Original Article

Clinical and laboratory parameters of confirmed and probable COVID-19 patients: experience from a tertiary care hospital of Bangladesh

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ABSTRACT

Background: *Severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), which was previously known as novel corona virus 2019 (2019-nCoV), causes corona virus disease 2019 (COVID-19). Since 8 March 2020, COVID -19 emerged in Dhaka city and rapidly spread throughout the country. This study evaluated the sociodemographic, clinical and laboratory parameters of confirmed and probable COVID-19 patients in a tertiary care hospital.*

Methods: *This cross-sectional study was conducted in BIRDEM General Hospital, Dhaka, Bangladesh from May to October 2020. Adult (>18 years) patients having clinical symptoms and signs of COVID-19, irrespective of sex were included in this study. Diagnosis was confirmed by positive reverse transcriptase polymerase chain reaction (RT-PCR) for SARS-CoV-2 from nasopharyngeal samples of patients and the disease classification was done following national guidelines.*

Results: *Total patients were 141 with a mean age of 59.74±11.0 years; majority was from urban areas and there was male predominance. Diabetes mellitus (91.5%) and hypertension (75.2%) were common co-morbidities. Common clinical presentations were fever (100%), cough (97.2%), fatigue (88.7%) and shortness of breath (61.7%). Laboratory investigations revealed lymphopenia (73.8%), elevated level of C-reactive protein (94.3%) and positive D-dimer (99.4%). Chest x-ray showed bilateral shadows in 73.8% cases and 42.6% had COVID pneumonia in high-resolution computed tomography (HRCT) scan of chest. Nearly three-fifths (58.9%) of the study subjects had moderate COVID-19 and 70.92% patients were shifted to the COVID-dedicated hospitals.*

Conclusions: *COVID-19 affects mostly the older males. Majority was diabetic and hypertensive. Common symptoms were fever, cough and respiratory distress. Common laboratory findings were lymphopenia, high CRP, positive D-dimer and bilateral shadows on lung imaging.*

Key words: *clinical characteristics, COVID-19, imaging, pandemic, SARS-CoV-2.*

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INTRODUCTION

Coronavirus is an enveloped single stranded RNA virus.[1,2] There are various corona viruses like severe acute respiratory syndrome coronavirus (SARS-CoV), Middle East respiratory syndrome coronavirus (MERS-CoV) and now, severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), previously which was known as 2019-nCoV.[3] This SARS-CoV-2 is responsible for corona virus disease 2019 (COVID-19).[4] On 11 March 2020, COVID-19 was declared as global pandemic due to its spreading ability across the continents.[5] The first COVID-19 case was reported from Wuhan, China, in December 2019.[6] In Bangladesh first three cases were detected on 8 March 2020.[7]

Clinical presentation of COVID-19 varies from no symptom to fatal disease. Fever, dry cough, breathlessness and fatigue are the most common clinical manifestations. Radiographic presentations of the chest are mostly peripheral in distribution with ground-glass opacity (GGO), crazy paving, fine reticular opacity, vascular thickening and pneumonia.[8, 9] Here, we have described the sociodemographic, clinical, biochemical, radiological profile and treatment of confirmed and probable COVID-19 patients in a tertiary care hospital of Bangladesh.

METHODS

This cross-sectional study was done in Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM) General Hospital, Dhaka, Bangladesh from May to October 2020. We included all patients having clinical symptoms and signs of COVID-19, above the age of 18 years, irrespective of sex. We defined probable and confirmed COVID-19 case according to 'National Guidelines on Clinical Management of Corona Virus Disease 2019 (COVID-19) Version 7.0, published on 28 May 2020.[10]

Data were collected in structured questionnaire from patients and hospital records. Clinical assessment was done by measuring temperature and fever was defined as an axillary temperature of 37.5°C or higher. All laboratory tests were performed according to the clinical judgement. Laboratory assessments consisted of RT-PCR for COVID-19, complete blood count, coagulation tests, assessment of liver and renal function, C-reactive protein, procalcitonin, lactate dehydrogenase (LDH) and ferritin. Radiological assessments included chest x-ray and high resolution computed tomography (HRCT) scan. We defined the degree of severity of COVID-19 as per national guideline. Necessary information was

collected during discharge or death, if were any. Data were analyzed by Statistical Package for Social Sciences (SPSS) version 20.0 for Windows.

RESULTS

A total of 141 patients were included in this study, among them 110 were confirmed and 31 were probable case. The demographic parameter and co-morbidities are shown in Table I and II respectively. Mean age of the study subjects was 59.74±11.0 years and most patients were from urban areas and majority were males. Regarding co-morbidities, 91.5% of subjects had diabetes, 75.2% had hypertension, 13.5% had chronic kidney disease (CKD) and 2.9% had ischemic heart disease (IHD).

Table I Demographic parameters of the study subjects (N=141)

Characteristics	Value/parameter
Age in years, mean (range)	59.74±11.0 (20-80)
Male: female	2.1: 1
Urban: rural	6.8: 1

Table II Co-morbidities among the study subjects (N=141)

Co-morbidities	Frequency	Percentage
Diabetes mellitus	129	91.5
Hypertension	106	75.2
Chronic kidney disease	19	13.5
Ischaemic heart disease	4	2.9

Among clinical presentations, fever was the most common (100%) followed by cough (97.2%), fatigue (88.7%) and shortness of breath (61.7). Other features are presented in Table III.

Table III Clinical characteristics/symptomatology of COVID-19 patients (N=141)

Characteristics/symptomatology	Total	Confirmed COVID- 19 (n=110)	Probable COVID-19 (n=31)	P Value
Fever	141(100%)	110 (78.0%)	31(22.0%)	.014*
Bodyache	3(2.1%)	3(2.1%)	0	.472
Headache	0	0	0	0
Cough	137(97.2%)	107(75.9%)	30(21.3%)	.004*
Shortness of breath	87(61.7%)	69(48.9%)	18(12.8%)	.003*
Sore throat	12(8.5%)	10(7.1%)	2(1.4%)	.004*
Loose motion	2(1.4%)	2(1.4%)	0	.670
Fatigue	125(88.7%)	96(68.1%)	29(20.6%)	.001*
Vomiting	23(16.3%)	12(8.5%)	11(7.8%)	.002*
Abdominal pain	2(1.4%)	2(1.4%)	0	.607

On laboratory investigations, we found lymphopenia in 73.8% cases. Most of the patients had elevated levels of C-reactive protein (94.3%) and D-dimer was positive in 99.4% cases. Electrocardiogram (ECG) was abnormal (having ishchemic changes, tachy or brady arrhythmia, left ventricular hypertrophy) in 34.8% subjects. Elevated level of alanine amino-transferase (ALT) was found in 15.6% and aspartate amino-transferase (AST) in 24.8% cases. Chest x-ray was done in all patients, among them 73.8% had bilateral shadows and 42.6% had COVID pneumonia in HRCT scan of chest (Table IV). RT-PCR for COVID-19 was done in all subjects and the patients were classified as confirmed or probable COVID-19 depending on the result of RT-PCR as well as appropriate clinical and laboratory features.

Table IV Laboratory and imaging findings of study subjects (N=141)

Parameter	Mean±SD	Frequency	Percentage
TC of WBC/cmm of blood	9981±9405	-	-
Lymphopenia	-	104	73.8
Platelet count/cmm of blood	249635±113997	-	-
ESR (mm in 1st hour)	38±22	-	-
↑ESR	-	77	54.6
CRP(mg/L)	47.70±46.38	-	-
↑CRP	-	133	94.3
Procalcitonin (ng/ml)	0.55±1.87	-	-
↑Procalcitonin	-	22	15.6
Ferretin (ng/ml)	285.82±426.84	-	-
↑Ferretin	-	46	32.6
LDH U/L	341.99±239.75	-	-
↑LDH	-	36	25.5
D-dimer			
Positive	-	126	89.4
Negative	-	15	10.6
HbA1c (%)	8.01±2.70	-	-
↑HbA1c	-	101	71.6
S. Creatinine (mg/dl)	1.27±.91	-	-
↑S. Creatinine	-	32	22.7
ALT(U/L)	41.68±37.35	-	-
↑ALT	-	22	15.6
AST(U/L)	46.79±54.38	-	-
↑AST	-	35	24.8
ECG			
Abnormal		49	34.8
RT-PCR for COVID-19			
Positive	-	110	78.0
Negative	-	31	22.0
CXR (n=141)			
Bilateral shadow present		104	73.8
HRCT chest (n=62)			
COVID pneumonia suggestive		60	96.8

Most patients had mild (21.3%) to moderate (58.9%) COVID-19; severe (12.8%) and critical (7.1%) cases were less common. After admission antibiotic was started in 98.58% cases, anticoagulant in 86.52% and steroid in 19.85% subjects. Over two-thirds (70.92%) of the patients were transferred to the COVID dedicated hospitals and among the remaining patients, antiviral was given to14.6%, tocilizumab to 2.4% and convalescent plasma to 2.4% along with antibiotic, anticoagulant and steroid. One-tenth (12.19%) of the patients who remained at BIRDEM General Hospital needed intensive care unit (ICU) transfer (Table V). The indications of ICU transfer were acute respiratory distress syndrome (ARDS) (60%), cytokine release syndrome (CRS) (20%) and multi-organ failure (MOF) (20%).

Table V Diagnosis, treatment and outcome of study subjects (N=141)		
Parameter	Frequency	Percentage
Diagnosis (N=141)		
Confirmed	110	78.0
Probable	31	22.0
Classification of COVID-19 (N=141)		
Mild	30	21.3
Moderate	83	58.9
Severe	18	12.8
Critical	10	7.1
Treatment started after admission (N=141)		
Antibacterial	139	98.58
Anticoagulant	122	86.52
Steroid	28	19.85
Complete treatment was given to the subjects who remained at BIRDEM General Hospital (n=41)		
Antibacterial	40	97.6
Anticoagulant	36	87.8
Steroid	20	48.8
Antiviral	6	14.6
Tocilizumab	1	2.4
Convalescent plasma	1	2.4
Shifted to dedicated COVID hospital (N=141)		
Yes	100	70.92
No	41	29.07
ICU shifting needed (n=41)		
Yes	5	12.19
No	36	87.8
Indication of ICU shifting (n=5)		
ARDS	3	60
CRS	1	20
MOF	1	20

DISCUSSION

Globally until16 November 2020, there have been over 54 million COVID-19 cases confirmed with 1,316,502 deaths. From 8 March to 16 November 2020, according to the Directorate General of Health Services (DGHS) Bangladesh, 434,472 COVID-19 confirmed cases were detected by RT-PCR, including 6,215 COVID related deaths. Bangladesh is in the top 24th position in the world.[11]

Our study showed that the age of the subjects ranged from 20-80 year with a mean age of 59.74 years, which was almost similar to the age of patients in different studies from China and India.[12-17] Male gender was more affected than female in our study, which was consistent with the results from abroad.[12] The co-morbidities of our study were DM, hypertension, IHD and CKD, which were also common in Chinese population.[18,19]

Regarding clinical manifestations, in our study the most common symptoms were fever, dry cough, shortness of breath and fatigue; besides sore throat, diarrhea, vomiting, nausea, abdominal pain were also observed in a few cases which were more or less similar to the manifestations reported in several studies globally.[6, 16-17]

Common laboratory parameters of our study subjects were normal leukocyte with lymphopenia, elevated CRP and positive D-dimer coinciding with results of numerous studies.[6, 16-17] Deranged liver enzymes, hyperferritinemia, high LDH, abnormal ECG were observed in some cases. Majority of our study subjects had poor glycemic control and it is one of the most important risk factor for increased morbidity and mortality in COVID-19, reported in different studies.[20, 21]

Imaging findings like chest x-ray and HRCT scan of chest varied from no shadow to extensive involvement of both lungs which were used to classify the severity

and management of the cases as per national guideline.[10, 22] Seventy percent of our patients were shifted to COVID dedicated hospitals and rest of the subjects were treated at our hospital. Among them, a few required ICU care and others were treated with anticoagulant, antibiotics, antivirals, steroid and tocilizumab.

Limitations

It was a single center study with small sample size. We could not correlate severity of the disease with laboratory parameters and outcome, as most of our patients were shifted to COVID dedicated hospitals and a few of them to the ICU. Therefore, we could not follow up them properly. Extended follow up could provide more information about the clinical progression, treatment course and disease outcome. Further multi-center, large-scale study will strengthen the findings of this study.

Conclusion

From the findings of present study, it can be concluded that, COVID-19 affected predominantly elderly male patients. Most of them were diabetic and hypertensive. Common symptoms were fever, cough, fatigue and shortness of breath. Important laboratory findings were lymphopenia, high CRP, positive D-dimer, poor glycemic status and bilateral shadows on lung imaging. Most of them were shifted to the COVID dedicated hospitals and the remaining subjects were treated with anticoagulants, antibiotics, steroid, antivirals and tocilizumab.

Authors' contribution: HFH planned the research, searched literature and drafted the manuscript. AKMSA revised the manuscript. SHH analyzed data. MS, RPG, PDS, AN collected data. All authors read and approved the final version of the manuscript for submission.

Conflict of interest: Nothing to declare.

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