

Original Research Article

Clinicoepidemiological profile and outcome in patients of covid 19 with normal chest x-ray: study of 51 patients

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ABSTRACT

Background: Covid 19 was declared a pandemic by WHO on 11 March 2020. Patients usually have pneumonia on chest x-ray at time of presentation however many patients also do not develop pneumonia and have normal chest x-ray.

Methods: A total of 51 patients above the age of 15 years diagnosed with covid 19 by RT PCR of nasopharyngeal/oropharyngeal samples were included in the study. History of symptoms onset was recorded, chest x-ray and haematological investigations were done of all patients.

Results: A total of 51 patients >15 years of age were included in the study. 28 were male and 23 were female patients. Maximum number of patients were in age group 15-30 years. Most common presenting complain was fever (49% patients). Most common comorbidity was diabetes mellitus. There was no mortality reported in patients with normal chest x-ray.

Conclusions: We conclude from the current study that patients with normal chest x-ray at the time of presentation have a very good outcome.

Keywords: Clinical features and outcome, covid 19, Normal chest x-ray

INTRODUCTION

Corona virus disease 2019 (COVID-19) originated from Wuhan city of China in December 2019 is a severe acute respiratory infection caused by corona virus-2 (SARS-CoV-2) which is an enveloped beta coronavirus 2. Declared as a pandemic by WHO on 11 March 2020.¹

India has reported more than 15 lakh cases and more than 30000 deaths as of July 2020.

Common presenting symptoms are fever, dry or productive cough, shortness of breath, fatigue and anosmia.^{2,3}

The gold standard for diagnosis of the virus is the detection of viral RNA through reverse transcriptase polymerase chain reaction (RT-PCR) of respiratory tract samples.^{4,5} Till date there has been no definitive treatment options available however research to find a cure are ongoing.

Objective of the study

This study evaluated the clinical profile and outcome in terms of discharge from the hospital after testing negative or mortality during hospital stay in patients of covid 19 diagnosed by RT PCR of nasopharyngeal sample and presenting with normal chest x-ray meaning having no

signs of bronchopneumonia or lobar pneumonia at presentation.

METHODS

Methodology

This was a prospective observational study done in the department of TB and respiratory diseases, JN medical college AMU, Aligarh from August 2020 to September 2020. Ethical clearance was obtained from hospital ethical committee.

All patients above 15 years of age presenting to emergency department with symptoms suggestive of covid 19 were subjected to RT PCR of nasopharyngeal sample. Those testing positive were shifted to covid ward of the hospital. Routine investigations, spO₂ by pulse oximeter and chest x-ray of all patients were done in the covid isolation ward. Patients were given supportive treatment and repeat nasopharyngeal sample testing were done on day 5, day 9, day 12, day 15 and day 18 of the patients included in the study to see for days of conversion

Inclusion criteria

All patients above 15 years of age testing positive by RT PCR of nasopharyngeal sample and having normal chest x-ray at presentation were included in the study

Exclusion criteria

Patients below 15 years of age testing positive by RT PCR of nasopharyngeal sample and having normal chest x-ray; patients above 15 years of age testing positive by RT PCR of nasopharyngeal sample and having features of pneumonia on chest x-ray at presentation; all patients testing negative for covid 19 by RT PCR presenting to emergency department with symptoms suggestive of covid 19.

Ethical approval

Institutional ethical clearance was obtained for the current study.

Statistical analysis

Statistical tests were not applicable to the final result. Results are expressed in terms of percentage.

RESULTS

Among 51 patients included in the study 28 were male and 23 were female. Maximum number of patients were in the age group 16-30 years (20 patients, 39.2%) followed by age group 31-45 years, 46-60 years, 61-75

years and >76 years with 12, 11, 7, 1 patients in each age group respectively (Table 1).

Table 1: Age and sex distribution of study group.

Age group (in years)	Male	Female	Total
16-30	11	9	20
31-45	6	6	12
46-60	6	5	11
61-75	5	2	7
>76	0	1	1
Total	28	23	51

Out of 51 patients only 12 patients (23.5%) presented with symptoms of more than 5 days duration and majority of patients (76.5%) presented to emergency department within 5 days of onset of symptoms. The most common symptom was fever which was reported by 25 patients (49%). Next common symptom was cough reported by 16 patients (31.4%) among which 9 patients has dry cough and 7 patients presented with cough with minimal to moderate expectoration. Other symptoms were gastrointestinal symptoms of pain abdomen, nausea vomiting and diarrhea reported by 13 patients, 11 patients had sore throat, 8 patients had history of malaise and fatigue, 7 patients had complain of shortness of breath at presentation, 4 patients each presented with rhinitis, cold and loss of smell and taste and 8 patients presented with non specific symptoms like anxiety, chest pain and headache (Table 2). 7 patients were asymptomatic at the diagnosis and were tested because all had history of contact with a covid positive patient.

Table 2: Presenting complains of study group.

Symptoms	≤5 days duration	>5 days duration	Total
Fever	21	4	25
Dry cough	7	2	9
Cough with expectoration	3	4	7
GI symptoms	11	2	13
Sore throat	6	5	11
Malaise/fatigue	2	6	8
Shortness of breath	5	2	7
Rhinitis/cold	2	2	4
Loss of taste/smell	4	0	4
Nonspecific symptoms like anxiety/chest pain/headache	3	5	8

Table 3: Comorbidities in study group.

Comorbidities	T2DM	Systemic hypertension	both T2DM and syst. hypertension
No. of patients	4	3	5

Type 2 diabetes mellitus was the most common comorbidity seen in 4 patients, 5 patients had both type 2 diabetes mellitus and systemic hypertension and 3 patients had history of only systemic hypertension (Table 3).

Table 4: Other chronic diseases in the study group.

Other chronic diseases	No. of patients
CAD	2
CKD	2
Hypothyroid	2
Severe anaemia	1

Other chronic disease seen were CAD, CKD and hypothyroidism in two patients each, one patient had severe anaemia at presentation (Table 4).

Two females were pregnant at time of diagnosis of covid 19.

Out of 51 patients 49 patients (96%) had stable vitals at presentation, were maintaining normal saturation on room air and none of them required supplemental oxygen. However 7 patients complained of dyspnea at presentation but only two patients were found to be hypoxic with pulse oximeter and required supplemental oxygen and later on improved and were maintaining normal saturation at room air.

All the patients were diagnosed with RT PCR of nasopharyngeal sample. After diagnosing patients were shifted to covid isolation ward of the hospital. Routine blood investigations like arterial blood gas analysis, complete blood count, renal and liver function tests and chest x-ray were done for all patients.

Blood investigations were within normal range for all patients except one patient who had severe anaemia and blood transfusion was done for the same. Patients were given symptomatic treatment for covid 19 since there is no proven drug or vaccine till date. Repeat RT PCR of nasopharyngeal sample was done at day 5, day 9, day 12, day 15 and day 18 of first positive report.

Table 5: Duration of conversion from covid 19 positive to covid 19 negative.

Repeat RT PCR day	No. of patients tested negative
Day 5	5
Day 9	8
Day 12	26
Day 15	6
Day 18	6

Maximum number of patients (26 patients, 51%) tested negative on day 12 after first positive report, 8 patients tested negative on day 9 and 6 patients each tested negative on day 15 and day 18 of the repeat test

respectively. Only 5 patients (9.8%) were tested negative on day 5 of repeat test (Table 5).

None of the patient required any invasive or non-invasive ventilator support and there was no mortality and all patients (100%) were discharged after testing negative by RTPCR of nasopharyngeal sample.

DISCUSSION

Covid-19 is likely to remain an important differential diagnosis for the foreseeable future in anyone presenting to hospital with a flu-like illness.

Common presenting symptoms include fever, dry cough, anosmia (and other taste and/or smell disturbances), fatigue, sputum production and shortness of breath.^{2,3} Less common presenting symptoms can be myalgia/arthralgia, headaches, sore throat, chills, pleuritic pain and diarrhea.^{6,7} Rare presenting symptoms can be nausea, vomiting, abdominal pain, GI bleeding, nasal congestion (<10%), palpitations, chest tightness, hemoptysis (<5%), confusion, seizures, paresthesia, altered consciousness, stroke.^{2,7-14}

A study done by Zhiliang et al found that 30% of close contacts of covid 19 patients who themselves tested positive did not develop any symptoms. The remainder showed changes in CT, but ~20% reportedly developed symptoms during their hospital course, none of them developed severe disease.¹⁵ This suggests that a high percentage of covid 19 carriers are asymptomatic

The definitive test for SARS-CoV-2 is the real-time reverse transcriptase-polymerase chain reaction (RT-PCR) test. It is believed to be highly specific, but with sensitivity reported as low as 60-70% and as high as 95-97%.^{4,5}

The place of antibody tests in the investigation of present and previous cases of covid 19 remains unclear and contentious

The most common ancillary laboratory findings in patients, including a study of 61,742, were the following: lymphopenia, thrombocytosis, increased prothrombin time (PT), increased lactate dehydrogenase.^{16,17}

Other commonly identified abnormalities include: mild elevated CRP and ESR, elevated D-dimer, mildly elevated serum amylase, mildly deranged liver function tests are common, primarily elevated alanine aminotransferase (ALT) and aspartate aminotransferase (AST).^{18,19}

The SARS-CoV-2 virus, like the closely-related MERS and SARS coronaviruses, effects its cellular entry via attachment of its virion spike protein (a.k.a. S protein) to the angiotensin-converting enzyme 2 (ACE₂) receptor. This receptor is commonly found on alveolar cells of the

lung epithelium, underlying the development of respiratory symptoms as the commonest presentation of Covid 19.⁸ It is thought that the mediation of the less common cardiovascular effects is also via the same ACE₂ receptor, which is also commonly expressed on the cells of the cardiovascular system.⁸

The use of CT as a primary screening tool is discouraged. According to a Fleischner Society consensus statement published on 7 April 2020: imaging is not indicated in patients with suspected COVID-19 and mild clinical features unless they are at risk for disease progression; imaging is indicated in a patient with COVID-19 and worsening respiratory status; in a resource-constrained environment, imaging is indicated for medical triage of patients with suspected COVID-19 who present with moderate-severe clinical features and a high pretest probability of disease.²⁰

Moreover performing CT routinely for large cohorts of patients carries additional risks: 1) depletion of finite resources, especially PPE due to excessive usage, 2) increased risk of viral transmission (to staff, patients and carers) as covid 19 positive and negative patients come into close proximity in the radiology department, 3) additional ionizing radiation exposures, 4) although less sensitive than chest CT, chest radiography is typically the first-line imaging modality used for patients with suspected COVID-19.^{21,22} Chest x-rays are easily and readily available and cheaper than CT scans. Portable x-rays decrease risk of infection transmission and are easy to decontaminate than CT scans.²³ 5) Chest radiographs may be normal in early/mild disease.

Plain radiograph

The British Society of Thoracic Imaging (BSTI) have given a classification for chest xray appearance for covid suspected patients as follows:²⁴

Classic/probable covid 19: Lower lobe and peripheral predominant multiple opacities that are bilateral (>> unilateral).

Indeterminate for covid 19: Does not fit classic or non-COVID-19 descriptors

Non-covid 19: Pneumothorax/ lobar pneumonia/ pleural effusion(s)/ pulmonary edema/ other.

Normal: Covid 19 not excluded.

Treatment

No specific treatment or vaccine exists for covid 19 till date. Therefore resources have been concentrated on public health measures to prevent further interhuman transmission of the virus. Preventive measures to be followed include: meticulous hand-washing, wearing of

face masks, social distancing, avoidance of large crowds/crowded environments and self-isolation.²⁵

Aerosol transmission is now thought to have a more significant role in viral spread than initially thought and so to prevent the spread it will require additional public health measures as follows: 1) better ventilation, especially in indoor public spaces, workplaces, educational establishments, healthcare facilities, and community residential centers for the elderly.^{26,27} 2) specific aerosol infection control systems, such as: a) high throughput and effective air filtration b) virucidal UV (ultraviolet) lighting.

Limitation of the study was that chest x-ray is a less sensitive modality to see involvement of lung parenchyma and sample size is small to reach a statistically significant conclusion.

CONCLUSION

In this study we conclude that fever and respiratory complaints are most common presenting feature in patients of covid 19. Chest x-ray is a less sensitivity modality to diagnose covid 19 as many patients do not develop pneumonia or chest x-ray can be normal in early/mild disease. But as we saw in this study that majority of patients presented within 5 days of onset of symptoms and had normal x-rays at presentation. There was no mortality in any patient depicting that those presenting early with normal x-rays have way better outcome than patients who have features of pneumonia at presentation. So chest x-rays should be performed at the time of diagnosis of covid 19 in order to have a quick idea about thoracic involvement and categorization of the patient. With no definitive treatment till date preventive measure are the best approach to avoid infection.

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