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Demographic & clinical profile of patients with COVID-19 at a tertiary care hospital in north India

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***Background & objectives*: The COVID-19 pandemic emerged as a major public health emergency affecting the healthcare services all over the world. It is essential to analyze the epidemiological and clinical characteristics of patients with COVID-19 in different parts of our country. This study highlights clinical experience in managing patients with COVID-19 at a tertiary care centre in northern India.**

***Methods*: Clinical characteristics and outcomes of consecutive adults patients admitted to a tertiary care hospital at Chandigarh, India, from April 1 to May 25, 2020 were studied. The diagnosis of SARS-CoV-2 infection was confirmed by real-time reverse transcriptase polymerase chain reaction (RT-PCR) on throat and/or nasopharyngeal swabs. All patients were managed according to the institute's consensus protocol and in accordance with Indian Council of Medical Research guidelines.**

***Results*: During the study period, 114 patients with SARS-CoV-2 infection were admitted. The history of contact with COVID-19-affected individuals was available in 75 (65.8%) patients. The median age of the patients was 33.5 yr (13-79 yr), and there were 66 (58%) males. Of the total enrolled patients, 48 (42%) were symptomatic. The common presenting complaints were fever (37, 77%), cough (26, 54%) and shortness of breath (10, 20.8%). Nineteen (17%) patients had hypoxia (SpO_2<94%) at presentation and 36 (31%) had tachypnoea (RR >24). Thirty four (29.8%) patients had an accompanying comorbid illness. Age more than 60 yr and presence of diabetes and hypertension were significantly associated with severe COVID-19 disease. Admission to the intensive care unit (ICU) was needed in 18 patients (52%), with three (2.6%) patients requiring assisted ventilation. Mortality of 2.6 per cent (3 patients) was observed.**

***Interpretation & conclusions*: Majority of the patients with COVID-19 infection presenting to our hospital were young and asymptomatic. Fever was noted only in three-fourth of the patients and respiratory symptoms in half of them. Patients with comorbidities were more vulnerable to complications. Triaged classification of patients and protocol-based treatment resulted in good outcomes and low case fatality.**

Key words Acute respiratory distress syndrome - comorbidities - COVID-19 - hypoxia - India - pandemic - pneumonia

The World Health Organization (WHO) reported more than 43 million confirmed cases of SARS-CoV-2 infection and more than one million deaths globally[1], with India contributing to >600,000 confirmed patients and >100,000 deaths until October 29, 2020[2]. The first patient in India was reported from Kerala[3], and gradually COVID-19 has engulfed the entire country. Patients with SARS-CoV-2 infection may have mild-to-asymptomatic illness, but some rapidly progress to acute respiratory distress syndrome (ARDS), multi-organ dysfunction syndrome (MODS) and death[4].

It is pertinent to identify the clinical and demographic characteristics of patients considering the novelty and substantial heterogeneity of the illness across the world, particularly in countries like China and India[5-9]. This study describes the demographic characteristics, comorbid conditions, baseline laboratory findings, clinical course and outcomes among COVID-19 patients admitted at a dedicated COVID hospital in north India.

Material & Methods

Study population and settings: The study was conducted at the Nehru Hospital Extension Block, a dedicated COVID hospital at the Postgraduate Institute of Medical Education & Research (PGIMER), Chandigarh, India, from April 1 to May 25, 2020. Individuals with influenza-like illness who fulfilled the ICMR screening criteria (dated May 18, 2020)[10] and asymptomatic close contacts of COVID-19-positive patients were screened[10]. Consecutive adult patients (>12 yr) who tested positive on real-time reverse transcriptase polymerase chain reaction (RT-PCR) assay for SARS-CoV-2 on a throat and/or a nasopharyngeal swab were admitted and included in the study. Pregnant women and children were excluded. The study was approved by the Institutional Ethics Committee.

Data collection: A written informed consent was taken in person from patients by the treating team while a telephonic consent was obtained from the quarantined immediate family members in case the patient was unable to consent himself/herself. Demographic details, medical history including comorbidities, history of exposure to COVID-19 and vital parameters were recorded at admission to the hospital. Baseline laboratory parameters, treatment details and clinical outcomes were also collected.

Case definitions and classification: A standard protocol which included case definitions for categorization of SARS-CoV-2 infection, detailed management plan, baseline and follow up investigations and treatment according to clinical severity was devised by a group of experts from various specialities of the PGIMER. This consensus treatment algorithm was developed after reviewing the guidelines of various international societies and revised national clinical management guidelines for COVID-19 by the MoHFW, Government of India, dated March 31, 2020[11]. Symptomatic patients were categorized to have mild, moderate or severe disease. Patients with uncomplicated upper respiratory tract infection or non-specific symptoms such as fever, cough, sore throat, nasal congestion, malaise and headache were classified to have mild disease. Patients with radiologically proven pneumonia but without the signs of severe pneumonia were categorized as moderate disease. Severe pneumonia included a patient with fever, plus one of the following: respiratory rate >30 breaths/min, severe respiratory distress and SpO_2 <90% on room air. Standard criteria for defining, ARDS and MODS were used[12,13]. Critically ill patients included those who had severe pneumonia, shock and organ dysfunction syndrome at admission or during hospital stay.

All stable patients irrespective of symptoms were treated in isolation rooms, while those with critical illness were admitted in the intensive care unit (ICU). Standard organ-specific supportive care was provided when clinically indicated.

Specimen collection, laboratory test and discharge policy: Throat and/or nasopharyngeal specimens were obtained using standard techniques. The nasopharyngeal samples were tested using the National Institute of Virology (NIV), Pune-developed kits as per the ICMR recommendations[14]. The kit was a two-step kit wherein the *E* gene was used for the screening test. All those specimens came out to be positive by screening test were confirmed by a second reaction targeting the *ORF* and *RdRP* genes as per the NIV protocol[15]. The ICMR guidelines were followed to discharge the patients from the hospital[16,17]. Initially, till May 8, 2020, all the admitted patients were discharged only after two consecutive nasopharyngeal swabs (done after 14th day of stay) tested negative on RT-PCR. After May 8, 2020, with a change in the national guidelines, asymptomatic and mild patients were discharged after 10 days of symptom onset

and being afebrile for three consecutive days. The discharge guidelines for severe pneumonia were also revised and mandated oxygen-free period of three days and a negative RT-PCR result as against the two samples previously[16,17].

Statistical analysis: Statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA, version 23.0 for Windows) and Microsoft Excel 2016. All quantitative data such as age, weight, haemodynamic parameters and laboratory values were estimated using measures of central location (mean). Qualitative or categorical variables were described as proportions. Normality of quantitative data was checked by Kolmogorov-Smirnov tests of normality. For normally distributed data, means were compared using independent *t* test. Mann-Whitney U-test was applied for statistical analysis of skewed continuous variables and ordered categorical variables. Univariate and multivariate logistic regression analyses were performed to analyse the effect of comorbidities (age >60 yr, diabetes mellitus and hypertension) on the severity of COVID-19. Mortality as an outcome measure could not be used as its number was low.

Results

Demographics and baseline clinical characteristics: During the study period, 114 patients were diagnosed to have COVID-19 and were included in the study. The baseline demographic and clinical characteristics of these patients are summarized in Table I. The median age of the patients was found to be 33.5 yr (IQR: 24.2-46.7, range: 13-79 yr) and 66 (57.8%) were male. Of the total patients, 66 (57.8 %) were asymptomatic and 48 (42.1%) were symptomatic at admission. Two patients developed symptoms during hospitalization. Among the symptomatic patients (n=50), mild, moderate and severe illness was seen in 22, 10 and 18 patients, respectively. The common presenting complaints were fever in 37 (77.1%) followed by cough in 26 (54.2%) patients. Twenty eight patients (58.3%) were noted to have multiple (more >2) symptoms. At triage, 19 (16.6%) patients were hypoxic with oxygen saturation (SpO_2) <94 per cent on room air, 36 (31.6%) patients had tachypnoea while two patients (1.7%) had hypotension (systolic arterial pressure <60 mmHg). Two patients (1.7%) required non-invasive ventilation, while three (2.6%) were mechanically ventilated. Renal replacement therapy was instituted in four (3.5%) patients. Three of these had an underlying chronic kidney disease and were

Table I. Baseline characteristics and clinical outcomes of COVID-19 patients (n=114)

Parameters	Values
Age (yr)	
Mean±SD	35.9±14.7
Range	13-79
Median	33.5
IQR (%)	24.2-46.7
12-45	85 (74.5)
45-59	20 (17.5)
>60	9 (7.8)
Gender (%)	
Male	66 (57.8)
Female	48 (42.1)
Comorbidities** (%)	
None	80 (70.1)
Cardiovascular (IHD)	2 (1.7)
HTN	19 (16.6)
COPD	2 (1.7)
Diabetes mellitus	17 (14.9)
Thyroid	6 (5.2)
CKD	3 (2.6)
CLD	1 (0.8)
Obesity	1 (0.8)
CVA	1 (0.8)
Multiple comorbidity#	10 (8.7)
Temperature >38°C, n (%)	37 (77.1)
Per cent oxygen saturation room air, n (%)	
<94	19 (16.6)
>94	95 (83.3)
Respiratory rate (breaths/min), n (%)	
<24	78 (68.42)
>24	36 (31.6)
HR, n (%)	
<100/min	96 (84.2)
>100/min	18 (15.8)
Blood pressure, n (%)	
SBP <90 and DBP <60 mmHg	2 (1.8)
Admission to the ICU	18 (15.7)
Treatment (%)	
Oxygen supplementation	
Non-rebreathing mask	19 (16.6)
Mechanical ventilation	
Non-invasive	2 (1.7)
Invasive	3 ((2.7)

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Parameters	Values
Dialysis (renal replacement therapy)	4 (3.5)
Specific drugs	
Antibiotic treatment	9 (7.9)
Antifungal treatment	2 (1.8)
Anti-tubercular	2 (1.8)
Immuvac (Sepsivac)	20 (17.5)
Tocilizumab (IL-6 inhibitor)	2 (1.8)
HCQ	37 (32.5)
Anticoagulation	
Prophylactic (enoxaparin)	17 (14.9)
Therapeutic (enoxaparin)	11 (9.6)
Clinical outcome (%)	
Undergoing treatment	3 (2.6)
Discharge*	108 (94.7)
Mortality	3 (2.6)

Data expressed in number (n), and percentage (%); #Multiple comorbidity: >1 comorbidity; *Discharge as per the ICMR guidelines[15,16]; **Comorbidities listed here are defined as medical diagnoses, included in medical history by ICD-10 coding. SD, standard deviation; IQR, interquartile range; IHD, ischaemic heart disease; HTN, hypertension; COPD, chronic obstructive pulmonary disease; CKD, chronic kidney disease; CLD, chronic liver disease; CVA, cerebrovascular accident; HCQ, hydroxychloroquine; ICMR, Indian Council of Medical Research; ICD, International Classification of Diseases; IL, interleukin; ICU, intensive care unit; SBP, systolic blood pressure; DBP, diastolic blood pressure; HR, heart rate

on maintenance dialysis regimen before the current illness, whereas one patient developed new-onset acute kidney injury (Kidney Disease Improving Global Outcomes stage 3).

Baseline laboratory characteristics of patients: At admission, leucocyte counts had increased in 17 patients (15%) and were below the normal range in five (4.5%) patients. Twenty one (19%) patients had lymphocyte count below the normal range. High neutrophil-to-lymphocyte ratio (NLR) (≥3.5) was observed in 41 (37%) patients. Fourteen (13%) patients had thrombocytopaenia (<0.15 million), and 38 (34%) had anaemia (haemoglobin <12 g/dl) at baseline A variable degree of liver dysfunction with an increase in aspartate aminotransferase (25%)/alanine aminotransferase (32%)/alkaline phosphatase (29%) was observed. Nine (12%) patients had high serum procalcitonin. Thirty seven (41%) patients had high C-reactive protein (CRP), while 14 (16%) had a serum ferritin level above the normal range. Determination of cardiac injury was assessed with troponin T (Trop T) levels in 51 patients, but only five (9.8%) patients had the values above the normal range. Similarly, of the 54 patients tested, eight (14.8%) had values of pro-BNP higher than the normal range at admission (Table II).

Clinical characteristics of patients with comorbid illness: Thirty four (29.8%) patients had associated comorbid condition of varying severity. These included hypertension in 19 (16.6%), diabetes in 17 (14.9%) and chronic renal disease in three (2.6%) patients. Ten patients (8.7%) had multiple comorbidities (Table I). Significantly higher levels of inflammatory biomarkers at admission [CRP, ferritin and lactate dehydrogenase (LDH)] among patients with an underlying comorbidity as compared to those without a comorbidity (P<0.05) were observed. In addition, these patients also demonstrated significantly higher levels of high D-Dimers as well as cardiac biomarkers (Trop T, pro-BNP) (P=0.05) (Table III). On univariate analysis, age >60 yr and presence of hypertension and diabetes mellitus were significantly associated with severe COVID-19 but failed to achieve significance on multivariate analysis (Table IV). This could be attributed to the small sample size, which was evident from the wide confidence intervals (CIs).

Comparison of clinical and laboratory characteristics of asymptomatic and symptomatic patients: Asymptomatic patients were younger with a mean age of 29.90±12.91 yr while the mean age of patients with severe COVID-19 was 55.9±12.91 yr (Table V). Comorbidities including hypertension and diabetes were observed more frequently in patients who were symptomatic as compared to those who were asymptomatic (14/50 vs. 5/59). Inflammatory parameters (LDH, CRP and serum ferritin) were significantly increased in the symptomatic group compared to asymptomatic group. Maximal increase in the above inflammatory parameters was observed in patients with severe SARS-CoV-2 infection.

Clinical characteristics of critically ill patients: Eighteen (15.7%) patients were critically ill at admission and required intensive care services. Elderly patients (age >60 yr), presence of comorbidities such as hypertension and diabetes, increased serum levels of inflammatory biomarkers (CRP, ferritin and LDH) and renal dysfunction/high creatinine at admission

Table II. Baseline laboratory parameters of COVID-19 patients

Parameter	Median (IQR)	n	Normal range
Haemoglobin (g/dl), median (IQR)	12.7 (11.6-13.9)	110	11-16
Decreased (<12 g/dl)	38 (34)		
WBC count ($\times 10^9$/l)	7.6 (6.2-9.6)	110	4000-11000
Increased, n (%)	17 (15)		
Decreased, n (%)	5 (4.5)		
DLC		110	
Neutrophils (%)	58 (48-70)		
Lymphocytes (%)	30 (21-35.5)		
Lymphocyte count	1500 (1000-2500)	110	1100-3200
Increased, n (%)	4 (4)		
Decreased, n (%)	21 (19)		
NLR	2.35 (1.48-5.7)	110	<3.5
Increased, n (%)	41 (37)		
Platelets ($\times 10^9$/l)	305 (224-486)	110	150-450
Increased, n (%)	33 (30)		
Decreased, n (%)	14 (13)		
APTT (s)	30.9 (27-34)	95	<35
Increased, n (%)	18 (18)		
PT (s)	14.3 (13.5-15.2)	95	<15
Increased, n (%)	25 (26)		
D-Dimer[#] (normal standardized value)	0.94 (0.5-1.9)	88	<1
Increased, n (%)	36 (40.9)		
Fibrinogen (g/l)	3.53 (2.9-4.5)	79	<4
Increased, n (%)	28 (35)		
Serum sodium (mEq/l)	141 (139-142)	95	135-145
Increased, n (%)	2 (2)		
Decreased, n (%)	8 (8)		
Serum potassium (mEq/l)	4.3 (4.1-4.6)	91	3.5-5.5
Increased, n (%)	5 (5)		
Decreased, n (%)	3 (3)		
Chloride (mEq/l)	100 (98-103)	50	95-105
Decreased, n (%)	4 (8)		
Total protein (g/dl)	7.6 (7.1-7.8)	95	>6.5
Decreased, n (%)	5 (5)		
Albumin (g/dl)	4.4 (4-4.6)	93	>3.5
Decreased, n (%)	8 (8.6)		
AST (U/l)	27.7 (20-40.2)	92	<40
Increased, n (%)	23 (25)		
ALT (U/l)	29 (18-49.2)	92	<40
Increased, n (%)	30 (32)		
ALP (U/l)	102 (82-125)	92	<120
Increased, n (%)	27 (29)		

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Parameter	Median (IQR)	n	Normal range
Total bilirubin (mg/dl)	0.5 (0.4-0.7)	94	<1.1
Increased, n (%)	4 (4.2)		
LDH (U/l)	223.5 (192.5-266.5)	58	<333
Increased, n (%)	4 (6.8)		
Urea (mg/dl)	24.4 (20-28.7)	95	<50
Increased, n (%)	5 (5.2)		
Serum creatinine (mg/dl)	0.7 (0.6-0.9)	95	<1.2
Increased, n (%)	4 (4.2)		
Lipid profile - TG (mg/dl)	112.5 (82.2-155.7)	58	<150
Increased, n (%)	16 (27)		
Procalcitonin (ng/ml)	0.03 (0.0-0.1)	70	<0.15
Increased, n (%)	9 (12)		
CRP (mg/dl)	2.1 (0.8-5.4)	90	<3
Increased, n (%)	37 (41)		
Serum ferritin (ng/ml)	90 (40.5-200.5)	83	30-300
Increased, n (%)	14 (16)		
Decreased, n (%)	16 (19)		
Pro-BNP (pg/ml)	11.4 (5-38.7)	54	<125
Increased, n (%)	8 (14.8)		
Trop T (pg/ml)	6.1 (5.4-8.2)	51	<100
Increased, n (%)	5 (9.8)		
CK-MB (U/l)	44.9 (38.0-100.3)	6	<25
Increased, n (%)	6 (5.26)		
HBA_{1c} (%)	6.4 (5.5-8.4)	15	
Increased, n (%)	7 (46.6)		

#Normalized D-Dimer value (1 indicate 240 ng/ml); Data expressed as median and IQR. DLC, differentiate leucocyte count; NLR, neutrophil-lymphocyte ratio; PT, prothrombin time; APTT, activated partial thromboplastin time; CRP, C-reactive protein; AST, aspartate aminotransferase; ALT, alanine aminotransferase; ALP, alkaline phosphatase; LDH, lactate dehydrogenase; TG, triglyceride; Pro-BNP, pro-brain natriuretic peptide; Trop T, troponin T; CK-MB, creatinine kinase-MB; HbA_{1c}, haemoglobin A_{1c}; IQR, interquartile range; WBC, white blood count

were significantly higher among critically ill patients. (P<0.05) (Table VI). High D-dimers and fibrinogen levels were also observed among these patients.

Treatment and clinical outcome: Fifty nine (51.75%) patients were given specific therapies for COVID-19. Thirty seven patients (32.4%) received hydroxychloroquine (HCQ), 20 (17.54%) received a study drug Immuvac (Sepsivac-Mw vaccine)[18] and two patients (1.75%) received tocilizumab (interleukin-6 inhibitor). By the end of May 25, 108 (94.7%) patients were discharged, three were still undergoing treatment and three (2.6%) patients had died. All the three patients who succumbed to the illness had diabetes mellitus, while two patients also had chronic kidney disease.

Discussion

SARS-CoV-2 is one of the most virulent pathogens causing severe acute respiratory illness along with MERS and swine flu in humans. Initial case studies from China demonstrated COVID-19 to be a respiratory illness with a spectrum ranging from mild illness (81%), severe respiratory distress (14%) and critical illness in five per cent with a case fatality rate of around 2.4 per cent[5]. Considerable disparities in demographic and clinical patterns have been observed between countries across different continents. This prospective study demonstrated the clinical profile and outcomes of initial COVID-19 patients from northern India. These patients were well categorized according

Table III. Clinical characteristics based on the burden of comorbid illness

Parameter	Without comorbidities (n=80)		With comorbidities (n=34)		*P*
	Median	Range	Median	Range	
Age (yr) (%)	30	13-59	50	22-29	
12-44[τ]	71 (88.7)		14 (41.1)		
45-59[τ]	9 (11.25)		11 (32.3)		
>60[τ]	0		9 (26.4)		
Gender (%)					
Male[τ]	50 (62.5)		16 (47)		
Female[τ]	30 (37.5)		18 (52.9)		
RR (/min)	20	16-24	20	16-26	
SpO_2 (%), room air	98	93-100	97	90-100	
Temperature (°C)	37	36.7-38.4	37	37-39	
SBP (mmHg)	120	100-160	129	88-206	
DBP (mmHg)	80	64-104	78	60-100	
NLR	1.9	0.6-22.5	2.3	0.7-47.5	
Fibrinogen (g/l)	3.3	1.5-8.0	4.5	1.2-7.9	
Ferritin (ng/ml)	86	8.1-1522	138.5	11.3-2000	0.047
CRP (mg/dl)	1.3	0.1-162	5.0	0.1-252	<0.001
Normalized D-Dimer[#]	0.7	0.0-83	1.0	0.1-25	0.021
LDH (U/l)	227	159-359	208	150-603	0.626
Pro-BNP (pg/ml)	5.1	3.0-138.5	40	4.1-105330	0.002
Trop T (pg/ml)	5.8	3.8-317	8.24	3.5-49.7	0.014
Procalcitonin (ng/ml)	0.0	0.0-0.4	0.0	0.0-7.0	0.211
Urea (mg/dl)	24	14-39	24.950	14-263	0.176
Creatinine (mg/dl)	0.7	0.4-1.2	0.7	0.2-12	0.334

[#]Normalized D-Dimer value (1 indicate 240 ng/ml); [τ]Expressed in number and percentage. RR, respiratory rate; SPO_2, oxygen saturation; HB, haemoglobin; TLC, total leucocyte count

to severity and managed using standard protocols for investigations and treatment.

Patients in our study were younger (median age – 33 yr) compared to those in China (median age – 56 yr)[19], New York (median age – 63 yr)[20] or Italy (median age – 63 yr)[21]. Although similar age pattern (mean age of 40.3 yr) was observed in a study done by Gupta *et al*[22] at another tertiary care hospital from northern India, but their sample size was limited.

Fifty eight per cent of the patients in our study were asymptomatic at admission; all of them were followed closely, and only two out of 66 patients became subsequently symptomatic during the hospital stay. We found abnormalities in laboratory parameters in 25 per cent of our asymptomatic patients. In a study by Hu *et al*[23] from China, five of the 24 asymptomatic COVID-19 patients developed symptoms during the hospital stay. Varied laboratory abnormalities were observed, with four each (16.7%) developing lymphopaenia ($<0.8\times10^9$ cells/l) and leucopenia at admission. These observations reiterate the fact that asymptomatic patients need to be followed closely as some of them may progress to severe disease. Another observation was an increased incidence of severe COVID-19 disease manifestations in patients with underlying chronic diseases (hypertension 16.6% and diabetes 14.9%). Similar findings have been reported from various studies across the world[4,5,7].

Various biomarkers have been shown to predict severe COVID-19 disease. This observation is confirmed in a meta-analysis of 21 studies (3,377 patients) by Henry *et al*[24]. An increased white blood count, decreased lymphocyte/platelet count, high interleukin-6 and high serum ferritin levels were strong discriminators for severe

Table IV. Univariate and multivariate logistic regression analyses with 'hypoxia at admission' and 'critical illness' being the outcome variables with age >60 yr and presence of hypertension and diabetes mellitus as predictor categorical variables

Outcome variable	Predictor variable	Univariate analysis		Multivariate analysis	
		Odds ratio/95% CI	*P*	Odds ratio/95% CI	*P*
Critical illness at admission	Age >60 yr	13.07 (2.55-66.84)	0.002	3.82 (0.53-27.13)	0.18
	Hypertension	12.15 (3.44-42.94)	0.001	4.51 (0.80-25.35)	0.87
	Diabetes	10.37 (2.91-37.11)	0.001	3.02 (0.52-17.3)	0.21
Hypoxia at admission	Age >60 yr	1.12 (0.12-10.01)	0.920	1.07 (0.94-12.23)	0.95
	Hypertension	1.88 (0.45-7.82)	0.385	0.41 (0.06-2.7)	0.36
	Diabetes	1.23 (0.242-6.26)	0.803	1.47 (0.17-12.51)	0.72

Table V. Clinical laboratory parameters of symptomatic and asymptomatic COVID-19 patients

Variable	Asymptomatic (n=64)	Symptomatic (n=50)			*P**
		Mild (n=22)	Moderate (n=10)	Severe (n=18)	
Sex (male/female)	38/26	11/9	6/4	11/9	0.60[a]
Age (yr), mean±SD	29.90±12.91	32.33±13.69	37.08±14.12	55.9±12.37	<0.01[b]
Age, (>60 yr)	1	1	1	6	<0.01[a]
Hypertension (absent/present)	59/5	20/2	6/4	10/8	<0.01[a]
Diabetes (absent/present)	60/4	19/3	7/3	11/7	<0.01[a]
NLR, median (IQR)	1.90 (1.15)	1.79 (1.08)	1.43 (0.92)	5.57 (25.5)	<0.01[c]
CRP (mg/dl), median (IQR)	1.02 (2.07)	1.97 (4.62)	3.6 (28.23)	34.6 (167.40)	<0.01[c]
Serum ferritin (ng/ml), median (IQR)	56.6 (100.60)	63.10 (153.83)	113.55 (342.98)	425.0 (381)	<0.01[c]
D Dimer[#] (normal standardized value <1)	0.70 (0.83)	NA	NA	2.8	-
LDH (U/l) (<333)	205 (80.5)	225 (50)	214 (117.5)	374 (304.5)	0.06[c]

[#]Normalized D-Dimer value (1 indicates 240 ng/ml); [a]Fisher's-exact test; [b]One-way ANOVA, [c]Kruskal-Wallis test

disease[24]. We also observed nearly same results with high baseline levels of CRP, ferritin and LDH and an NLR ratio of ≥3.5 along with hypoalbuminaemia and deranged baseline creatinine, indicating severe COVID-19-related illness.

The frequency of COVID-19-related myocardial injury among hospitalized patients varied from 7 to 28 per cent[25]. At admission, 9.8 per cent of our patients had an elevated Trop T level, while pro-BNP was higher than the normal range in 14.8 per cent of the patients. Two of our patients had acute myocardial insults during the hospital stay. COVID-19 is considered a hypercoagulable state, leading to venous thromboembolism in patients with severe disease[26]. Routine radiological screening for venous thrombosis was not performed. A compression ultrasound was done only if peripheral venous thrombosis was clinically suspected (n=3), however, none of these patients had any evidence of venous thrombosis at imaging. This was despite 35 per cent of patients having increased D dimer levels at admission. As per our institutional protocol, early institution of heparin therapy based on D-dimers levels was strictly followed. This intervention might have made a difference in preventing any thrombotic episodes in any of our patients. Tang *et al*[27] also observed beneficial effects of early initiation of low molecular weight heparin among the 449 severe COVID-19 patients with markedly elevated D-dimers with a significantly improved 28 day overall survival (*P*=0.017 and *P*=0.029, respectively) among the users versus non-users.

Two severely hypoxaemic patients with exuberant inflammatory response received tocilizumab. This was followed by a significant improvement in their P/F ratio, radiological features and reduction in the inflammatory biomarkers in each of these two patients. This drug has shown promise if given early in the course of the disease. Sciascia *et al*[28] used tocilizumab

Table VI. Difference in baseline clinical characteristics between critically ill and clinically stable patients

Parameter	Critically ill patients (n=18)		Clinically stable patients (n=96)		*P*
	Median	Range	Median	Range	
Age (%)	55.9	29-79	31	13-65	
12-44[τ]	5 (27.7)		80 (83.3)		
45-59[τ]	7 (38.8)		13 (13.5)		
>60[τ]	6 (33.3)		3 (3.1)		
Gender (%)					
Male[τ]	11 (61.1)		55 (57.2)		
Female[τ]	7 (38.8)		41 (42.7)		
Hypertension (%)	8/18 (44.4)		11/96 (11.45)		<0.001
Diabetes (%)	7/18 (38.8)		10/96 (10.4)		<0.001
RR (/min)	22	16-26	20	16-24	
SpO_2 (%) room air	96	79-97	98	94-100	
Temperature (°C)	37	37-39	37	36.7-39	
SBP (mmHg)	129	88-160	120	100-206	
DBP (mmHg)	79	60-100	80	64-104	
Hb (g/dl)	12.4	5.8-16	13	8-17.8	
TLC ($\times 10^6$/l)	7300	4000-19,800	6650	3100-15,400	
Neutrophil (%)	78	53-96	56	31-80	
Lymphocyte (%)	14	2-29	30	9-60	
Absolute lymphocyte count ($\times 10^6$/l)	936	256-2128	1883	816-7200	
Increased (%)	0		7 (7.3)		
Decreased (%)	9 (50)		6 (6)		
Platelets ($\times 10^6$/l)	180	54-518	163	68-690	
Increased (%)	1 (5.5)		3 (3.1)		
Decreased (%)	3 (16.6)		35 (36)		
NLR	5.5	1.8-47.5	1.8	0.6-8.8	
Fibrinogen (g/l)	4.6	1.2-8.0	3.5	1.5-116	
Increased (%)	8 (44.4)		20 (21)		
Ferritin (ng/ml)	425	81-2000	75.25	8.1-1522	
Increased (%)	8 (44.4)		6 (7)		
CRP (mg/dl)	34.6	3.7-252	1.6	0.1-162	<0.001
Normalized D-Dimer[#]	2.8	0.1-25	0.8	0.02-83	
LDH (U/l)	374	265-603	216	150-359	0.004
Total protein (g/dl)	7.10	5.3-7.9	7.600	5.4-6.9	0.16
Albumin (g/dl)	3.500	2.7-4.3	4.500	2.8-5.3	<0.001
Pro-BNP (pg/ml)	2881	11.2-105330	8.5	3-734	0.02
Trop T (pg/ml)	579	145-4975	6.00	3.5-317	<0.001
Procalcitonin (ng/ml)	0.09	0.02-7.0	0.02	0.2-0.8	<0.001
Urea (mg/dl)	36	16-263	24	14-39	
Serum creatinine (mg/dl)	1.2	0.5-12	0.7	0.2-1.2	0.001

[#]Normalized D-Dimer value (1 indicates 240 ng/ml); [τ]Expressed in number and percentage

in 63 patients with severe COVID-19. They observed significant improvement in the levels of ferritin, CRP, D-dimer, and serial PaO_2/FiO_2 after tocilizumab use. They also observed that tocilizumab, when given within six days of admission, was associated with an increased likelihood of survival [hazard ratio (HR): 2.2 95% CI: 1.3-6.7, $P<0.05$)[28]. Steroids, especially dexamethasone, are now a mainstay in the treatment of COVID-19 management after the results of the RECOVERY trial have been published[29]. Better outcomes as compared to usual care were observed when dexamethasone was initiated in those patients requiring invasive mechanical ventilation (29.3 vs. 41.4%) and among those receiving oxygen without invasive mechanical ventilation (23.3 vs. 26.2%). No benefit was observed in the use of steroids in patients with COVID-19 infection who were not hypoxic at admission[29]. We did not routinely use corticosteroids in critically ill patients as part of our treatment protocol.

The case fatality rate in our study was 2.6 per cent. All the three patients had diabetes mellitus, whereas two patients also had chronic kidney disease and were on maintenance haemodialysis. They had missed multiple dialysis sessions before being admitted at the hospital with COVID-19.

To conclude, though symptomatic SARS-CoV-2 infection was encountered in 43 per cent patients, severe illness was seen in 15.7 per cent patients only. Fever was noted only in three-fourth of the patients and respiratory symptoms in nearly half of them. High inflammatory parameters, NLR ratio of ≥3.5, hypalbuminaemia and deranged creatinine predicted severe COVID-19 illness. Older patients with diabetes and hypertension were significantly associated with severe disease on univariate analysis. The management team consisting of physicians from different specialities and triaged classification of patients and protocol-based management algorithms resulted in good outcomes and low case fatality.

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