

Study of HRCT Score, Comorbidities, Specific Blood Findings, and Management of COVID-positive Patients at Dr DY Patil Medical College and Hospital, Pune

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ABSTRACT

Aim: Study of HRCT score, comorbidities, specific blood findings, and management of COVID-positive patients at Dr DY Patil Medical College and Hospital, Pune.

Materials and methods: We conducted a prospective study of all hospitalized cases of COVID infection in Dr DY Patil Medical College and Hospital, admitted between April and May 2021 from COVID ward 405. The study was conducted in respect to the severity of symptoms, comorbidities, HRCT chest score, the specific blood parameters, requirement of oxygen, and different treatment modalities. The inclusion criterion was admitted patients diagnosed with COVID-19. We excluded those with suspected COVID-19 infection but with negative RT-PCR reports. Also, we excluded patients diagnosed with COVID-19 who were advised home quarantine. COVID-19 infection was confirmed by RT-PCR using swab samples from the nasopharynx and oropharynx. Tests were carried out with the COVID-19 RT-PCR.

Results: In our study, on CO-RADS score, we found 42% were mild, 32% were moderate, and 26% were severe. We found that out of 50 patients, only 1 received a complete dose of Covishield vaccine and only 4 received the 1st dose of Covishield vaccine. We found that out of 50 patients, only 40 patients required oxygen therapy. Patients who were on high CO-RADS scores, received a dose of remdesivir + clexane + dexamethasone. We found that out of 50 patients, 4 patients were suffering from asthma. We found that out of 50 patients, 15 patients were suffering from diabetes mellitus type 2. We found that out of 50 patients, 1 patient was suffering from chronic renal disease.

Conclusion: In this prospective study done at Dr DY Patil Medical College in COVID-positive ward (sample size of 50), we came to find out the most common HRCT thorax score is between 1 and 7 (mild).

Out of 50 patients, 15 were suffering from type 2 diabetes mellitus. And out of these, 13 patients were >50 years of age.

In this study, out of 50 patients, those who received remdesivir + dexamethasone + clexane were 6 patients.

In this study, out of 50 patients with diabetes mellitus and age above 50 years were 13 patients.

Only 1 patient received 2 doses of the COVID vaccine (Covishield).

One patient was suffering from chronic renal disease and needed dialysis.

Keywords: COVID-19, COVID-19 pneumonia, COVID-19 study, HRCT thorax score.

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PATHOPHYSIOLOGY

Based on the cells that are infected, COVID infection can be divided into phases that correspond to different clinical stages of the disease:

Stage 1: Asymptomatic state (initial 1–2 days of infection)

The inhaled virus likely binds to cells in the nasal cavity and replicates. ACE2 is the main receptor for SARS-CoV.¹

Local propagation of the virus occurs up to the nasal cavity. The virus can be detected by taking nasal swabs during this period of the disease. These individuals are infectious even though the viral load is low.^{2–5}

Stage 2: The virus propagates down the respiratory tract along the conducting airways, and a more robust innate immune response is triggered. Nasal swabs show the presence of virus and the RT-PCR report comes positive. At this time, the COVID-19 disease can be clinically diagnosed.

CXCL10 has also been reported to be useful as a disease marker in SARS.^{6–9}

The aggressiveness of the COVID-19 disease depends upon the immunity and other comorbidities of the patients.¹⁰ About 80%

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of patients have mild symptoms that can be treated with home isolation and do not need any hospitalization.¹

Stage 3: About 20% patients show lung infiltration showing ground glass appearance on HRCT thorax. This is stage 3 of the disease.

The alveolar infection is at the peripheral and subpleural levels.^{11,12} A large number of viral particles are released, and the

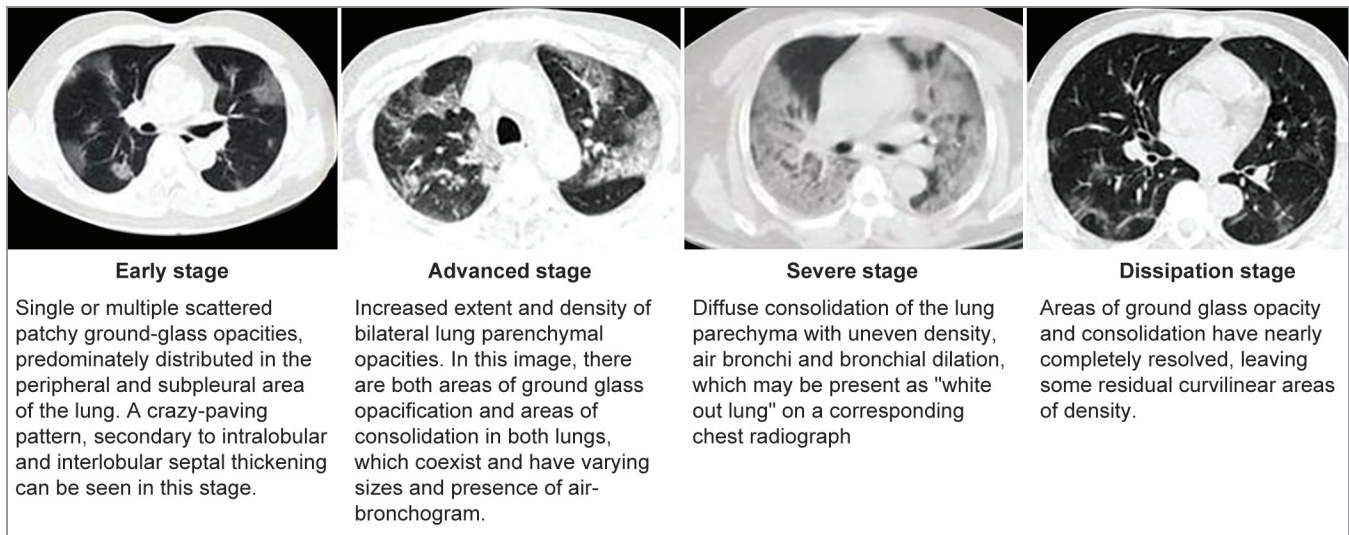


Fig. 1: Stages of COVID in HRCT thorax

cells undergo apoptosis and die.^{13,14} The end result is likely a self-replicating pulmonary toxin as the released viral particles infect type 2 cells in adjacent units.

There is diffuse alveolar damage with a few multinucleated giant cells.¹⁵ The aberrant wound healing may lead to more severe scarring and fibrosis than other forms of ARDS. There will be irreversible damage to the lungs.

There is increased risk among elders due to reduced immunity and reduced capacity of epithelial healing.¹⁶⁻¹⁸ The reduced mucociliary clearance among elders increases the spread of viral load to the gaseous exchange among the lungs.¹⁹

Coronavirus disease-19 produces severe acute respiratory syndrome. It has become a global pandemic, causing severe health damage all over the world. Many countries like United States of America and European countries have seen a two-wave pattern of reported cases, with a first wave between December and March and a second between March and June.

In India, the first wave began in March 2020. The Government of India took some serious steps to prevent further spread of COVID-19 infection among Indian population. Isolation of patients, confinement zone implementation, wearing of masks, and maintaining social distance were followed strictly nationwide. Work from home, online schools, and colleges were introduced. Only essential services were working round the clock.

All the entertainment activities and sports were paused for some duration. About 50% of beds in all hospitals were reserved for COVID patients, and elective surgeries were withheld for few months during the time of crisis.

The vaccination drive of all Indians, prioritywise doctors, nurses, policemen, and other frontline workers along with above 60 years was started. Two vaccines, Covaxin and Covishield, were given by the Government of India. This reduced the spread of infection and also reduced virulence in patients with COVID-19 post vaccination.

Our study investigated the severity of the disease and various treatment modalities of COVID-19 hospitalized patients during the 2nd wave at Dr DY Patil Medical College Pune, Maharashtra, India.^{20,21}

We evaluated comorbidities, vaccination status, mortality, oxygen requirement, treatment, and the outcome for all the patients included in our study.

Early stage: Single or multiple scattered patch ground glass opacities predominantly distributed in peripheral and subpleural areas of the lung.

Advanced stage: Increased extent and density of bilateral lung parenchymal opacities. In this stage, there are both areas of ground glass opacification and areas of consolidation in both lungs (Fig. 1).

Presence of Air Bronchogram

Severe stage: Diffuse consolidation of the lung parenchyma with uneven density, air bronchi, and bronchial dilation, which may be present as whited-out lung on a corresponding chest radiograph.

Dissipation stage: Areas of ground glass opacity and consolidation have nearly completely resolved, leaving some residual curvilinear areas of density.

MATERIALS AND METHODS

As soon as the patient got admitted in COVID-positive ward, depending upon his HRCT score and blood investigation reports, the patient was started on antibiotic azithromycin 1 gm twice daily, remdesivir (200 mg IV on day 1 followed by 100 mg IV daily for 5 days, Fabiflu (favipiravir 200 mg 9 tablets twice daily on day 1 followed by 4 tablets twice daily for 6 days), and all patients admitted in COVID-positive ward were given vitamin C (1000 mg per day), vitamin D (60000 IU), and zinc (50 mg per day) supplements.

All routine tests were repeated at regular intervals.

Oxygen saturation was checked as soon as the patient was admitted into the ward.

If oxygen saturation was below 90%, the patient was started on oxygen therapy.

STUDY DESIGN

We conducted a prospective study of all hospitalized cases of SARS-CoV-2 infection in Dr DY Patil Medical College and Hospital, admitted between April and May 2021 from COVID ward 405.

All patients admitted were considered to be in the first wave, and all those admitted from April to May 2021 were in the second wave.

Table 1: Comparison of CO-RADS score of admitted patients

CO-RADS score (HRCT thorax)	No. of patients	Percentage
Mild (1–7)	21	42%
Moderate (8–15)	16	32%
Severe (16–24)	13	26%

Table 2: Treatment given to admitted patients

No. of patients receiving medications	Medication given
18	Clexane
18	Remdesivir
8	Fabiflu
50	Azithromycin
6	Remdesivir + clexane + dexamethasone
46	Dexamethasone

Table 3: Number of patients on oxygen therapy

No. of patients on oxygen therapy	Between 4 L and		
	On 2 L/hour O ₂	6 L/hour O ₂	>6 L Oxygen
40	22	13	5

The only inclusion criterion was to be a hospitalized patient with an analytical diagnosis of SARS-CoV-2. We excluded those with suspected SARS-CoV-2 infection but had no laboratory confirmation and those who came to the hospital with symptoms compatible with COVID-19 but did not require hospitalization.

SARS-CoV-2 infection was confirmed by RT-PCR using swab samples from the upper respiratory tract (nasopharyngeal/oropharyngeal exudate), from the lower respiratory tract (sputum/endotracheal aspirate/bronchoalveolar lavage/bronchial aspirate).

Tests were carried out with RT-PCR kit.

According to Table 1, in this study, out of 50 patients, 21 patients were in mild score (1–7) of HRCT thorax, 16 patients, out of 50, were in moderate score (8–15), and 13 patients, out of 50, were in severe score.

According to Table 2, in this study, out of 50 patients, 18 patients received clexane (0.6 mg/kg subcutaneous injection once daily) and remdesivir (200 mg IV on day 1 f/b 100 mg IV daily for 5 days).

Only 8 patients received fabiflu (9 tablets twice daily on day 1 and followed by 4 tablets twice daily for 6 days), 50 patients received azithromycin (500 mg once daily), 6 patients received a combination of remdesivir + clexane + dexamethasone, and 46 patients received dexamethasone.

In this study, out of 50 patients, only 1 received a complete dose of the Covishield vaccine and only 4 received the 1st dose of the Covishield vaccine.

Every patient admitted received a tablet of vitamin C 1000 mg per day, a tablet of zinc 50 mg per day, and tablet of vitamin D 60,000 IU stat.

According to Table 3, in this study, out of 50 patients, 40 patients were on oxygen therapy, and out of those 40 patients, 22 patients were on 2-liter oxygen/hour and 13 patients were between 4 liters and 6 liters of oxygen and 5 patients required more than 6 liter of oxygen/hour.

In this study, out of 50 patients, 15 patients were suffering from diabetes mellitus type 2.

Table 4: Comparison of the CRP value, D-dimer value, and ferritin value

Total no. of patients taken 50	No. of patients		No. of patients with very high value
	with normal values	No. of patients with high value	
CRP value (0.3–10 mg/dL)	18	26	6
D-dimer value (<–500 ng/mL) (0.50)	6	28	16
S. ferritin value (20–250 ng/dL)	18	23	9

In this study, out of 50 patients, 4 patients were suffering from asthma.

In this study, out of 50 patients, 13 patients were with diabetes mellitus and age above 50 years.

In this study, out of 50 patients, one patient was suffering from chronic renal disease.

According to Table 4, in this study, out of 50 patients, the number of patients with normal CRP values is 18, patients with high values are 26, and patients with very high values are 6.

In this study, out of 50 patients, the number of patients with normal D-dimer values is 6, patients with high values are 28, and patients with very high values are 16.

Patients with normal values of serum ferritin level were 18, with high values were 23, and patients with very high values were only 9.

CONCLUSION

In this prospective study done at Dr DY Patil Medical College in COVID-positive ward (sample size of 50), we came to find out the most common HRCT thorax score is between 1 and 7 (mild).

In total, 15 patients, out of 50, were suffering from type 2 diabetes mellitus.

And out of these, 13 patients were >50 years of age.

In this study, out of 50 patients, those who received remdesivir + dexamethasone + clexane were 6 patients.

In this study, out of 50 patients, 13 patients were with diabetes mellitus and age above 50 years.

Only 1 patient received 2 doses of Covid vaccine (Covishield).

One patient was suffering from chronic renal disease and needed dialysis.

All patients included in this study were discharged without any casualties.

To conclude, patients less than 60 years with mild and moderate CO-RADS score without any comorbidities can be treated with antibiotic, Fabiflu, and supplementary medications.

Remdesivir should be preserved for patients with severe CO-RADS score and for patients with moderate CO-RADS score with comorbidities.

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