Journal of Cardiovascular Disease Research

ISSN:0975-3583,0976-2833 VOL14,ISSUE05,2023

Demographical Profile and Clinical Outcomes of Covid-19 Patients at a Tertiary Care Centre

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Abstract

Background: A new strain of coronavirus responsible for pneumonia of unknown origin was detected in early January 2020, named as 2019-novel coronavirus. Even though COVID-19 has affected all regions of the world, there are great variations in the prevalence of the disease and mortality rates in different countries, the reasons for which are poorly understood. In this study, we analysed the clinical manifestation, laboratory profile and final outcome in COVID-19 patients in our Medical College & Hospital providing tertiary care with the purpose of adding information to the already existing data. **Material and Methods:** Inclusion Criteria: All positive and confirmed cases of COVID-19 disease, admitted in COVID wards, HDU, ICU of our Medical College & Hospital, irrespective of age & gender. **Results:** Majority of study subjects (61%) were above 40 years of age. The commonest presenting complaint was cough with less than one-fifth having fever. Sputum was present in 27% of cases and more common in live subjects. Breathlessness was present in 56% of cases and more common in expired subjects. Oxygen support was required in 59% of cases. Treatment with Remdesivir was needed in more than 80% of non-survivors of Covid-19 disease while less than 30% survivors needed Remdesivir therapy. Plasma treatment therapy was given in 6% and Mechanical ventilation in 34% of cases. **Conclusion:** Majority of the patients were asymptomatic but potential spreaders of the disease. Fever, cough, and breathlessness were the major presenting symptoms. Advanced age, high TLC with high N/L ratio, high CRP level, high serum ferritin level, high D-dimer value and low vitamin D levels correlated positively with severity of disease responsible for high mortality rate.

Keywords: Severe Acute Respiratory Syndrome, Middle East Respiratory Syndrome, Quick Sequential Organ Failure Assessment.

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Introduction

Pneumonia of unknown etiology hit Wuhan, Hubei, China on December' 2019 which was later attributed to a coronavirus.[1] On investigation, a new strain of coronavirus responsible for pneumonia of unknown origin was detected in early January 2020, named as 2019-novel coronavirus (2019-nCoV).[2] India notified it's first case of COVID-19 on 30/01/2020 with steady increase in number over a period of few months due to local and community transmission.[3] SARS-CoV-2 belongs to the same family of viruses as the causative agents of the other two recent outbreaks of viral pneumonia: severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS).[4,5] Different countries from various continents of the world reported variable clinical manifestation and final outcome of COVID-19 patients attributable to demographic differences, variable behaviour of the local population along with the healthcare system's ability to analyse and document the cases. Among the various manifestations of the COVID-19 disease, breathlessness and sputum production dominated with variable representation by fever without chills, cough, myalgia, fatigue, sore throat, headache, anosmia, ageusia, vomiting, diarrhoea, etc. Thus, none of the symptoms were classical of COVID-19 disease. Singla et al (2021),[6] in their study descriptive & prospective of 1030 patients evaluated demographics, clinical presentations of Covid-19 patients visiting the tertiary level institution. The strongest predictors of mortality in their study were shortness of breath and tachycardia. The majority of the patients do not report any history of contact. Even though COVID-19 has affected all regions of the world, there are great variations in the prevalence of the disease and mortality rates in different countries, the reasons for which are poorly understood. For example, in China, where the first case of COVID-19 was reported and which has the largest population in the world, the prevalence has been very low compared to other countries. In this study, we analysed the clinical manifestation, laboratory profile and final outcome in COVID-19 patients in our Medical College Hospital providing tertiary care with the purpose of adding information to the already existing data.[7,8]

ISSN:0975-3583,0976-2833 VOL14,ISSUE05,2023

AIM

- To study the Demographical profile and clinical outcome of COVID-19 patients.

OBJECTIVES

- To identify exposure characteristics of the patients.
- To identify the clinical manifestations.
- To identify the laboratory parameters.
- To compare the clinical outcome of the study group.

Methodology

Inclusion criteria

All positive and confirmed cases of COVID-19 disease, admitted in COVID wards, HDU, ICU of our Medical College Hospital, of age 18 and above.

Clinical Severity And Assessment Parameters,[31] (as annexure)

Clinical Severity	Clinical Presentation	Clinical Parameters
Mild	patients with uncomplicated upper respiratory tract infection, may have mild symptoms such as fever, cough, sore throat, nasal congestion, malaise, headache	Without evidence of breathlessness or Hypoxia (normal saturation).
Moderate	Pneumonia with no signs of severe disease	Adolescent or adult with presence of clinical features of dyspnea and or hypoxia, fever, cough, including SpO2<94% (90-94%) on room air, respiratory rate >=24/min. Child with presence of clinical features of dyspnea and or hypoxia, fever, cough, including SpO2 <94% (90-94%) on room air, respiratory rate >=24/min. Fast breathing (in breaths/min): < 2 months: ≥ 60; 2–11 months: ≥ 50; 1–5 years: ≥ 40.
Severe	Severe pneumonia	Adolescent or adult: with clinical signs of Pneumonia plus one of the following: respiratory rate >30 breaths/min, severe respiratory distress, SpO2 <90% on room air. Child with cough or difficulty in breathing, plus at least one of the following: central cyanosis or SpO2 <90% severe respiratory distress (e.g., grunting, chest in-drawing); signs of pneumonia with any of the following danger signs: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions. Other signs of pneumonia may be present: chest in drawing, fast breathing (in breaths/min): < 2 months: ≥ 60; 2–11 months: ≥ 50; 1–5 years: ≥ 40.

Statistical Analysis

All the data collected from the cases was recorded in the predesigned proforma followed by its entry into MS EXCEL spreadsheet and evaluation by SPSS software. All the quantitative variables were expressed as mean & standard deviation while all categorical variables were expressed by frequency & percentage. Appropriate statistical tools and methods were applied at the time of data analysis. A p-value of <0.05 was considered statistically significant

RESULTS

Table 1: Distribution of study participants according to some parameters

Fever	Survive (n=69)	Expired (n=31)	Total (n=100)	p-value
Absent	17	5	22	0.222
Present	52	26	78	

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Breathlessness				
Absent	42	2	44	<0.001
Present	27	29	56	
Cough				
Absent	22	16	38	0.049
Present	47	15	62	
Sputum				
Absent	46	27	73	0.026
Present	23	4	27	
Myalgia				
Absent	46	26	72	0.060
Present	23	5	28	
Fatigue				
Absent	55	28	83	0.154
Present	14	3	17	
Sore throat				
Absent	55	28	83	0.154
Present	14	3	17	
Headache				
Absent	60	29	89	0.273
Present	9	2	11	
Anosmia				
Absent	65	29	94	0.607
Present	4	2	6	
Aguesia				
Absent	64	30	94	0.393
Present	5	1	6	
Vomiting				
Absent	65	30	95	0.505
Present	4	1	5	
Diarrhoea				
Absent	67	31	98	0.474
Present	2	0	2	
BCG Vaccination				
No	44	25	69	0.071
Yes	25	6	31	
History of Contact				
Absent	67	31	98	0.067
Present	2	0	2	
Type 2 Diabetes Mellitus				
Absent	51	19	70	0.302
Present	18	12	30	
Hypertension				
Absent	61	23	84	0.070
Present	8	8	16	
Renal Disease				
Absent	69	30	99	0.310
Present	0	1	1	
Liver disease				
Absent	69	29	98	0.094
Present	0	2	2	
Cardiovascular disease				
Absent	69	29	98	0.094
Present	0	2	2	
COPD				
Absent	68	27	95	
Present	1	4	5	

ISSN:0975-3583,0976-2833 VOL14,ISSUE05,2023

Smoking				
Absent	46	25	71	
Present	23	6	29	

Table 2: Distribution of study participants according to some parameters

Treatment with Remdesivir	Survive (n=69)	Expired (n=31)	Total (n=100)	p-value
No	53	6	59	<0.001
Yes	16	25	41	
Treatment with Plasma Therapy				
No	65	29	94	0.607
Yes	4	2	6	
Mechanical Ventilation				
No	66	0	66	<0.001
Yes	3	31	34	

Table 3: Distribution of study participants according to Demographic and biochemical characteristics

Parameter	Survive		Expired		p-value
	Mean	SD	Mean	SD	
Age	42.4	16.9	51.5	16.8	0.014
TLC	9097.0	4078.6	14168.3	9517.0	<0.001
N/L Ratio	7.2	7.6	13.1	10.6	0.002
S.Ferritin	624.9	1214.7	830.3	397.3	0.361
D-Dimer	1348.1	2067.9	2994.5	2855.5	0.002
Vitamin D	25.4	13.4	18.4	18.0	0.033

[Table 4] shows mean values of demographic and biochemical characteristics. There was statistically significant difference noted between the two groups with respect to age, TLC, N/L ratio, D-dimer and Vitamin D ($p<0.05$).

Table 4: Distribution of study participants according to Demographic and biochemical characteristics with Clinical Severity

Parameter	Asymptomatic		Mild		Moderate		Severe		p-value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Age	35.0	16.0	37.0	17.0	49.8	15.5	52.1	15.1	<0.001
TLC	6324.3	1324.0	8516.4	4265.1	10415.9	4292.5	13686.5	8490.2	<0.001
N/L Ratio	1.7	0.6	4.4	5.0	9.2	5.3	14.6	10.5	<0.001
S.Ferritin	178.4	209.5	325.0	331.6	709.8	320.0	1095.0	1493.5	0.004
D-Dimer	249.8	254.5	725.9	1450.3	1797.9	1970.9	3191.0	2884.5	<0.001
Vitamin D	34.1	13.3	24.8	12.1	21.7	12.8	19.5	17.5	0.027

[Table 4] shows mean values of demographic and biochemical characteristics. There was statistically significant difference noted between the groups with respect to age, TLC, N/L ratio, S.Ferritin, D-dimer and Vitamin D ($p<0.05$).

DISCUSSION

This hospital-based, cross-sectional, observational study was conducted on *one hundred* COVID-19 positive IPD patients in the Department of Medicine, Teerthanker Mahaveer Medical College and Research Centre. Majority of study subjects (61%) were above 40 years of age. Both the groups had similar distribution. 27% of cases were less than 30 years of age and 12% of cases in 31-40 age groups. There was no statistically significant difference between the two groups ($p>0.05$). Out of 100 cases, 70% were male and 30% were female. Fever was present in 78% of cases. Breathlessness was present in 56% of cases and more common in expired subjects. There was statistically significant difference between the two groups ($p<0.05$). Cough was present in 62% of cases and more common in expired subjects. There was statistically significant difference between the two groups ($p<0.05$). Mohan A et al (2020),[2] in their study on 144 patients had more than 90% males including 6-7% foreign nationals. The authors observed comorbidities in in 15-16% patients with diabetes mellitus being the

ISSN:0975-3583,0976-2833 VOL14,ISSUE05,2023

commonest, as noted in our study as well. The commonest presenting complaint was cough with less than one-fifth having fever. Sputum was present in 27% of cases and more common in live subjects and was statistically significant ($p<0.05$). Myalgia was present in 28% of cases. There was no statistically significant difference between the two groups ($p<0.05$). Fatigue was present in 17% of cases. Sore throat was present in 78% of cases. Headache was present in 11% of cases. Anosmia was present in 6% of cases. Ageusia was present in 6% of cases. Vomiting was present in only 5% of cases. Diarrhoea was present in only 2% of cases. BCG vaccination was present in 31% of cases. History of contact was present in only 2% of cases. Type 2 Diabetes Mellitus was present in 30% of cases. Hypertension was present in 16% of cases. Renal disease was present in only 1% of case. Liver disease was present in only 2% of cases. Cardiovascular disease was present in only 2% of cases. COPD was present in 5% of cases. Smoking was present in 29% of cases. CRP was raised in 61% of cases. Oxygen support was required in 59% of cases. Treatment with Remdesivir was needed in more than 80% of non-survivors of Covid-19 disease while less than 30% survivors needed Remdesivir therapy. There was statistically significant difference between the two groups ($p<0.05$). Plasma treatment therapy was given in 6% of cases. Mechanical ventilation was given in 34% of cases and more frequently given to expired cases. There was statistically significant difference between the two groups ($p<0.05$). asymptomatic cases were 12%, mild in 29%, moderate in 19% and severe in 40% of cases. All expired cases (31%) were in severe category. All COVID-19 related deaths were reported in severe category patients with fewer patients in this category showing survival suggesting high correlation between the disease severity and mortality. All COVID-19 disease non-survivors had significantly higher total leukocyte count (TLC) (14168.3 ± 9517.0 vs 9097.0 ± 4078.6), neutrophil-lymphocyte ratio (N/L ratio) (7.2 ± 7.6 vs 13.1 ± 10.6) & D-dimer levels (1348.1 ± 2067.9 vs 2994.5 ± 2855.5) compared to the survivors. All the non-survivors of Covid-19 disease had significantly higher serum ferritin (624.9 ± 1214.7 vs 830.3 ± 397.3) & lower Vitamin D (25.4 ± 13.4 vs 18.4 ± 18.0) levels compared to the survivors. Severity grade of COVID-19 disease revealed positive correlation with age, TLC, N/L ratio, D-dimer level, CRP level, serum ferritin level & Vitamin D levels. Poorest correlation was noted with vitamin D levels. Severity grade of COVID-19 disease revealed positive correlation with hypertension. Severity grade of COVID-19 disease revealed positive correlation with need for mechanical ventilation as well as need for Remdesivir & Plasma therapy. Pande et al (2020),[9] in their study on 27 COVID-19 patients admitted to ICU evaluated the demographics, clinical profile and outcome. The authors observed a high mortality rate of approximately 60% in their study, unlike our study with 31% mortality rate as non-ICU patients were also included in our study. The authors finally concluded that patients in middle-age with various comorbidities had a higher chance of severe grade of Covid-19 disease with poor outcome.[10]

CONCLUSION

COVID-19 disease caused by SARS-CoV-2 became pandemic within a few months of the detection of first case primarily attributed to respiratory spread of infectious droplets especially with International Travel. Majority of the patients were asymptomatic but potential spreaders of the disease. Fever, cough, and breathlessness were the major presenting symptoms. Males were affected more than females primarily related to their outdoor activities. With lower numbers of Covid-19 cases, the history of contact was elicited which was lost with higher numbers due to community spread of the infections. Presence of comorbid diseases especially diabetes mellitus, hypertension, chronic renal failure & COPD complicated and worsened the course of disease in many patients.
Patients with severe disease revealed signs of hypoxia with need of oxygen supplementation and/or mechanical ventilation in ICU, which served as independent factors predicting non-survivors. Advanced age, high TLC with high N/L ratio, high CRP level, high serum ferritin level, high D-dimer value and low vitamin D levels correlated positively with severity of disease responsible for high mortality rate in many studies including ours.

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