deaths and all were in ICU. Among 25 deaths, eight deaths were reported within 24 hours of admission indicating the severity of disease. 23 cases out of 25 deaths were unvaccinated, suggesting the fact that vaccination reduces mortality in the patients.

Average CRP among ICU admission was 100.25 as compared to 32.5 among patients admitted in ward (Fig: 8). Number of days of hospital stay was almost equal in both vaccinated and unvaccinated categories.

CONCLUSION

The Government of India launched the massive vaccination drive for the citizens over 50 years of age keeping in mind the severe effects of virus due to increased age and poor immunity on the above-mentioned population. Both vaccines have proven to be effective. No data on decreased incidence of the disease is available, however, the current study shows that there is reduced severity and mortality in vaccinated patients when compared to unvaccinated ones. Vaccination has led to decreased hassle and monetary burden due to ICU admission.

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