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Local Experience on Clinical Characteristics of COVID-19: Single Center Experience

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ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) emerged in December 2019 in Wuhan, the capital of Hubei province, China. COVID-19 is an acute respiratory disease caused by a newly emerged zoonotic coronavirus. The virus is now known as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease it causes is called coronavirus disease 2019 (COVID-19). In March 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a pandemic.

Aim of the work: Clinical description of COVID-19 patients presented to El-Minia University Hospital Screening Triage. Identification of different varieties of COVID-19 clinical manifestations and complications.

Patients and Methods: A retrospective study on the clinical manifestation and complications of 76 patients of COVID-19.

Results: Average age 50 years old 43 male and 33 female. 29% with previous history of smoking, 26% with hypertension, 15% diabetic patient and 9% chronic kidney disease. The most common presentation is fever 80%, dry cough 81.6% and shortness of breath 75%, productive cough 9%, anosmia 18.4%, myalgia and bone aches in 60.5%, easy fatigability 61.8% and persistent headache in 34%. GIT manifestations including diarrhea 22% and vomiting 14.5%. Another 3 cases diagnosed as mesenteric vascular occlusion and 2 cases presented with eye involvement. The acute kidney injury (AKI) occurred in 5.3% of the patients.

Conclusion: SARS COV-2 can present with different clinical manifestation affecting multiple body systems.

Key words: COVID-19, Comorbidity, GIT manifestations, Acute kidney injury.

INTRODUCTION

Since December 2019, coronavirus disease 2019 (COVID-19) has become a global pandemic health problem caused by the highly transmissible severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [(1)]. SARS-CoV-2 is an enveloped, positively charged and single-stranded RNA belonging to the beta coronavirus genus. It enters cells via the angiotensin-converting enzyme 2 (ACE2) receptor [(2)].

Current studies revealed that respiratory symptoms of COVID-19 such as fever, dry cough, and even dyspnea represent the most common manifestations. Most patients exhibited mild symptoms and partial patients exhibited worse prognosis and developed severe pneumonia, acute respiratory distress syndrome (ARDS), multi-organ failure (MOF) and death [(3)].

COVID-19 reported to be presented with other gastrointestinal manifestations by **Zhang *et al.*** [(4)] who reported that ACE2 was highly expressed in oesophageal epithelial cells and the absorptive enterocytes from ileum and colon, suggesting possible faecal transmission.

PATIENTS AND METHODS

We performed a retrospective study on the demographic, clinical symptoms, patients' comorbidities and their outcome and complications of a laboratory confirmed cases with COVID-19. 76 confirmed cases with COVID-19 from El-Minia University Hospital Screening Triage were included in this study. The data were obtained from their medical reports.

The severity of COVID was defined based on the criteria established by China's National Health Commission [(5)]: 1- Mild: minor symptoms only, without evidence for pneumonia by chest X-ray. 2- Moderate: Fever and respiratory symptoms are present, and there is evidence for pneumonia by chest X-ray, (both groups classified also as non-severe cases). 3- Severe: Defined by any of the following conditions. 1) Dyspnoea, respiratory rate $\geq$ 30/min, 2) resting hypoxia $SaO_2 \leq 93\%$, 3) $PaO_2/FiO_2 \leq 300$ mmHg. 4. Critical. The presence of any of the following conditions. 1) Respiratory failure, require mechanical ventilation, 2) shock, 3) other acute organ failure. (Both groups classified also as a severe cases).

Ethical approval and written informed consent:

An approval of the study was obtained from Minia University academic and ethical committee. Every patient signed an informed written consent for acceptance of the operation.

Statistical analysis

The analysis of the data was carried out using the IBM SPSS 20.0 statistical package software. Data were expressed as median, interquartile range (IQR), mean and standard deviation (SD) for quantitative data in

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addition to both number and percentage for categorized data. The Mann-Whitney test was used for comparison between two independent groups for non-parametric data, and the *Chi- square test or Fisher's exact tests* was used to compare categorical variables. A *p*-value of 0.05 or less was considered significant, whereas values 0.01 and 0.001 were considered highly significant.

RESULTS

Table (1): Demographic data and comorbidities

	Total (N=76)	
Age (Years)		
Median (IQR)	50 (40-60)	
Mean ± SD	49.3 ± 14.4	
Sex		
Male	43	(56.6%)
Female	33	(43.4%)
Comorbidities		
Smoking	22	(29%)
Hypertension	20	(26.3%)
Diabetes	12	(15.8%)
Chronic kidney disease	7	(9.2%)
OTHERS	7	(9.2%)

Table 1 shows average age 50 years old 43 male and 33 female, Most patients exhibited other comorbidities which may increase the severity as the results show that 29% with previous history of smoking, 26% with hypertension, 15% diabetic patient, 9% chronic kidney disease and 9% counted for other comorbidities including ischemic heart diseases, liver cirrhosis, bronchial asthma and rheumatoid arthritis.

Table (2): Different clinical presentations

	Total (N=76)
Symptoms	
Asymptomatic	3 3.9%)
Fever	61 80.3%)
Dry Cough	62 81.6%)
Short breath	57 75.0%)
Productive cough	7 9.2%)
Anosmia	14 18.4%)
myalgia-bone pain	46 60.5%)
Fatigue	47 61.8%)
Headache	26 34.2%)
Diarrhea	17 22.4%)
Vomiting	11 14.5%)
Acute abdomen	3 3.9%)
Eye congestion	2 2.6%)

Fever is the most common presentation in about 80%, dry cough 81.6% and shortness of breath 75%. The productive cough reveled in only 9%.

There are multiple non-specific complains reported as anosmia 18.4%, myalgia and bone aches in 60.5%, easy fatigability 61.8% and persistent headache in 34%. GIT manifestations are reported in multiple cases in this study including diarrhea 22% and vomiting 14.5%. 3 cases presented with unexplained acute abdomen. Other 2 cases presented with red eye.

Table (3): Comparative data between non-severe and severe group as regard clinical different presentations

	Non-severe (N=62)		Severe (N=14)		p value
Asymptomatic	3	4.8%)	0	0.0%)	1.00
Fever	47	75.8%)	14	100.0%)	0.059
Dry Cough	53	85.5%)	9	64.3%)	0.119
Short breath	43	69.4%)	14	100.0%)	**0.016***
Anosmia	13	21.0%)	1	7.1%)	0.445
myalgia-bone pain	37	59.7%)	9	64.3%)	1.00
Productive cough	3	4.8%)	4	28.6%)	**0.019***
Fatigue	38	61.3%)	9	64.3%)	1.00
Headache	18	29.0%)	8	57.1%)	0.063
Diarrhea	15	24.2%)	2	14.3%)	0.723
Vomiting	9	14.5%)	2	14.3%)	1.00
Acute abdomen	3	4.8%)	0	0.0%)	1.00
Eye congestion	2	3.2%)	0	0.0%)	1.00

After grouping the patients into 2 groups severe and non-severe (table 3), it was found that shortness of breath and presence of productive cough presented with statistical significance more in severe group (P value **0.016, 0.019** respectively) which may be explained by multifactorial causes one of them may be 2ry bacterial infection.

Table (4): Comparative study between both groups as regard oxygen therapy

	Non-severe (N=62)	Severe (N=14)	p value
Not received O2 therapy	53 85.5%)	0 0.0%)	
Received O2 therapy			
Nasal cannula	8 12.9%)	3 21.4%)	**<0.001'**
Cpap	0 0.0%)	2 14.3%)	
Invasive intubation	1 1.6%)	9 64.3%)	

CPAP: continuous positive airway pressure.

As regard the oxygen therapy needed by the patients (table 4), nearly 85.5% of non-severe group needs no oxygen therapy and the rest of them need oxygen therapy (13% on nasal cannula and 1.5% predisposed suddenly to acute severe hypoxia after 2 days of admission and necessitate invasive intubation and arrested). In contrary to severe group who mainly presented late to the hospital and exhibited much more comorbidity with old age and did not receive any specific therapy early, all of them need oxygen therapy 21.4% need oxygen with nasal cannula, 14.3% need continuous positive airway pressure (CPAP) and 64.3% necessitate at the end (after consuming all modalities of raising oxygen saturation) an invasive intubation.

Table (5): Comparative data between both groups as regard the outcome and complication data

	Total (N=76)				
Death					
Yes	10				(13.2%)
No	66				(86.8%)
	Non-severe (N=62)		**Severe (N=14)**		**p value**
Death					
Yes	**1**	**(1.6%)**	**9**	**(64.3%)**	
No	61	(98.4%)	5	(35.7%)	**<0.001***
Complications e.g.					
Cerebral infarction	0	0.0%)	1	7.1%)	
Sudden hypoxia	1	1.6%)	4	28.6%)	
Acute kidney injury	2	3.2%)	2	14.3%)	0.001*
Mesenteric vascular occlusion	3	4.8%)	0	0.0%)	
Orbital cellulitis	2	3.2%)	0	0.0%)	
No complications	54	87.1%)	7	50.0%)	

There are multiple complication occur after the admission and observed with further follow up of the cases (table 5); the most serious one and most fatal is sudden hypoxia with 6.6% of all cases more in the severe group 28.6% versus 1.6% in non-severe then AKI with 5.3% also more in severe group than non-severe (14% versus 3% respectively), the patients who presented with acute abdomen (3.9%) underwent CT angiography and diagnosed as mesenteric vascular occlusion at the emergency room and undergo urgent operation to save their lives till the result of the swab appear under complete infection control precautions, orbital cellulitis in 2.6% and one case complicated with cerebral infarction.

DISCUSSION

After studying the clinical presentations of 76 patients of confirmed COVID-19 (table 1) with average age 50 years old, 43 male and 33 female. Most patients exhibited other comorbidities, which may increase the severity as the results showed that 29% with previous history of smoking, 26% with hypertension, 15% diabetic patient, 9% chronic kidney disease and 9% counted for other comorbidities including ischemic heart diseases, liver cirrhosis, bronchial asthma and rheumatoid arthritis. **Zhang *et al.* [6],** also found that the median age of all his patients was 57 years old, which is close to **Wang *et al.* [7]** (56.0 years) and **Chen *et al.* [8]** (55.5 years).

As regard, the comorbidity **Cao *et al.* [9],** found in his study that 21.2% of patients had hypertension, 7.6% had diabetes and 6.0% had cardiovascular diseases. **Zhang *et al.* [6]** found that hypertension was present in 30% and diabetes in 12.1%.

This study reported that the most common presentation (table 2) was fever (80%), dry cough (81.6%) and shortness of breath (75%). The productive cough reveled in only 9%. There were multiple non-specific complains reported as anosmia (18.4%), myalgia and bone aches in (60.5%), easy fatigability (61.8%) and persistent headache in 34%. GIT manifestations were reported in multiple cases in this study including diarrhea (22%) and vomiting (14.5%). 3 cases presented with unexplained acute abdomen. Other 2 cases presented with red eye. After grouping the patients into 2 groups severe and non-severe (table 3), it was found that shortness of breath and presence of productive cough presented with statistical significance more in severe group (P value **0.016** and **0.019** respectively), which may be explained by multifactorial causes one of them may be 2ry bacterial infection.

As regards oxygen therapy needed by the patients (table 4), nearly 85.5% of non-severe group needed no oxygen therapy and the rest of them needed oxygen therapy (13% on nasal cannula and 1.5% predisposed suddenly to acute severe hypoxia after 2 days of admission and necessitate invasive intubation and arrested). In contrary to severe group who mainly presented late to the hospital, exhibited much more comorbidity with old age and did not receive any specific therapy early, all of them needed oxygen therapy. 21.4% needed oxygen with nasal cannula, 14.3% needed continuous positive airway pressure (CPAP) and 64.3% necessitated at the end (after consuming all modalities of raising oxygen saturation) an invasive intubation. All cases needed invasive ventilation ended by death with its percentage from all the study cases was 13%.

There were multiple complications occurred after the admission and observed with further follow up of the cases (table 5). The most serious one and most fatal is sudden hypoxia with 6.6% of all cases more in the severe group 28.6% versus 1.6% in non-severe, then AKI with 5.3% also more in severe group than non-severe (14% versus 3% respectively). The patients who presented with acute abdomen (3.9%) underwent CT angiography, diagnosed as mesenteric vascular occlusion at the emergency room and underwent urgent operation to save their lives until the result of the swab appear under complete infection control precautions. Orbital cellulitis presented in 2.6% and one case complicated with cerebral infarction. It is nearly similar to multiple studies as **Zhang *et al.* [6]** reported that the most commonly experienced symptoms were fever (91.7%), followed by cough (75%), fatigue (75%) and chest tightness or dyspnea (36.7%). 39.6% of them complained about gastrointestinal symptoms, including nausea, diarrhea, poor appetite, abdominal pain, belching, and emesis. Also **Fang *et al.* [10]** stated that up to 79% of the patients presented with gastrointestinal symptoms as diarrhoea, anorexia, nausea, vomiting, abdominal pain and gastrointestinal bleeding during the onset and subsequent hospitalization. Diarrhoea might be the first symptom before diagnosis. He found that diarrhoea occurred in 49.5% of patients. Different possible theories might be considered for diarrhoea. First, direct viral attack on the digestive tract; this is supported by the detection of viral nucleocapsid protein in epithelial cells. Second, the side effect of anti-viral drugs may induce nausea and diarrhoea. Third, dysbiosis of intestinal microbiota induced by antibiotics [11].

Presence of Microvascular Obstruction(MVO), cerebral infarction and sudden hypoxia can be explained by the thromboembolic complications, which was recognized in coronavirus-19 (COVID 19) pneumonia, which lead to deep venous thrombosis and pulmonary embolism (PE) and acute mesenteric ischemia (AMI) [12]. The exact pathological mechanism is not known. Four mechanisms, in isolation or in varying combinations could account for this fulminant complication in severe COVID-19. First, hypercoagulability induced by systemic inflammatory state, endothelial activation, hypoxia and immobilization may lead to thrombosis [13]. Second, elevated levels of von Willebrand Factor in response to endothelial damage which occur in severe COVID-19 with resultant vascular thrombosis. The enterocytes of small bowel expression of angiotensin converting enzyme 2 results in direct bowel damage [14].

The other rare presentations were 2 cases presented with eye congestion and severe redness, diagnosed as orbital cellulitis. Ocular manifestations of COVID-19 are overall rare in the published literature. Only 0.8% of patients were reported to have "conjunctival congestion"[15]. And out of 30 hospitalized patients with COVID-19 examined by **Xia *et al.* [16],** one patient had conjunctivitis and tested positive for SARS-CoV-2 in ocular secretions by a conjunctival swab. It isn't unknown how SARS-CoV-2 accumulates in ocular secretions. May be due to direct inoculation of the eye by respiratory droplets or aerosolized viral particles, or due to migration from the nasopharynx via the nasolacrimal duct, or even hematogenous spread through the lacrimal gland [17].

In this study, the acute kidney injury (AKI) occurred in 5.3% after hospitalization. **Wang *et al.* [18]** also reported increase in serum creatinine or blood urea nitrogen in 10.8% of hospitalized patients within the first 48 h of hospital stay. AKI with SARS COV-2 is multifactorial may be due to direct viral injury via its receptor (ACE2), which is highly expressed in the kidney, an imbalanced renin angiotensin aldosterone system (RAAS), an elevation of pro-inflammatory cytokines elicited by the viral infection and microvascular thrombosis [19]. It may be due to other indirect mechanisms, especially in the critically ill patients. First, presence of old age and other

comorbidities such as hypertension or diabetes mellitus. Also, a lot of patients complaining of prolonged fever, tachypnea, anorexia, vomiting and diarrhea especially with the psychological impact of COVID stigma and quarantine isolation, which could lead to hypovolemia and subsequent pre-renal AKI. In addition, other contributing reasons like drug nephrotoxicity and contrast nephropathy [(20)]. Second, patients with acute respiratory distress syndrome (ARDS) have impairment of gas exchange and severe hypoxemia [(21)]. In addition, hemodynamic disturbances such as central venous pressure elevation, increased intra-thoracic pressure and PEEP could influence urine output and glomerular filtration [(22)]. All of this may lead to AKI initiation or aggravation.

Limitations:

Small sample size. Difficult to confirm presence of viral nucleocapsid protein in different tissues and body secretions.

CONCLUSION

In conclusion, SARS COV-2 can present with different clinical manifestations due to affection of multiple body systems. Health care workers must be aware about these variable presentations to reduce the risk of infection spread. Older age and presence of other comorbidity increase the risk of severity.

RECOMMENDATION

Large-scale study. More researches are needed to explain the wide variety of presentations and complications of COVID-2 including viral sequencing to define the number of strains present and its predilection.

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