

ORIGINAL RESEARCH

Assessment of clinical and radiological profile of post covid 19 patients

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ABSTRACT

The 2019 coronavirus disease (COVID-19) pandemic has caused widespread destruction. Some of the survivors appeared to be dealing with lingering symptoms far after the initial period of illness had passed. Hence, the study is being undertaken to access clinical and radiological profile of post covid 19 patients. A total of 50 patients of post Covid were enrolled in this study. Investigations included CBC, Liver function test, Blood urea and creatinine, ECG, Chest X-ray and CRP were performed on the patients. Mean age of the patients was 53.7 years with females in majority as compared to males. Diabetes and hypertension were common comorbidities and clinical laboratory findings showed lower mean Hb of 11.2 ± 1.5 g/dl, higher levels of ESR, CRP, d-dimer, and random blood sugar (mean 150.0 ± 37.4 mg/dl). Chronic fatigue, depression, anxiety, and breathlessness, chronic headache, anosmia, arthralgias, myalgia and post-Covid chest pain were reported. The results showed that 82% of the chest x-rays were abnormal, while 86.84% of the chest CTs had abnormal findings. The high prevalence of comorbidities, suggests that patients with these conditions may be at a higher risk for severe illness and long-term health consequences following a COVID-19 infection.

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INTRODUCTION

Since the 19th Century, pathogenic viral outbreaks and their complex interactions with humans and animals have resulted in cross-species transmission, posing a great threat to human health and safety.^{1,2} Over the last two decades, there has been an upsurge in newly identified coronaviruses, such as MERS-CoV,³ haemorrhagic fever viruses (Lassa, Ebola), and novel coronaviruses including severe acute respiratory syndrome coronavirus (SARS-CoV) and highly pathogenic influenza (avian influenza A H7N9, pandemic H1N1).^{4,5} The 2019 coronavirus disease (COVID-19) pandemic has caused widespread destruction. Some of the survivors appeared to be dealing with lingering symptoms far after the initial period of illness had passed. Patients who still experience symptoms three weeks after the commencement of acute COVID-19 have been referred to variously as having “Long COVID,” “Post-acute COVID-19 sickness,” and “Post-acute sequel of COVID-19” (PASC). The symptoms of PASC disease can range from being somewhat

annoying to being life-threatening, necessitating hospitalization, intense treatment, and close monitoring. Some patients who were asymptomatic during the acute COVID-19 phase have gone on to develop PASC symptoms, while some survivors of even severe disease have remained symptom-free beyond three weeks, suggesting that the risk factors predisposing to the development of PASC have yet to be fully determined. Hence, the study is being undertaken to assess clinical and radiological profile of post covid 19 patients.

MATERIAL AND METHODS

The present cross-sectional study was conducted in the Department of Medicine and Department of Radiodiagnosis, Guru Nanak Dev Hospital, Govt. Medical College, Amritsar. A total of 50 patients of post Covid were enrolled in this study. A detailed history, clinical examination and laboratory investigations were performed after taking informed consent. The study was carried out after seeking

permission from Institutional Ethics Committee, Government Medical College, Amritsar.

Inclusion criteria: Patients recovered from Covid-19 having clinical features upto 12 weeks after recovery/discharge from hospital, patients above 18 years with hypoxia and those who needed oxygen therapy during admission.

Exclusion criteria: Patients whose written informed consent could not be taken, patients who were <18 years, those who did not need oxygen support and patients' part of any other study at the same time. Investigations included CBC, Liver function test, Blood urea and creatinine, ECG, Chest X-ray and CRP were done.

STATISTICAL ANALYSIS

Mean value with standard deviation of Hb, TLC, Platelet, D-dimer and CRP were calculated for all post covid-19 patients. X-ray and CT finding such as

consolidation, ground glass opacities, intestinal thickening and pleural effusion was mentioned in the form of percentage of patients in which they were seen.

RESULTS

The present study was conducted in the Department of Medicine and Department of Radiodiagnosis, Guru Nanak Dev Hospital, Govt. Medical College, Amritsar, on 50 patients post Covid. The study reveals that mean age of the patients was 53.7 years with 4% under the age <30 years, 6% were in 31-40 years group, 34% in 41-50 years, 22% were in 51-60 years and 30% fell under the age group 61-70 years. Out of total 50 patients, 60% (30) were female while 40% (20) were males. It was found that out of 50 patients, 19 (35%) had no co-morbidities while 14 (28%) were diabetic, 9 (18%) were hypertensive and 8 (16%) were both hypertensive and diabetic.

Table 1: Mean baseline biochemical parameters among patients

Baseline biochemical parameters	Mean ± Std.
HB (g/dl)	11.2 ± 1.5
TLC (thousand /mm ³)	8.0 ± 1.9
PLT (x10x9/L)	3.1 ± 1.0
ESR (mm in 1st hour)	29.4 ± 12.9
CRP (mg/l)	13.3 ± 7.1
D-DIMER (ng/ml)	1.1 ± 0.4
RBS (mg/dl)	150.0 ± 37.4

Table 1 shows mean of all baseline biochemical parameters among patients. Mean Hb of all patients was 11.2±1.5 (g/dl). Mean TLC of all patients was 8.0±1.9 (thousand/mm³). Mean platelet count of all patients was 3.1±1.0 (x10x9/L). Mean ESR of all patients was 29.4±12.9 (mm in 1st hour). Mean CRP of all patients was 13.3±7.1 mg/l. Mean D-dimer of patients was 1.1±0.4 ng/dl. Mean RBS of patients was 150±37.4 mg/dl.

Other parameters showed that chronic fatigue was noted in 36 (72%) cases and 14 (25%) had no chronic fatigue, breathlessness was in 41 (82%) cases while 9 (18%) had no breathlessness. Chronic headache was

noted in 36 (72%) and 14 (28%) cases did not complaint about any chronic headache, anosmia was noted in 18 (36%) patients while 32 (64%) patients had no anosmia. Depression was noted in 30 (60%) of patients while 20 (40%) had no depression. It was seen that post covid many people showed signs of anxiety which was present in 27 (54%) and 23 (46%) patients were free of anxiety. Arthralgias were noted in 34 (68%), myalgias were present in 23 (46%) patients, ageusia was present in 27 (54%) of patients. Post covid chest pain was there in 28 (56%) of patients while 22 (44%) did not have post covid chest pain.

Table 2: Post covid x ray findings among patients

Post Covid X Ray Findings	No. of patients	Percentage
Ground glass opacities	20	40.0
Interstitial thickening	12	24.0
Normal chest Xray	9	18.0
Consolidation	7	14.0
Pleural effusion	2	4.0
Total	50	100.0

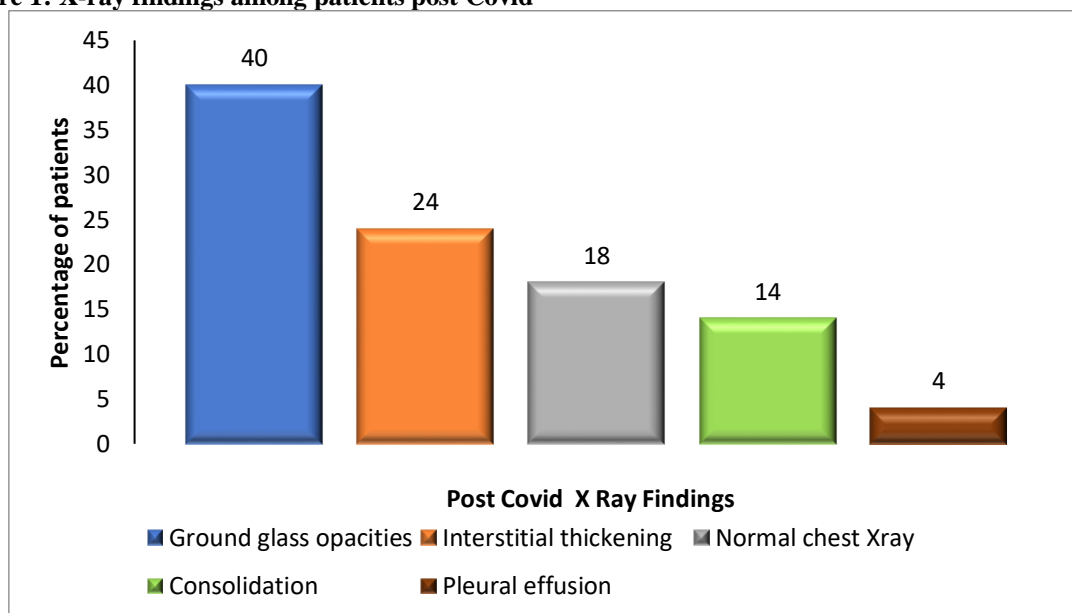
Figure 1: X-ray findings among patients post Covid

Table 2 and Figure 1 shows that ground glass opacities were present in 20 (40%) of patients, interstitial thickening was noted in 12 (24%) patients, consolidation was seen in 7(14%) of patients, pleural effusion was noted in 2(4%) and 9(18%) patients had normal chest X-ray. Post covid CT chest findings were noted in 33 (86.84%) of patients while 5 (13.16%) had a normal CT and CT scan was not performed in 12 of patients.

DISCUSSION

The present study aimed to explore the clinical and radiological profile of post Covid-19 patients. This cross-sectional study was performed on 50 patients recovered from Covid-19 infection. In the present study, majority of the patients belong to 41-50 years age group followed by age group 61-70 years. The study found out that the mean age of patients was 53.7±11.35 years. Similar age groups were considered in many studies (Goel N et al, Rahar S et al).^{6,7} Goel N et al,⁶ in their study reported the mean age of subjects as 44.62±15.77 years. In another study Rahar S et al,⁷ reported that the mean age of study subjects was 46.5 ± 16.5 years with majority of subjects (45.3%) of age group 21-45 years. The study found out that females outnumbered males. In contrast with findings of our study, Rahar S et al,⁷ in their study reported a majority of male patients as compared to females. In the study by Goel N et al,⁶ majority of patients were male.

The present study found out that diabetes and hypertension were most common comorbidities reported in subjects. These findings were consistent with the findings of previous studies. In a similar study, Penmetsa CS et al,⁸ reported that among the study subjects, 14 (28%) had history of diabetes mellitus, 8 (16%) were hypertensive, 4 (8%) had Pulmonary tuberculosis, 3 (6%) had COPD and none of them had bronchial asthma, hypothyroidism,

coronary artery disease, cerebrovascular accident and 21 (42%) didn't have any co morbidities. In the study conducted by Rahar S et al,⁷ they reported that comorbidities were present in 103 (60.6%) patients, of which diabetes mellitus (DM) ($n = 65$; 38.2%) was most commonly observed, while 19 (11.2%) had coronary artery disease (CAD) and 39 (22.9%) had hypertension. Thirty-seven (21.76%) patients had more than one comorbidity. In another study Goel N et al,⁶ reported similar findings. Goel N et al,⁶ study reported diabetes in 17.14% and hypertension in 22.85% patients. Padalkar DA et al,⁹ conducted a study and reported that diabetes was found in 20% patients while hypertension was reported in 33.33% patients. These findings suggest that majority of the co-morbid patients had either diabetes or hypertension. The present study found out that chronic fatigue, depression, anxiety, breathlessness, chronic headache, anosmia, arthralgias and myalgia, ageusia and post covid chest pain were commonly observed. In a reference study Penmetsa CS et al,⁸ reported that 12 (24%) patients had shortness of breath, 5 (10%) had fever, 8 (16%) had generalised weakness, 6 (12%) had weight loss and none had anosmia. Thyagaraj V et al,¹⁰ in their study, reported that the most frequently reported symptoms were fatigue ($n=71(42.26\%)$), breathlessness ($n=38(22.61\%)$), and cough ($n=35(20.83\%)$). This study also reported that low mood was reported in 4.16% patients while anxiety was reported in by 11.3% patients. In this study loss of taste was reported in 14.28% patients.

In the present study majority of subjects had normal clinical laboratory findings. However, the mean level of Hb was 11.2±1.5 g/dl which is lower than the normal range. Higher levels of erythrocyte sedimentation (ESR), CRP, d-dimer and random blood sugar among patients was also reported. The mean random blood sugar (RBS) of study subjects

was 150.0 ±37.4 mg/dl. In our study, there were 28% diabetic patients and this can be the possible reason behind the elevated mean levels of blood sugar. These findings were consistent with the findings of previous studies by (Thyagaraj V et al, Rahar S et al, Goel N et al).^{6,7,10}In the study conducted by Rahar S et al.⁷ they found out that Anemia was present in 62 (36.5%) patients. Leukocytosis was noted in 26 (15.3%) patients of which lymphopenia was noted in 70 (41.2%) patients while neutrophilia was noted in 45 (26.5%) patients. Twenty-two (12.9%) patients had thrombocytopenia. In another study Goel N et al.,⁶ reported that anaemia was present in about 40% of patients and thrombocytopenia in about 11% patients. In the present study it was found that that 40% of patients had ground glass opacities, 24% had interstitial thickening, 14% showed consolidation, 4% had pleural effusion, and 18% patients had normal chest X-rays. Goel N et al.,⁶ in their study reported that normal chest X-ray was found in 65.71% patients. However, our study had found a lower number of patients with normal CXR. Goel N et al.,⁶ also reported that diffuse reticulations were seen in 14.28% cases, bilateral lower zone reticulations were seen in 11.42% cases, cystic changes were recorded in 5.71% and unilateral hilar lymphadenopathy was reported in 2.85% patients. Interstitial thickening was seen in 6% cases which was similar to study done by Guler SA et al.¹¹Penmetsa CS et al.,⁸ reported normal chest X-ray findings in 66% cases. This study reported that consolidation, ground glass opacities and interstitial thickening was seen in 16%, 10% and 8% patients respectively. The present study found out that 86.84% cases had shown abnormal CT findings. There were only 5 patients with normal chest CT findings. CT scan showed fibrotic appearances with some aspects of interstitial involvement, architectural distortion and traction bronchiectasis. In a study Goel N et al.⁶ reported that none of the patient had normal CT findings. Goel N et al.⁶ found out that Diffuse reticulations (52.94%) were seen in majority of the cases. Diffuse ground glass opacities, diffuse nodular shadows, bilateral lower lobe GGOs and emphysematous changes were seen in 35.29%, 29.41%, 11.76% and 11.76% patients, respectively. Chest radiographs are usually of limited value in the diagnosis of early stages especially in mild disease course; however, the CT findings may be present early even before the onset of the symptoms. Chest radiographs are very helpful during follow up as well as in the intermediate to advanced stages of COVID-19 with features of acute respiratory distress syndrome (ARDS). A prolonged follow up is essential to alert risk of longer symptom duration. The limitations of our study were less sample size and also that are study was confined to a single center.

CONCLUSION

The study aimed to explore the clinical and radiological profile of post-Covid-19 patients.

Diabetes and hypertension were common comorbidities and clinical laboratory findings showed lower mean Hb of 11.2±1.5 g/dl, higher levels of ESR, CRP, d-dimer, and random blood sugar (mean 150.0±37.4 mg/dl). Chronic fatigue, depression, anxiety, and breathlessness, chronic headache, anosmia, arthalgias, myalgia and post-Covid chest pain were reported. The results showed that 82% of the chest x-rays were abnormal, while 86.84% of the chest CTs had abnormal findings. The findings of this study highlight the significant impact that COVID-19 infection can have on patients, even after recovery. The high prevalence of comorbidities, such as diabetes and hypertension, suggests that patients with these conditions may be at a higher risk for severe illness and long-term health consequences following a COVID-19 infection. Additionally, the high rates of chronic fatigue, depression, anxiety, and other symptoms indicate the need for ongoing monitoring and management of post-COVID-19 patients to address these long-term health effects. This study provides important insights into the clinical and radiological profile of post-COVID-19 patients. It would be valuable to explore the impact of other factors, such as race and socioeconomic status, on the clinical and radiological profiles of post-COVID-19 patients.

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