ORIGINAL ARTICLE

Clinical Characteristics and Early Findings of Coronavirus Disease (Covid-19) at a Tertiary Care Teaching Hospital in Pakistan

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ABSTRACT

Background: Severe acute respiratory syndrome-2 (SARS-CoV-2) emerged as a novel coronavirus and associated with the pandemic. In our study we observed the clinical characteristics, early findings, and its association with comorbidity.
Methods: A single center retrospective study was carried out in Mardan Medical Complex (MMC), Khyber Pakhtunkhwa (KP), Pakistan from May 21st, 2020 to June 30th, 2020. Altogether three thousand, one hundred and fifteen (n=3115) COVID-19 suspected patients were included in the current study. Briefly nasopharyngeal swab, sputum and blood were collected. The viral amplification was carried out by qualitative RT-PCR using commercially available kit and routine laboratory tests of all the suspected patients were performed.
Results: Using RT-PCR total 19.8% (n=613/3115) confirmed cases of COVID-19 were observed. The majority were males' patients. The most common comorbidity was type-2 diabetes (T2DM); 24.8% followed by cardiovascular diseases; 6% and T2DM with cardiovascular disease 3.1%. Among the infected patient's leukocytosis was observed in 43% patients and 27.9% had abnormal findings on X-rays. The RNA detection efficacy from the sputum, nasopharyngeal swab, and blood specimens were 30%, 25.3% and 9.6% respectively. In total, 18.3% patients were critical, and 14.5% patients were on ventilator and the reported mortality rate were 5.2%.
Conclusion: Overall, the COVID-19 patients observed in our study was comorbid and asymptomatic or with mild symptoms like fever, cough, and shortness of breath. Higher, RNA detection efficacy was observed from sputum.
Keywords: COVID-19, RT-PCR, T2DM, Clinical characteristics, comorbidity, Pakistan

INTRODUCTION

Sever acute respiratory syndrome-2 (SARS-CoV-2) emerged as a novel coronavirus and associated with severe respiratory diseases named as coronavirus diseases-2019 (COVID-19). On March 11, 2020 the World Health Organization (WHO) declared COVID-19 as a pandemic diseases and its cases has been reported in >200 regions and countries[1,2,3]. Human to human transmission are mainly through respiratory droplets and close contact [4,5]. In mild infection the clinical manifestation is mainly fever, body aches and cough whereas in severe cases life threatening conditions such as shortness of breath, respiratory failure, and acute respiratory distress syndrome (ARDS) occurs [6,7,8]. Currently, various studies have been reported on clinical characteristics of COVID-19 patients from different countries[9,10,11]. There is scarcity of data from Pakistan regarding its clinical characteristics and early findings. Therefore, the current study is based on comparison of different specimens for the detection, clinical history, radiological findings, and its association with comorbidity.

MATERIALS AND METHODS

A single center retrospective study was carried out in Mardan Medical Complex (MMC), Khyber Pakhtunkhwa (KP), Pakistan from May 21st, 2020 to June 30th , 2020. The MMC is the largest referral tertiary care teaching hospital of the province with the capacity of 520 beds. The hospital has emergency, intensive care unit, supportive services and all the minor and major facilities with state of the art diagnostics. The study population included all the patients who were initially presented with fever, respiratory symptoms and pulmonary infiltrates on chest radiographs and had been diagnosed as SARS-CoV-2 pneumonia as per WHO interim guidelines [12]. The patients related information such as history, physical findings, radiological, microbiological, biochemical, and hematological investigations were recorded.

The patients detailed data were collected including age, gender, history of exposure, initial sign and symptoms (cough, fever, chest pain, headache and vomiting etc), vital signs (blood pressure, heart rate, respiratory rate), laboratory investigations and co-infections.

A total three thousand one hundred and fifteen (n=3115) individuals suspected of coronavirus infection were included. Briefly, nasopharyngeal swab, sputum and blood were collected. The nasopharyngeal swabs were placed in viral transport medium (VTM). Plasma and serum were separated from EDTA and clotted blood, respectively. The study was approved by Ethical committee Department of Medical Laboratory Technology, Th University of Haripur, and Mardan Medical Complex, Mardan.

On the basis of observed symptoms routine laboratory tests of all suspected patients including inflammatory biomarkers, D-Dimer, Lactate dehydrogenase, C reactive protein (Architect C 4000, Abbott, USA), Ferritin and Troponin I (Architect I 1000, Abbott, USA), complete blood count (CELL DYN ruby system, Abbott, USA), Alanine transaminase (ALT), bilirubin, urea and creatinine (Architect C 4000, Abbott, USA) were performed.

The viral RNA was extracted by MagMax *mirVana* Total RNA isolation Kit (Thermo Fisher Scientific) and amplification was carried out by qualitative RT-PCR using commercially available kit (Sansure Biotech Inc) in Rotor Gene Plate (QIAGEN, Germany).

SPSS software, version 21.0 was used for statistical analysis and for comparison of variables Chi square test was performed. The percentages of patients in each group were calculated for categorical variables.

RESULTS

During study period a total of three thousand one hundred and fifteen (n=3115) samples were processed for corona virus detection by RT-PCR and 613 (19.8%) confirmed cases of CoVID-19 were observed. Among positive cases 421 (66.7%) were male and 210 (33.3%) were female. The confirmed patients were categorized into 4 age groups and the highest numbers of cases were in the age group of 21-40 years (Table 1).

Overall, 112 (18.3%) patients were critical, and 89 (14.5%) patients were on ventilator and the reported mortality were 32/613 (5.2%). The most common symptoms observed during infection were headache 595 (97.1%), fever 586 (95.6%), sore throat 511 (83.4%) and cough 444 (72.4%) etc (Table 1). The common comorbidity observed were type-2 diabetes (DM2) 152 (24.8%)

followed by cardiovascular diseases 37 (6.03%), DM2 with cardiovascular disease 19 (3.09%) and other diseases (liver, lungs, and kidney diseases etc) were 26 (4.24%). Remarkably, 379 (61.8%) had no underlying comorbidities and no cases of immunodeficiency was observed. Among the infected patient's leukocytosis and lymphocytosis were observed in 176/409 (43.03%) and 58/409 (14.18%) patients whereas lymphocytopenia, thrombocytopenia and leukopenia were 170/409 (41.56%), 167/409 (40.83%) and 14/409 (3.43%) respectively as shown in table 2.

Table 1. Study population and characteristics of COVID-19 patients

Demographic and clinical features of the patients				
Age group				
Variables %(n)	1-20yrs	21-40yrs	41-60yrs	>60yrs
Overall	9.3 (57)	43.4(266)	37.2(228)	10.1(62)
Male 53.8(330)	9.7(32)	44.5 (147)	35.2 (116)	10.6 (35)
Female 46.2(283)	8.8 (25)	42 (119)	39.6 (112)	9.5 (27)
Onset Symptoms				
Headache 97(595)	5.9 (35)	33.8 (201)	39.1 (233)	21.2 (126)
Fever 95.6(586)	5.1 (30)	33.8 (198)	24.7(145)	36.4 (213)
Cough 83.4(511)	9.4 (48)	26.4 (135)	24.8(127)	39.4 (201)
Chest pain 72.4(444)	12.2 (54)	19.4 (86)	26.6 (118)	41.8 (186)
Loss of taste 64(393)	3.8 (15)	18.8 (74)	43 (169)	34.4 (135)
Loss of smell 39.3(241)	10.4 (25)	34.8 (84)	30.3 (73)	24.5 (59)
Shortness of breath 35(214)	1.4 (3)	23.8 (51)	35 (75)	39.8 (85)
Diarrhea 22.5(138)	5 (7)	27.5 (38)	28.3 (39)	39.2 (54)
Abdominal pain 17.4(107)	5.6 (6)	26.2 (28)	38.3 (41)	29.9 (32)
Runny nose/Flu 14.5(89)	13.5 (12)	16.8 (15)	24.8 (22)	44.9 (40)
Comorbidity				
Diabetes 24.8 (152)	0	12.5 (19)	38.8 (59)	48.7 (74)
Cardiac Disease 6.2 (38)	2.70 (1)	13.51 (5)	32.43 (12)	54.0 (20)
Diabetes+ Cardiac 3.3(20)	0	0	57.89 (11)	42.1 (8)
Others 4.2(26)	7.7 (2)	23.1 (6)	26.9 (7)	42.3 (11)

Table 2. Laboratory findings of COVID-19 patients

Variables	Positive mean ± SD value	Negative mean ± SD value	Units	Reference range
TLC	9.24±4.75	6.65±2.23	(10e3/uL)	3.70-10.1
Neutrophils	64.52±18.19	57.43±10.20	(%)	39.3-73.7
Lymphocytes	26.66±16.98	34.52±9.81	(%)	18.0-48.3
Monocytes	7.08±2.35	6.93±1.45	(%)	4.40-12.7
Platelets	221.56±91.60	293.58±53.74	(10e3/uL)	155-366
D Dimer	1917± 2110.497	156.05±15.93	(ng/mL)	140-198
LDH	340.63±138.79	211±13.2	(U/L)	125-220
Ferritin	560.82±749.94	188.01±53.72	(ng/mL)	4.63-274.66
CRP	3.73±2.89	0.32±0.19	(mg/dL)	0.00-0.50
ALT	39.45±43.39	34.29±13.11	(U/L)	0-55
Bilirubin	0.74±0.47	0.8±0.2	(mg/dL)	0.2-1.2
Urea	31.75±14.49	35.44±9.2	(mg/dL)	10-50
Creatinine	0.85±0.35	0.91±0.25	(mg/dL)	0.57-1.25
Trop I	158.94±1234.93	18.81±4.06	(pg/ml)	0.0-29.7

TLC; Total leucocytes count, LDH; lactate dehydrogenase, CRP: C Reactive protein, ALT: Alanine Transaminase

Table. 3 Radiographic findings of COVID-19 patients

X rays Findings	No of Patients 25.1%(n=154)
Normal x ray	72.1 (111)
Abnormal x ray	27.9(43)
Lung disease	
Unilateral	46.5(27)
Bilateral	53.5(16)
Shadows in Zones	100%(n=43)
Upper part of lungs	9.3(4)
Mid part of lungs	18.6(8)
Lower part of lungs	25.6(11)
Mid + Lower part of lungs	30(13)
Consolidation	20.8%(n=32)
Upper part of lungs	9.4(3)
Mid part of lungs	15.6(5)
Lower part of lungs	21.8(7)
Lower + Mid part of lungs	37.5(12)

n: numbers, %: Percentages

Chest X-rays were performed in which 43(27.9%) had abnormal findings. The 27 (62.8%) patients had unilateral and 16(37.2%) patients had bilateral lungs involvement (Table 3). The RNA amplification from the sputum, nasopharyngeal swab, and blood were 25 (30.12%), 21 (25.3%) and 8 (9.6%) respectively.

DISCUSSION

CoVID-19 is an aggressive infectious disease that has infected a large population[13].The patient have variable clinical manifestation and the outcome of the diseases are also very different[14]. The MMC hospital was assigned by the government to treat CoVID-19 patients in Khyber Pakhtunkhwa (KP) province, so our data partially represent SARS-CoV-2 infection in KP. In our study we observed high infections rate of CoVID-19 in aged population (>41 years) with comorbidity, which is comparatively lower than the previous reports[15, 16,17]. The most common co-morbid infections were diabetes ,cardiac diseases, or both which are in consistence with other study[18]. Interestingly, during the first week of observation no bacterial super infection was observed.

At the initial phase of CoVID-19 outbreak, the clinical sign and symptoms , imaging findings and laboratory investigations were not clear. In our study we reported fever and cough in 95.6% and 83.4% patients, respectively. Previously the same findings were observed in SARS-CoV infected patients[21,22,23]. Fever and cough were more common in the infected patients of SARS- CoV -2 as compared to gastrointestinal symptoms observed in SARS-CoV and MERS-CoV[24,25]. Critical illness occurred in 18.3% (n=112) patients after admission in hospital. Overall , 41.6% patient have lymphocytopenia which are in consistence with the other studies[21,23]. Regarding increased values of lactate dehydrogenase, C Reactive protein, ,D-dimer, Alanine transaminase, bilirubin, urea, creatinine, and ferritin the same findings have been reported elsewhere[26,27].

We observed the fatality rate of 5.2% which is comparatively higher from the previous study and lower from another report [21,28]. The difference in fatality rate may be due to variation in sample size and inclusion criteria. Since all those patients who have mild illness and did not seek medical attention were excluded from our study. Early detection, diagnosis and management might have collectively contributed to the reduction of fatality rate in Pakistan. In our study the detection and amplification of RNA were higher from sputum samples which are in accordance with the previous findings[29].

The current study has some limitations such as duration of the study, incomplete information of the exposure history, information on incubation period, missed patient who had mild infection and treated at home, due to overwhelmed medical resources patient didn't undergo sputum bacteriological or fungal assessment on admission and data generated were clinical driven and not systematic.

CONCLUSION

COVID-19 is a pandemic disease that has unprecedently changed the world, rapidly spreading worldwide including Pakistan. The patients mostly presented were asymptomatic or with fever, cough, and shortness of breath. Further, we suggest testing from both nasopharyngeal and sputum to reduce false negative rate.

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