

Clinical Profile of Severe covid patients admitted to ICU in a tertiary care hospital in Kerala

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Abstract

Background: The clinical characteristics of COVID-19 was diverse. This study was aimed at the clinical characteristics and associated survival data of covid patients admitted to ICU of a tertiary hospital in India.

Materials and Methods: This was a retrospectively observational study with data of 238 patients admitted to intensive care unit (ICU) of Chazhikattu Multi Super-Specialty Hospital in Thodupuzha, Kerala, India from January 2021 to June 2022. Demographic, clinical characteristics and outcome data at were obtained from medical records. All data were analyzed using SPSS (version 28, IBM Corp.) software.

Results: The median (IQR) age of the patients was 67 (26) years in total. Total survival was 60.1% (143 patients). 14Day survival was 69.3% (165 patients). The median (IQR) length of stay (LOS) in hospital was 9(8) while the median(IQR) LOS in ICU was 7(7). Age was significantly lower among survivors while breathlessness was significantly common in non-survivors. Survival was higher among those who did not require O2 support at presentation. Respiratory rate was higher among survivors.

Conclusion: The mortality rate of COVID-19 patients admitted to ICU is high. Higher age, breathlessness as symptom, higher respiratory rate and O2 requirement at admission may be associated with higher in-hospital mortality.

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I. INTRODUCTION

An outbreak of viral pneumonia caused by a novel coronavirus was reported in China in late 2019. It resulted in a severe acute respiratory syndrome (SARS) called SARS-coronavirus 2 (SARS-CoV-2). Soon it spread rapidly from China to other countries which resulted in global air travel being restricted and quarantines being introduced. On January 31, 2020 WHO declared a Global Health Emergency and on February 11th WHO renamed it as COVID-19 (coronavirus disease 2019)(1). On March 11, 2020, WHO declared the outbreak as a global pandemic(2). First case in India was reported in Kerala on January 30,2020 in an Indian student who had returned from Wuhan(3). Thereafter the cases rose exponentially and by January 31, 2021, more than 100 million confirmed cases and one million deaths from COVID-19 were reported globally. In India, at least 10 million laboratory-confirmed cases and >1,50,000 deaths of COVID-19 were reported by January 31,2021(4).

Early identification is important for better treatment and thereby to lower mortality among patients with severe COVID-19 pneumonia. In this study, we describe the epidemiological clinical features of patients with severe COVID-19 requiring ICU admission in the Indian Population.

II. AIMS & OBJECTIVES

Studies found that the clinical characteristics of COVID-19 were diverse and variable in different countries. Hence, it is essential to investigate the clinical symptoms and co-morbidities associated with severe COVID-19 in the local population. Though there are many studies on the symptoms and clinical characteristics of covid patients in India in general, we found that the number of studies on clinical characteristics of severe COVID-19 patients admitted to ICU in India was limited. Hence, we studied the symptoms, co-morbidities, and Oxygen requirement at admission and their relation to survival among severe COVID-19 patients admitted in the ICU of one of the Corona Hospitals in Kerala, India.

III. MATERIALS AND METHODS

Study design

This is a single institution cross sectional study performed using data from medical records of patients admitted to intensive care unit (ICU) of Chazhikattu Hospital in Thodupuzha, India from January 2021 to June 2022. This hospital was assigned as a COVID Hospital by the Govt. of Kerala during the early phase of the pandemic. Admission of COVID patients to the ICU was according to ICMR guidelines(5). From the cohort of ICU patients, those meeting the inclusion criteria were enrolled in this study. The study was approved by Hospital Ethics Committee.

Study Population

The inclusion criteria was patients diagnosed with COVID-19 who were admitted to ICU and age above 18. Exclusion criteria used in the study included all pregnant patients, patients leaving against medical advice, patients who were already admitted in hospital for another disease developing covid as nosocomial infection, patients who developed other non covid-related diseases while on treatment at hospital, readmission to the ICU/hospital for COVID related diagnosis, and those with incomplete data. The diagnosis of COVID-19 and the criteria for admission to ICU were made in accordance with ICMR guidelines. Laboratory confirmation of COVID-19 in majority of cases were performed using RTPCR done at DDRC Laboratories, Kochi while lab confirmation for rest of the cases were done through Rapid Antigen Test (RAT) at the microbiology lab of Chazhikattu Hospital. Other common respiratory infections were ruled out. Of 381 COVID cases admitted to the intensive care units from January 2021, 143 patients were excluded. Finally, 238 patients were enrolled in this study. Patients underwent standard care based on ICMR guidelines. Invasive procedures were performed when indicated. Viral clearance was confirmed in all patients before discharging them from ICUs using RAT in the microbiology lab of the hospital.

Data collection/Variables

Demographic, patient reported symptoms at admission, comorbidities and outcome data were obtained retrospectively from electronic medical record. No follow-up was done after discharge. All data was obtained without patient identifiers. All data was independently double checked by two physicians. All data were collected onto a printed proforma and then the data was entered into MS Excel.

Outcome

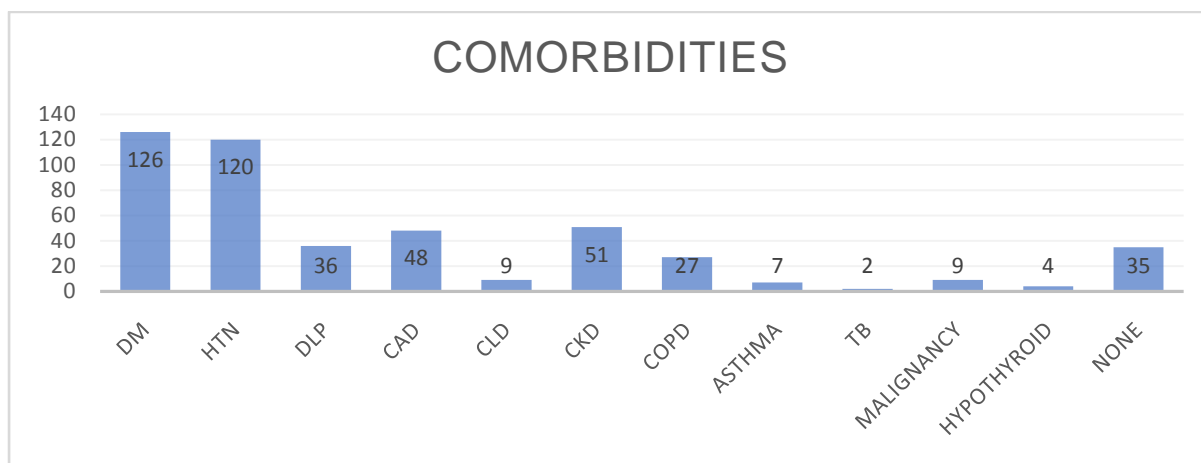
The primary outcome of the study was defined as survival at discharge from the hospital. Secondary outcomes included 14 Day survival from the day of admission, Length of stay in hospital and Length of stay in ICU.

Statistical Analysis

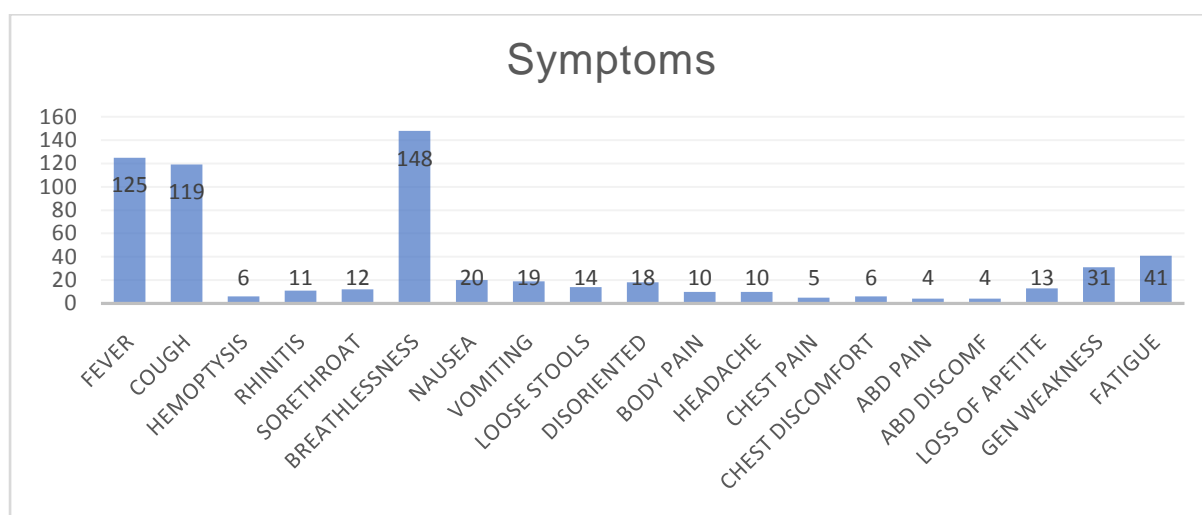
All categorical variables were presented as count (%). All normally distributed continuous variables were represented using mean (SD) and all continuous variables without normal distribution were represented using median (IQR). Depending on normal distribution, Chi-square and Fischer Exact tests were used to analyse categorical data while, Independent samples T-test and Mann-Whitney U tests were used to analyse continuous data. A two-sided P value of <0.05 was considered to be statistically significant. All statistical analysis was performed using SPSS (version 28, IBM Corp.) software.

IV. RESULTS

A total of 238 patients were analysed. Age, Vital signs and Length of Stay (LOS) in hospital and ICU are given in Table 1. Frequency of co-morbidities, symptoms at presentation and survival are mentioned in Table 2. P-value of analyses are mentioned in Tables 3 and 4. There were a greater number of males admitted to the ICU compared to females. But there was no significant difference in mortality with regard to gender. The mean age of admitted patients was 67 years with an IQR of 26 years. We found that mortality from severe covid was significantly higher as age increased. DM and HTN were the most common comorbidities followed by close incidence of CAD and CKD. More than 1/3rd of the patients had more than 2 co-morbidities. None of the Co-morbidities had any significant association with overall survival.



Among symptoms at presentation, Fever, cough and breathlessness were the most common. The triad of fever, breathlessness and cough was not found to be significantly associated with higher mortality. We found that among those who reported no breathlessness, the mortality was low. Respiratory rate was also found to be higher among non-survivors compared to survivors. Also we found that among patients who ended up in ICU at one stage or another, a vast majority had low oxygen saturation and therefore required O₂ support at presentation (64.3%).



Characteristic	
Age, Median(IQR)	67(26)
SBP, Mean(SD)	140.5(26)
DBP, Mean(SD)	80.5(11)
PR, Mean(SD)	89.7(18)
RR, Median(IQR)	23(8)
LOS in hospital, Median(IQR)	9(8)
LOS in ICU, Median (IQR)	7(7)

Table 1

Table 2 - Frequencies

	Count(N)	Percentage(%)
Sex		
Male	158	66.4
Female	80	33.6
Comorbidities		
DM	126	52.9
HTN	120	50.4
DLP	36	15.1
CAD	48	20.2
CLD	9	3.8
CKD	51	21.4
MALIGNANCY	9	3.8
TB	2	.8
COPD	27	11.3
ASTHMA	7	2.9
Total Co-morbidities		
None	35	14.7
1	67	28.2
2	52	21.8
>2	84	35.3
Symptoms		
FEVER	125	52.5
COUGH	119	50
BREATHLESSNESS	148	62.2
NAUSEA	20	8.4
VOMITING	19	8
LOOSE STOOLS	14	5.9
DISORIENTED	18	7.6
BODY PAIN	10	4.2
HEADACHE	10	3.8
LOSS OF APPETITE	13	5.5
GEN WEAKNESS	31	13
FATIGUE	41	17.2
O2 support at presentation	153	64.3
Overall Survival	143	60.1
14Day Survival	165	69.3

Similar results were obtained for survival on Day 14. Higher age ($p=0.002$) and higher respiratory rate($p<0.001$) was associated with higher 14-Day mortality while those who did not have breathlessness ($p=0.027$) as a symptom and those who did not require O2 at presentation ($p=0.038$) had a higher Day 14 survival.

The median(IQR) Length of Stay (LOS) in hospital was 9(8) while that in ICU was 7(7). We also analysed the symptoms and co-morbidities against the mean LOS in hospital and mean LOS in the ICU. We also found that for those with cough($p=0.021$), the mean LOS in hospital was longerwhile for those with cough ($p=0.011$) and breathlessness ($p=0.041$), the mean LOS in ICU was found to be longer.

Characteristic	Survivors, N(%)	Non Survivors, N(%)	P value
Sex			.765
MALE	96(60.8)	62(39.2)	
FEMALE	47(58.8)	33(41.3)	
Comorbidities			
DM	77(61.1)	49(38.9)	.731
HTN	67(55.8)	53(44.2)	.177
CAD	26(54.2)	22(45.8)	.349
CKD	27(52.9)	24(47.1)	.240
MALIGNANCY	3(33.3)	6(66.7)	.095
Total Comorbidities			.675
NONE	21(60)	14(40)	
ONE	39(58.2)	28(41.8)	

TWO	35(67.3)	17(32.7)	
>TWO	48(57.1)	36(42.9)	
Symptoms			
FEVER	79(63.2)	46(36.8)	.302
COUGH	71(59.7)	48(40.3)	.895
No DYSPNEA	65(72.2)	25(27.8)	.003
TRIAD OF FEVER,COUGH,DYSPNEA	27(58.7)	19(41.3)	.830
NAUSEA	13(65)	7(35)	.639
VOMITING	13(68.4)	6(31.6)	.439
DIARRHEA	7(50)	7(50)	.427
DISORIENTED	9(50)	9(50)	.364
MYALGIA	7(70)	3(30)	.513
HEADACHE	6(60)	4(40)	.996
LOSS OF APPETITE	6(46.2)	7(53.8)	.292
GENERALISED WEAKNESS	22(71)	9(29)	.185
FATIGUE	25(61)	16(39)	.898
No O2 Support at presentation	62(72.9)	23(27.1)	.003

Table 3 – Overall Survival

Characterisitic	Overall	Survivors	Non Survivors	P value
Age, Median(IQR)	67(26)	65(25)	73(22)	<0.001
SBP, Mean(SD)	140.5(26)	140.9(25.7)	140(26.7)	0.8
DBP, Mean(SD)	80.5(11)	79.9(10.5)	81.2(11.7)	0.353
PR, Mean(SD)	89.7(18)	87.9(17.7)	92.6(18.4)	0.052
RR, Median(IQR)	23(8)	22(4)	26(8)	<0.001

Table 4

V. DISCUSSION

A total of 238 patients were analysed. Of that, 143 patients (60.1%) survived and were discharged in a stable condition to their home. All patients were isolated for the entire duration of treatment. Doctors and other staff used disposable Personal Protective Equipment(PPE) inside the ICU and ward. All patients were categorized based on their clinical severity according to ICMR guidelines. Treatment included use of antivirals like Remdisivir, Favipravir and Baricitinib as well as other supportive measures including Corticosteroids, Anticoagulants, bronchodilators and supplemental oxygen therapy. Respiratory support using Non Invasive Ventilation (NIV) and Mechanical Ventilation were provided whenever required.

There were a greater number of males admitted to the ICU compared to females. This was similar to previous studies showing similar results(6,7). The mean age of admitted patients was 67 years with an IQR of 26 years. The age of patients who did not survive is significantly greater than those who survived. This is in accordance with previous studies showing the higher mortality with advanced age in COVID patients(6,8). DM and HTN were the most common comorbidities followed by close incidence of CAD and CKD. This is also consistent with previous studies(9). More than 1/3rd of the patients had more than 2 co-morbidities.

None of the patients were asymptomatic which could probably be because the study was done in a tertiary care hospital and limited to only the ICU patients. Former studies have shown that the chances of asymptomatic patients ending up in an ICU is significantly lower compared to symptomatic patients(10). The mean (SD) duration of symptoms was 4.2 (3.2) days and the duration varied from 1 to 17 days. Among symptoms at presentation, Breathlessness was the most common, followed by fever and cough. This is similar to a previous study done on ICU patients in India with a smaller sample size of 60(9). The triad of Fever, cough and breathlessness was found in 46 patients(19.3%). But the presence of the triad was not found to be significantly associated with higher mortality. Also we found that among patients who ended up in ICU at one stage or another, a vast majority had low oxygen saturation and therefore required O2 support at presentation (64.3%).

Similar results were obtained for Day 14 survival status. Higher age and Higher respiratory rate were associated with lower Day 14 survival while absence of breathlessness at presentation and non-requirement of O₂ support were associated with higher Day 14 survival. Day 14 survival (69.3%) was higher than overall survival (60.1%). Among those who were alive on Day14, a vast majority (86.7%) survived and were discharged to home.

The median(IQR) LOS in hospital was 9(8) while the median (IQR) LOS in ICU was 7(7). These results are in accordance with previous systematic review studies(11) conducted in other countries. We also found that for those with cough, mean LOS in hospital was longer while for those with cough and breathlessness, the mean LOS in ICU was found to be longer independently ($p<0.05$).

Our study had a few limitations. This being a retrospective study during a pandemic with a high rate of missing data, there could have been bias in the study results. Secondly, we did not account for vaccination status as that data was missing for a significant portion of the initial study sample. Third, we did not conduct follow-up of patients to check for mortality after discharge from the hospital. Finally, we did not report the cause of death specifically.

VI. Conclusion

Higher number of males ended up in ICU due to covid compared to females. Among severe covid patients admitted to the ICU, higher age was associated with higher mortality. Absence of breathlessness was associated with higher survival while higher respiratory rate at presentation was associated with higher mortality. Similar results were obtained for survival status on Day 14. Also, breathlessness and cough were associated with higher mean LOS in hospital and ICU.

VII. Conflict of interest

Authors declare that they have no conflict of interest.

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