



CLINICAL PROFILE OF PATIENTS WITH COVID-19 IN A TERTIARY CARE HOSPITAL, SOLAPUR, MAHARASHTRA: A RETROSPECTIVE STUDY

General Medicine

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ABSTRACT

Background: Since December 2019, the 2019 coronavirus disease (COVID-19) has expanded to cause a worldwide outbreak that more than 17,00,00,000 infected and 38,00,000 deaths, in India 2,95,00,000 cases and 3,74,000 deaths, in Maharashtra we saw 59,17,121 cases and 1,12,696 deaths (1.9%), in Solapur we saw 1,34,090 cases and 2962 deaths (2.2%) till June 15, 2021.

Methods: We retrospectively analysed the clinical characteristics and treatment progress of 609 patients diagnosed with COVID-19 in Tertiary care hospital, Solapur, Maharashtra from a Period of May 2019 to Jan 2020

Results: Of the 609 patients diagnosed with COVID-19, 91 cases (14.94%) were severe, 518 (85.08%) were Mild/moderate. Cases of Age >60 years represented (23.9%) of total cases, out of the total cases (63.87%) were Males of which (16.11%) were severe. The Mild to moderate disease group tended to be older (52 vs. 50.0 years) and have more chronic disease (22% vs. 14.8%;) relative to Severe disease group. The most common complaints were Fever (n = 533; 82.4%) and cough (n = 585; 64.8%), followed by fatigue (n = 323; 38.5%), Breathlessness (n = 313; 23.1%), Running nose (n = 262; 23.1%), Loss of smell (n = 54; 16.5%), Loss of taste (n=5; 0.01%) Laboratory parameters showed elevated levels of N/L (88.66%), **Creatinine levels** (15.7%), **Bilirubin** (17.54%), **Trop-T** (15.15%), **CKMB** (16.21%). The levels of **LDH** and **C-reactive protein**, two biomarkers of inflammation, were increased in 90.47% and 49.09% of patients. **D-Dimer** was increased in 57.79% cases where as **Ferritin** was increased in 58% cases, **Procalcitonin** was >0.05 in (41.4%) cases.

Other parameters like **Chest Xray** showed abnormal findings in (38.9%) cases, **HRCT** showed abnormality in (50.84%) cases, **ECG** Findings were abnormal in (92%) of the cases 226 cases (37.7%) suffered non-respiratory injury, including 82% of the critically ill patients and 18% of the mild/moderate patients.

Conclusions: Overall, the study of patients in Solapur showed that most patients showed symptoms of Fever followed by Cough and Breathlessness, a correlation was seen between the severity of disease and elevation of inflammatory markers like Ferritin, D-Dimer, LDH, CRP, Trop-T, CKMB. We found liver, kidney, and heart injuries in COVID-19 cases besides respiratory problems.

KEYWORDS

COVID-19, Disease characteristics, Respiratory failure, Laboratory Parameters

Background

Since December 2019, several cases of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection were first reported the virus has caused an outbreak in a short time by human-to-human transmission throughout China, especially in Hubei Province. The severe contagiousness and rapid disease progression of the 2019 coronavirus disease (COVID-19) have drawn significant global public health attention. As of June 15, 2021, the world saw more than 17,00,00,000 infected and 38,00,000 deaths, in India 2,95,00,000 cases and 3,74,000 deaths, in Maharashtra we saw 59,17,121 cases and 1,12,696 deaths, in Solapur we saw 1,34,090 cases and 2962 deaths.

Like severe acute respiratory syndrome (SARS) ¹¹ and Middle East respiratory syndrome (MERS) ¹¹, COVID19 not only causes infections in the respiratory tract but also in the digestive tract, liver, and heart ¹¹. A considerable proportion of COVID-19 patients develop severe pneumonia, acute respiratory distress syndrome, and even multiple organ failure. In this study, we conducted a comprehensive exploration of the epidemiology and clinical features of 609 patients with confirmed COVID-19 admitted to Tertiary Care Hospital, Solapur, one of the most severely affected cities in Maharashtra.

METHODS

Patients We retrospectively analysed patients diagnosed with COVID-19 hospitalized from May,2020 to Jan, 2021. Patients suspected of having COVID-19 were admitted and throat swab samples were collected and tested for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by quantitative polymerase chain reaction assay (qPCR). Patients diagnosed with COVID-19 were enrolled in this study and asked to sign a written informed consent form during

hospitalisation. This study was approved by the ethics committee of Dr VMGMC Solapur. The patients have not been reported in any other submission by anyone else. The final date of follow-up was Jan10, 2021. Data collection Clinical data [age, previous chronic disease, epidemiological history, symptoms, vital signs, computed tomography (CT) images, laboratory tests, complications, and treatment process] of the 609 patients involved in this study were collected. Acute respiratory distress syndrome was defined according to the Berlin definition [6]. Liver injury was judged by increase in Total Bilirubin. Acute kidney injury was identified according to elevated creatinine (Cr). The presence of cardiac injury was confirmed if the serum levels of cardiac biomarkers [cardiac troponin T (CTnT), creatine kinase isoenzyme (CK-MB)] were elevated. Other Inflammatory markers included LDH, Ferritin, CRP. The diagnosis of COVID-19 was made by the comprehensive evaluation of epidemiological exposure, symptoms, laboratory tests, chest CT scan, and qPCR analysis.

RESULTS

Clinical characteristics of COVID-19 patients. –

We collected clinical information of 609 patients diagnosed with COVID-19 in Tertiary care hospital, Solapur. Of these patients, 91 (14.54%) were assessed as being severely ill. The median age of our study population was 52.0 years, with severe patients being generally with a median age of 52 years relative to that of 50 years among the mild/moderate cases. More than half (63.87%) of the patients were male and there was a male preponderance in the Severe cases (59.3%) and the Mild/moderate Cases (64.4%) as well. 90 patients (14%) had one or more coexisting medical conditions, including hypertension, diabetes, chronic obstructive pulmonary disease, kidney disease, and malignancies. Coexisting medical conditions were more prominent in

the Severe disease group (22% had chronic disease vs. 14.8% in mild/moderate disease group). The median duration from onset of symptoms to hospital admission was 4 days. All patients were confirmed as qPCR-positive eventually. Taken together, our results supported that older patients with chronic disease were more likely to become critically ill and, At data cut off, considering 609 evaluable patients, the most common symptoms were fever (n = 533; 82.4%) and cough (n = 585; 64.8%), followed by fatigue (n = 323; 38.5%), Breathlessness (n = 313; 51.3%), Cold (n = 262; 23.1%), Loss of smell (n = 54; 16.5%), Loss of taste (n=5; 0.01%).

Baseline characteristics of laboratory tests in COVID-19 patients

The Laboratory parameters showed, **N/L >3.5** (88.66%), **Creatinine >1.5** (15.7%) **Bilirubin >1.2** (17.54%) **Trop-T >40** (15.15%) **CKMB >5** (16.21%). The levels of **LDH** and **C-reactive protein**, two biomarkers of inflammation, were increased in 90.47% and 49.09% of patients. **D-Dimer** was **>0.5** in 57.79% cases where as **Ferritin** was increased in 58% cases. **Procalcitonin** was **>0.05** in (41.4%) cases. Other parameters like **Chest Xray** showed abnormal findings in (38.9%) cases, **HRCT** showed abnormality in (50.84%) cases, **ECG** Findings were abnormal in (92%) of the cases. Typical CT images All of the patients in our study presented exudative changes, with different degrees of patchy consolidation or ground-glass opacities, suggesting that CT imaging is an important method in differential diagnosis and evaluating the severity of COVID-19.

Main treatment measures of COVID-19 patients during hospitalization

Most patients received **antiviral therapy** (n = 580), **glucocorticoid therapy** (n = 209), and **antibacterial therapy** (n = 580), which was given in all severe cases (n = 91). Supportive treatment measures, including **Oxygen therapy** (n = 209), **Non-Invasive ventilation** (n = 50), **NRBM** (n=159), **Room Air with CARP** (n=400), the use of **Remdesivir** (n = 116; 38.5%), and **Favipiravir** (n = 168), **Anticoagulation** (n=259)

DISCUSSION

On Analysis of the data, our study found that the disease had a Male preponderance in accordance with study done by Ion Maruntu² where 52.21% of them were men, and advancing age was also associated with severity of infection. Individuals with Chronic disease like diabetes, hypertension, CKD, ischemic heart disease, COPD, Asthma, Stroke were at further risk to develop severe infection as evidenced in other studies like the one done by Mingchun Ou et al¹, Juan Mo et al¹. Diabetes was seen in 39.5% of severe cases and Hypertension in 20.8% cases, study by Muhammad K. Azwar et al³ showed incidence of diabetes mellitus (11%) and hypertension (14%).

Patients with Mild/Moderate disease usually presented with fever (n = 533; 82.4%) and cough (n = 585; 64.8%), followed by fatigue (n = 323; 38.5%) while Severe disease had Breathlessness (n = 313; 51.3%), as a primary complaint along with fever, seen also in study by Guang Chen et al⁵ and Editorial by BMJ 2020;369:m1470⁶.

Further, we found that most patients with the disease had a high N/L ratio, also seen in study by Jianhong Fu et al⁷, in both mild/moderate and severe case. Characteristically patients in our study with severe disease had raised inflammatory marker like LDH/CRP/Ferritin, similar findings were seen in study by Gita Vita Soraya et al⁸ which found D-dimer, and CRP were also raised in severe COVID-19 compared to non-severe COVID-19.

The severe form of the disease was also associated with multiorgan failure as evidenced by increased Creatinine/ Bilirubin/ Trop-T/ CKMB. Cardiac mortality was seen in Severe cases as seen by increased Trop T/CKMB in study by Feng Pan⁹, our study did not include mortality. Secondary Bacterial Infections were also seen in severe cases which could be attributed to longer hospital stays and Hospital acquired infections as seen by raised Procalcitonin levels (41.4%), similar association with raised PCT was seen in Pan Ji et al¹⁰.

Most patients presented typical CT imaging changes during the study, thus we could establish a clinical diagnosis decision using CT before positive qPCR results were obtained. Hence, CT imaging is a favourable means for diagnosing COVID-19 as well as evaluating the severity of the disease. In sum, the confirmation of COVID-19 should be dependent upon the comprehensive analysis of epidemiological

exposure, symptoms, laboratory tests, qPCR, and CT imaging. The mechanism of multiple organ damage in the context of COVID-19 infection is currently unclear. The virus enters into the host cells by the recognition of spike glycoproteins. Accumulated evidence has shown that ACE2 is the cell receptor of choice for SARS-CoV-2, same as in the SARSCoV infection, which means that the virus infects cells expressing ACE2. ACE2 was initially thought to be expressed only in the heart, kidneys, and testis, but has now been found to be widely expressed in the lungs, brain, and digestive tract Xin-Ying Zhao¹¹. This explains why the COVID-19 caused multiple organ damage. Other possible reasons, including hypoxia caused by respiratory failure and the immune response caused by virus, might also account for the multiple organ damage. Patients got worse and developed respiratory failure in seven to 10 days.

Almost all the patients in this study received antibacterial agents along with antiviral therapy and hypoxic cases received glucocorticoid therapy. Remdesivir for severe cases and Favipiravir for mild/moderate cases was advocated. Anticoagulation in form of Low-Molecular Heparin was given to hypoxic cases and helped in tackling the prothrombotic nature of the disease. Majority of the Mild/moderate cases were off oxygen therapy, and severe cases were put on NIV in form of BiPAP/CPAP or NRBM (Non-Rebreathable Mask). Chen et al¹². retrospectively analyzed 401 patients, including 249 critically ill patients, showing that glucocorticoids were effective in controlling the inflammatory response caused by SARS. However, the multivariate analysis of another retrospective analysis suggested that corticosteroid therapy was significantly associated with a 20.7 times higher intensive care unit occupancy rate among patients with SARS relative to SARS patients who did not receive corticosteroids

CONCLUSION

Our single-center study of 609 cases of confirmed COVID-19 sampled from a distinct but representative location (Solapur) into the ongoing efforts to understand COVID-19, which should benefit the diagnosis, therapy, and control of the spread of the disease. Overall, the study of patients in Solapur showed that most patients showed symptoms of Fever followed by Cough and Breathlessness. A correlation was seen between the severity of disease and elevation of inflammatory markers like Ferritin, D-Dimer, LDH, CRP, Trop-T, CKMB. We found liver, kidney, and heart injuries in COVID-19 cases besides respiratory problems.

Clinical Characteristics & and Lab parameters of patients

Age	Total	Severe	Mild/Moderate
<60	453	65	388
>60	156	26	130
Sex			
Male	389	54	335
Female	220	37	183
Co-morbidity			
HTN	22	19	3
DM	42	36	6
IHD	8	3	5
COPD	8	1	7
Asthma	2	2	0
CKD	5	3	0
Stroke	3	3	2
ECG			
Sinus Tachycardia	561	68	25
Normal Rate	48	23	493
CRP			
>6	216	83	299
<6	393	8	401
Ferritin			
>300	443	83	360
<300	166	8	158
D-Dimer			
<0.5	181	15	166
>0.5	428	76	352
LDH			
<400	58	8	50
>400	551	83	468
PCT			

<0.05	42	3	38
>0.05	35	31	4
N/L			
<3.5	69	2	68
>3.5	540	89	451
CKMB			
<5	62	4	58
Trop T			
<40	56	8	48
>40	10	8	2
Creatinine			
<1.5	523	10	513
>1.5	96	81	5
LFT			
<1.2 Bilirubin	502	30	472
>1.2 Bilirubin	107	61	46
NIV	50	50	0
NRBM	159	41	118
Room Air	400	0	400
CXR			
Clear	372	0	372
2-4 zones	208	62	146
>4 zones	29	29	0
HRCT			
WNL	87	0	87
CT SS 4-10	61	3	58
CT ss 10-15	21	21	0
CT SS >15	8	8	0

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