An Update on Initial Epidemiological Profile, Clinical Course, and Outcome of COVID-19 Patients at a Tertiary Care Center in India

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Abstract

Background and Aim: Coronavirus disease 2019 (COVID-19) has become a global pandemic with the spectrum of disease from asymptomatic or mild disease to severe cases requiring intensive care unit (ICU) admission. In India, it started with milder presentation affecting younger population. Later on, an increase in disease severity was observed involving older age group as well. However, there is a paucity of published data regarding patients requiring ICU care in India. This case series describes the initial experience of an ICU in India regarding epidemiological profile, clinical course, and outcome of critically ill COVID-19 patients. **Methods:** This case series included 27 consecutive laboratory-confirmed COVID-19 patients who were admitted in a tertiary care ICU over 14 days period, followed up till their discharge from ICU. Demographic and clinical data, including laboratory and radiological findings, were compiled with special attention to co-morbidities of the patients. The management of these patients was done as per the institutional protocol for critically ill COVID-19 patients. **Results:** The median age of the patients was 50 years with no difference in gender. Comorbid conditions were seen in 85% of the patients with diabetes (43.7%) and hypertension (37.5%) as the most common conditions. The median duration of symptoms before admission was 6 days with fever as the most common clinical symptom at presentation. Chest roentogram showed bilateral lung infiltrates in 88.8% of the patients. Mild, moderate, and severe hypoxia were observed in 3, 8, and 16 patients, respectively. Ten patients were managed with oxygen therapy. Seventeen patients (62.9%) required ventilatory support. Mortality rate among patients admitted to our ICU was 59.2%. **Conclusions:** This case series shows middle-aged patients with comorbid diseases present with severe COVID-19 disease and have poor outcome.

Keywords: Coronavirus disease 2019, critically ill patients, India

INTRODUCTION

Coronavirus disease 2019 (COVID-19) originated from the city of Wuhan, China, in December 2019, thereafter; soon it became pandemic involving Indian subcontinent as well. Up to May 12, 2020, India had 46,008 active cases, 22,454 recovered cases, and 2293 deaths.[1] COVID-19 has shown a wide spectrum of disease ranging from asymptomatic or mild disease to severe cases requiring intensive care unit (ICU) admission. Increasing number of cases led to rapid filling up of ICU worldwide. There are reports from China, Italy, and the United States that show high mortality rates among critically ill patients.[2-4] COVID-19 outbreak in India has shown different course as compared to other countries. Initial report showed COVID-19 presenting as mild respiratory illness in young males in India.[5] However, there is a paucity of published data regarding patients requiring ICU care in our country.

The objective of this case series is to describe epidemiological profile, clinical course, and outcome of 27 consecutive COVID-19 patients confirmed by reverse transcriptase-polymerase chain reaction (RT-PCR) and admitted in a tertiary care ICU over 14 days period. Demographic and clinical data, including laboratory and radiological findings, were compiled with special attention to comorbid conditions of the patients.

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Methods

We included the confirmed cases of severe acute respiratory illness (SARI) due to COVID-19 presenting to the ICU of V. M. M. C and Safdarjung Hospital, a COVID-designated tertiary care hospital, from April 20, 2020, to May 3, 2020. Confirmation of the COVID-19 was done by the RT-PCR assay of nasopharyngeal and oropharyngeal swab specimen in accordance with the ICMR guidelines.[6]

The management of these patients was done as per the institutional protocol for critically ill COVID-19 patients. The criteria for ICU admission were acute respiratory failure (respiratory rate >30/min and arterial oxygen saturation <92% on room air), acute respiratory distress syndrome (ARDS), septic shock, and multiorgan dysfunction syndrome (MODS).

Patients were monitored using multipara monitors with recording of heart rate, noninvasive blood pressure, arterial oxygen saturation, and temperature. Ventilatory parameters were monitored throughout along with arterial blood gas analysis. Baseline blood investigations, including complete blood count, kidney function test, liver function test, serum electrolytes, international normalized ratio (INR) and random blood sugar were monitored regularly. In addition, additional specific investigations such as lactate dehydrogenase, C-reactive protein, D-dimer, and cardiac markers (Troponin-I, Creatine phosphokinase-myocardial band [CPK-MB]) were done. Electrocardiogram was obtained daily, and QTc interval was calculated using the Fridericia's formula.

Degree of hypoxemia was categorized as mild hypoxemia PaO_2/FIO_2: 200-300), moderate hypoxemia (PaO_2/FIO_2:100-200) and severe hypoxemia (PaO_2/FIO_2: <100). Patients with mild-to-moderate hypoxemia were put on oxygen therapy. Criteria for intubation and mechanical ventilation were tachypnea (RR >35 bpm), worsening hypoxemia, shock, and poor Glasgow Coma Scale.

Patients were started on prophylactic broad-spectrum antibiotics including azithromycin. Hydroxychloroquine, thromboprophylaxis, and other supportive management were given as per ICU protocol. Hydroxychloroquine was discontinued in patients having prolonged QTc. Ventilatory management was done as per ARDS-net protocol.[7] Weaning was done as per the patient's clinical condition. Patients with stable hemodynamics who no longer required oxygen therapy were transferred to isolation room facility.

Data collection and analysis

Epidemiological data were collected from the patient's record. Details of current illness, comorbid conditions, and concomitant medications were also noted. Clinical course and outcome was observed during their stay in ICU and patients were followed up till their discharge from ICU.

Deidentified (anonymized) data were summarized in Microsoft Excel and analysis for continuous variables was done using median and range. For categorical variables, analysis was done as counts and percentage.

Results

This report includes 27 confirmed cases of SARI due to COVID-19 requiring ICU admission from April 20, 2020, to May 3, 2020. The demographic data and co-morbid conditions of the patients are shown in Table 1. Median age of the patients was 50 years (range 9–90 years) with female: male ratio of 14:13. Eight patients (29.6%) were aged 60 years and above. Median weight of the patients was 60 kg (range 32–100). Grade-1 obesity was observed in two patients.

Majority of the patients (85%) had associated comorbidities. Among these, diabetes (43.7%) and hypertension (37.5%) were most common. Nearly 18.7% of the patients had both of these chronic illnesses [Table 1].

None of the patients had a history of travel. Two patients (7.4%) had a history of contact with the COVID-positive patient. Twenty-one patients were admitted directly, and six patients were referred cases from other hospitals [Table 1].

Majority of patients (66.6%) were admitted to the ICU during their 1st week of illness, 14.8% in the 2nd week, and 18.5% in the 3rd week of illness. Median duration of symptoms before admission was 6 days. Clinical symptoms at the presentation included fever (77.7%), shortness of breath (70.3%), and cough (62.9%) [Figure 1].

Baseline laboratory data are shown in Table 2. Three patients had hemoglobin <7 g/dl requiring blood transfusion. Two patients had lymphocytopenia (lymphocyte count 3%). Thrombocytopenia and thrombocytosis were observed in one patient each. Serum bilirubin was found to be raised in one patient. Liver enzymes, aspartate aminotransferase, and alanine aminotransferase were found to be elevated (> three times) in six (22.2%) patients. None of the patients had coagulopathy at the time of admission. Lactate and creatinine were elevated in seven (25.9%) and five (18.5%) patients, respectively.

Chest roentogram showed bilateral lung infiltrates in 88.8% of the patients. Empyema and pleural effusion were seen in one patient each.

Mild, moderate, and severe hypoxemia was observed in 3, 8, and 16 patients, respectively [Figure 2].

Ten patients (37%) were managed with oxygen therapy. Seventeen patients (62.9%) required ventilatory support. Seven patients (25.9%) developed shock and MODS during their ICU stay. Mortality rate among patients admitted to our ICU was 59.2%. Individual patient course is shown in Figure 3.

Discussion

To the best of our knowledge, this is the first case series reporting epidemiological profile, clinical characteristics, and early outcome of confirmed cases of SARI due to COVID-19 requiring ICU admission in the Indian population.

Table 1: Epidemiological data and comorbid conditions

Parameter	Value
Epidemiological data	
Total cases (male:female), *n*	27 (13:14)
Age (years), median (range)	50 (9-90)
Weight (kg), median (range)	60 (32-100)
Contact history, *n* (%)	2 (7.4)
Duration of symptoms (days), median (range)	6 (2-21)
Co-morbid conditions, *n* (%)	
Diabetes	9 (33.3)
Hypertension	8 (29.6)
Coronary artery disease	2 (7.4)
Valvular heart disease	2 (7.4)
Chronic kidney disease	2 (7.4)
Thyroid disease	2 (7.4)
Seizure disorder	2 (7.4)
Psychiatric illness	2 (7.4)
Chronic obstructive pulmonary disease	2 (7.4)
Cancer	2 (7.4)
Gout	1 (3.7)
Tuberculosis	1 (3.7)
Poliomyelitis	1 (3.7)
Trauma (femur fracture)	1 (3.7)
Pancreatitis	1 (3.7)

Table 2: Baseline laboratory data

Parameter	Median (range)
Hemoglobin (g/dl)	10.1 (6.3-15.1)
WBC's (per mm^3)	8800 (3800-16,300)
Platelet count (per mm^3)	180,000 (72,000-624,000)
Serum bilirubin (mg/dl)	0.7 (0.2-2.3)
AST (u/l)	57 (15-736)
ALT (u/l)	48 (5-531)
Serum creatinine (mg/dl)	0.8 (0.2-9.2)
Lactate (mm/l)	1.5 (0.3-4.3)
INR	1.08 (0.8-1.5)

WBC's: White blood cells, AST: Aspartate aminotransferase,
ALT: Alanine aminotransferase, INR: International normalized ratio

Our data shows that ICU admission was required in the middle-aged patients (median age 50 years) with no significant gender difference. Initial data of first 21 patients admitted in the same centre in India showed male preponderance (median age 40 years) with mild disease course.[5]

We observed the higher incidence of comorbidities (85%) compared to the reports by Wang *et al.* (72.2%) from China and Grasselli *et al.* (68%) from Italy in critically ill patients.[8,9] This could be due to the genetic and racial differences in patient population. Diabetes and hypertension were the most common comorbid illnesses in critically ill patients as seen by most of the previous studies.[4,9,10]

History of travel was reported in 62% patients by Gupta *et al.*, whereas none of our patients revealed such history. This difference could be possibly due to potential community
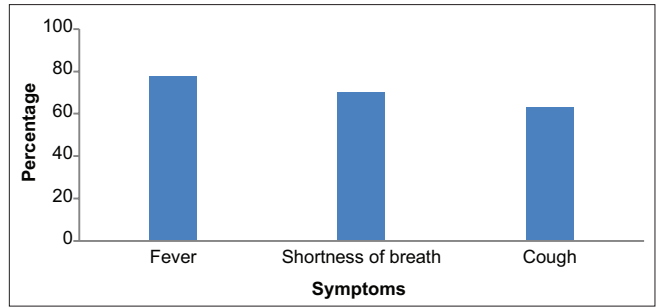

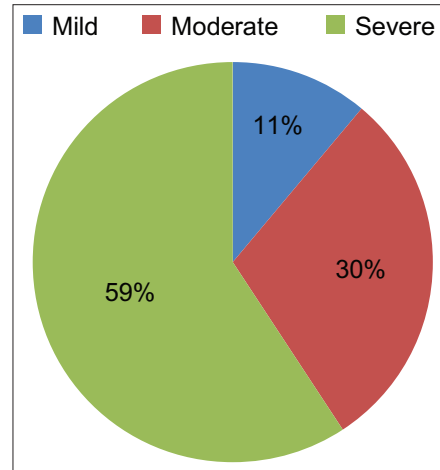**Figure 1:** Clinical symptoms at presentation
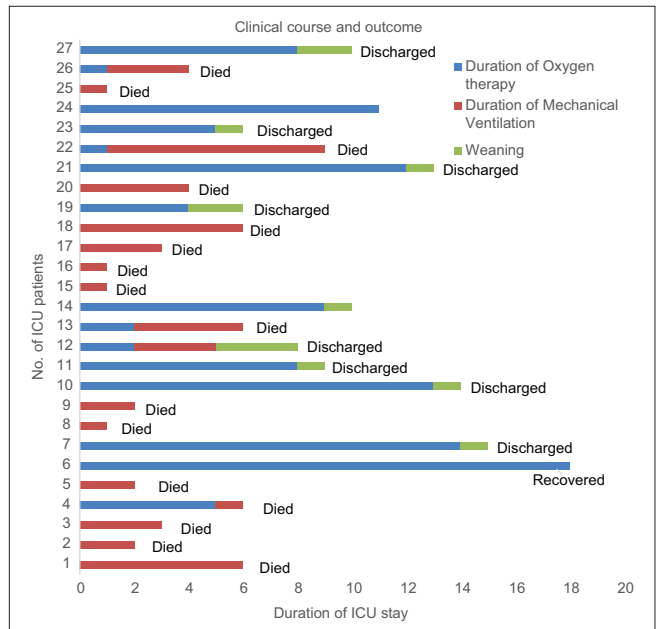

Figure 2: Degree of hypoxia

Figure 3: Clinical course and outcome of individual patient

transmission of the disease owing to rapid human-to-human transmission at the time of this report.[11-13]

The median duration of symptoms observed was 6 days in our series similar to the findings by Guan *et al.* from China.[14]

Fever was the most common presenting symptom followed by shortness of breath and cough in this case series, whereas cough was observed as the most common presenting symptom by Young *et al*.[15]

Lymphopenia, a cardinal feature of SARI due to COVID-19 was observed in only two patients in our series, whereas the reports by Zhou *et al*. and Bhatraju *et al*. reported higher incidence of lymphopenia in their series.[2,10] This difference could be due to the less number of patients observed over a limited period of time in our report or difference in the severity of disease. Bilateral lung infiltrates were observed as the most common radiological finding as mentioned in other reports.[10,15]

Majority of the patients on mechanical ventilation succumbed to the disease. The mortality rate of the patients requiring mechanical ventilation was high in our case series as reported from China, Washington, and New York Area.[2,4,16]

Among the patients who died, 59.2% had associated comorbid diseases with 37% having 2 or >2 comorbid conditions. Bhatraju *et al*. in their case series from the Seattle region have also observed poor outcome among the elderly and in patients with comorbidities.[10]

We observed 59.2% mortality rate in our ICU which is lower than the reported by previous reports (62%–78%). The possible reason for this observation could be the difference in severity of the disease.[2,16,17]

Limitations of our study include the data from a single center and observations over a limited period of time. As it is an initial experience, there is a need for larger data over a long period of time to know the course and outcome of disease in India.

Conclusions

This case series shows middle-aged patients with comorbid diseases present with severe COVID-19 disease and have poor outcome. Considering the novel infection and with evolving change in treatment strategy, our study can be a stepping stone for further research and data analysis.

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Conflicts of interest
There are no conflicts of interest.

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