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Clinical Manifestations and Comorbidities of SARS-Cov-2 Infection: A Descriptive Study

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ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) is a clinical syndrome caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Patients with severe illness have an overactive immune system, which can damage organs other than the lungs.

Objective: The aim of this study was to assess the prevalence of clinical manifestations and comorbidities in SARS-CoV-2 infected patients.

Patients and methods: This retrospective single-center observational study was conducted in the Tertiary Hospital, Internal Medicine Department, Faculty of Medicine, Zagazig University. This retrospective observational study was conducted on consecutive 370 patients with confirmed SARS-CoV-2 infection from May to September 2020.The diagnosis of the cases was confirmed using RT-PCR for detection of the viral RNA. Demographic characteristics, including underlying comorbidities, symptoms, signs, laboratory findings, chest CT scan and treatment measures were reported.

Results: According to this retrospective, single-center observational study, which was conducted on consecutive 370 patients with confirmed SARS-CoV-2 infection? The study involved 193 Egyptian males (52.1%) and 177 Egyptian females (47.9%) with COVID-19. The mean age was 40. 2 ±14.74 years. The common symptoms of the COVID-19 patients at the onset of sickness were myalgia [355 (95.9%)], fatigue [291 (78.6%)], headache [235 (63.5%)], fever [247 (66.8%)], cough [213 (57.6.%)], sputum production [201 (54.3%)] and dyspnea [189 (51.1%)].The most prevalent comorbidity were hypertension [142(38.4%)] followed by diabetes [132 (35.6%)].

Conclusion: The commonest clinical manifestations of confirmed cases of COVID-19 were myalgia, fatigue, headache, fever, and cough and the most prevalent comorbidities associated with COVID 19 patients were hypertension and diabetes.

Keywords: SARS-CoV-2, Diabetes, Comorbidity, Coronavirus.

INTRODUCTION

Coronavirus disease (COVID-19), which is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is a global pandemic disease that began in Wuhan, China, and swiftly spread to over 180 nations [1]. COVID-19 is a novel and understudied illness, with little information available. However, comorbidities were found to enhance the risk of infection in the instances that were found [2]. Coronaviruses can cause multiple system infections in various animals and mainly respiratory tract infections in humans, such as severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome [3].

The majority of individuals have little symptoms and a favourable prognosis. Few patients infected with 2019-nCoV have suffered severe pneumonia, pulmonary oedema, ARDS, or multiple organ failure thus far [4]. COVID-19 is more likely to cause severe sickness in People who have chronic obstructive pulmonary disease (COPD) or other respiratory diseases. In individuals with COPD, the probability of acquiring COVID-19 is reported to be 4-fold greater than in those without COPD [5].

Egyptian Ministry of Health and Population (MOH) issued a standardized guide for the diagnosis and management of COVID-19. According to this protocol, patients with COVID-19 infection are classified on clinical bases into mild, moderate, severe, and critical cases [6].

Finally, critical patients are those who fulfill one or more of the following criteria: (a) respiratory failure needing mechanical ventilation, (b) shock, or other organ failures needing ICU surveillance and treatment [7].

COVID-19 can affect anyone, and the disease can cause symptoms ranging from mild to very severe. Recent interesting study reported the clinical features of 41 confirmed patients with COVID 19 and established that 13 (32%) of them had underlying diseases, including cardiovascular disease, diabetes, hypertension, and chronic obstructive pulmonary disease [8].

Another recent research by **Wang *et al.*** [4] stated that at 138 patients of COVID-19, they found that 64 (46.4%) of them had comorbidities.

Importantly, patients admitted to the intensive care unit (ICU) had a greater rate of comorbidities (72.2%) than patients who were not sent to the ICU (37.3%). In this regard, comorbidities maybe risk factors for adverse outcomes. Assessing the

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prevalence of these chronic diseases is the basis for modifying complications in patients infected with SARS-CoV-2.

To the date of writing this study, there have been more than 155 million confirmed cases of COVID-19, including more than 3 million deaths, according to WHO reports. Regarding COVID-19 in Egypt, the number of cases increased to more than 170,000 cases by the end of April 2021 [9].

This study aimed to assess the prevalence of clinical manifestations and comorbidities in SARS-CoV-2 infected patients.

PATIENTS AND METHODS

This retrospective single-center observational study was conducted in the tertiary hospital, Internal Medicine Department, Faculty of Medicine, Zagazig University.

This retrospective observational study was conducted on consecutive 370 patients (193 males and 177 females) with confirmed SARS-CoV-2 infection during the period from May to September 2020. According to the WHO and Egyptian Ministry of Health and Population (MOH) criteria, the cases were diagnosed using RT-PCR for detection of viral RNA (Cobas 6800 system-Roche) [10].

Demographic characteristics, including sex, age, underlying comorbidities were recorded. We also reported symptoms, signs, laboratory findings and chest CT scan.

Ethical approval:

The study protocol was approved by the Ethical Committee of the Faculty of Medicine, Zagazig University (IRB no-6389). Informed written consent was obtained from each eligible patient who participated in the study.

Statistical analysis

The collected data were coded, processed and analyzed using the SPSS (Statistical Package for Social Sciences) version 22 for Windows® (IBM SPSS Inc, Chicago, IL, USA).

Data were tested for normal distribution using the Shapiro Walk test. Qualitative data were represented as frequencies and relative percentages. Chi square test ($\chi 2$) to calculate difference between two or more groups of qualitative variables.

Quantitative data were expressed as mean ± SD (Standard deviation). Independent samples t-test was used to compare between two independent groups of normally distributed variables (parametric data). P value ≤ 0.05 was considered significant.

RESULTS

Demographical characteristics of the patients enrolled in this study:

According to this retrospective single-center observational study that was conducted on consecutive 370 patients with confirmed SARS-CoV-2 infection. The study involved 193 Egyptian males (52.1%) and 177 Egyptian females (47.9%) with COVID-19, their mean age was 40.2 ± 14.74 years.

The common symptoms of the COVID-19 patients at the onset of sickness were myalgia [355 (95.9%)], fatigue [291 (78.6%)], headache [235 (63.5%)], fever [247 (66.8%)], cough [213 (57.6.%),sputum production [201 (54.3%) and dyspnea [189 (51.1%)] less common symptoms were nasal congestion, diarrhea, nausea, abdominal pain vomiting, anosmia, loss of taste ,eye congestion and sore throat (Table 1).

Table (1): Characteristics of patients with COVID-19

Characteristics, symptoms	Number and percentage (N=370)
Age, yr. Mean ±SD	40.2 ±14.74
Sex	
Male	193 (59.4%)
Female	177 (40.6%)
BMI, kg/m^2	30.34±8.43
Current smoker	29/370 (7.8%)
Co morbidity	
Any	79(21.4%)
Hypertension	142(38.4%)
Diabetes	132 (35.6%)
Chronic liver disease	69(18.6%)
Chronic renal disease	12 (3.2%)
Ischemic heart disease	19 (5.1%)
Malignancy	22(5.9%)
COPD	69(18.6%)
Immunosuppression	15(4.1%)
Symptoms	16 (4.3%)
Asymptomatic	15(4.1%)
Fever	247(66.8%)
Cough	213(57.6 %)
Sputum production	201 (54.3%)
Eye congestion	10(2.7%)
Dyspnea	189(51.1%)
Nasal congestion	66 (17.8%)
Sore throat	46(12.4%)
Myalgia	355 (95.9%)
Anosmia	78 (21.1%)
Abdominal pain	79 (21.4%)
Fatigue	291(78.6%)
Diarrhea	80 (21.6%)
Nausea and vomiting	82 (22.2%)
Headache	235(63.5 %)

Laboratory characteristics of patients with COVID-19 on admission:
Laboratory characteristics of patients with confirmed and reported cases of COVID-19 (Table 2).

Table (2): Laboratory findings of patients with COVID-19

Laboratory findings	Mean ± SD
Leukocytes, $\times 10^9$/L	9.7 ± 2.7
Neutrophils, $\times 10^9$/L	67.5 ± 6.1
Lymphocytes $\times 10^3/\mu$L	1.4 ± 0.07
Platelets, $\times 10^3/\mu$L	198.4 ± 7.7
Hemoglobin, g/dL	11.8 ± 1.11
Alanine aminotransferase, U/L	38.5 ± 3.2
Aspartate aminotransferase, U/L	36.7 ± 3.8
Blood urea nitrogen, mmol/L	33.6 ± 3.6
Serum creatinine, mg/dL	1.7 ± 0.09
C-reactive protein, mg/L	15.7 ± 1.6
D-dimer (mg/L)	0.81 ± 0.01
Ferritin (ng/mL)	387.6 ± 48.7

Radiographic findings of patients with COVID-19 on admission:

The prevalence of normal finding in both x ray and CT chest finding was 22 (5.9%) and regarding pneumonia, the prevalence of unilateral pneumonia was 31 (8.4 %) and for bilateral pneumonia was 69 (18.6%). Also, ground glass opacity prevalence was 65 (17.8%) and lastly crazy paving prevalence was 14 (3.7%) (Table 3 and figure 1).

Table (3): Radiographic findings of patients with COVID-19

Chest x-ray/CT findings	Number and percentage
Normal	22 (5.9%)
Unilateral pneumonia	31 (8.4%)
Bilateral pneumonia	69 (18.6%)
Ground-glass opacity	65 (17.6%)
Crazy paving	14 (3.7%)

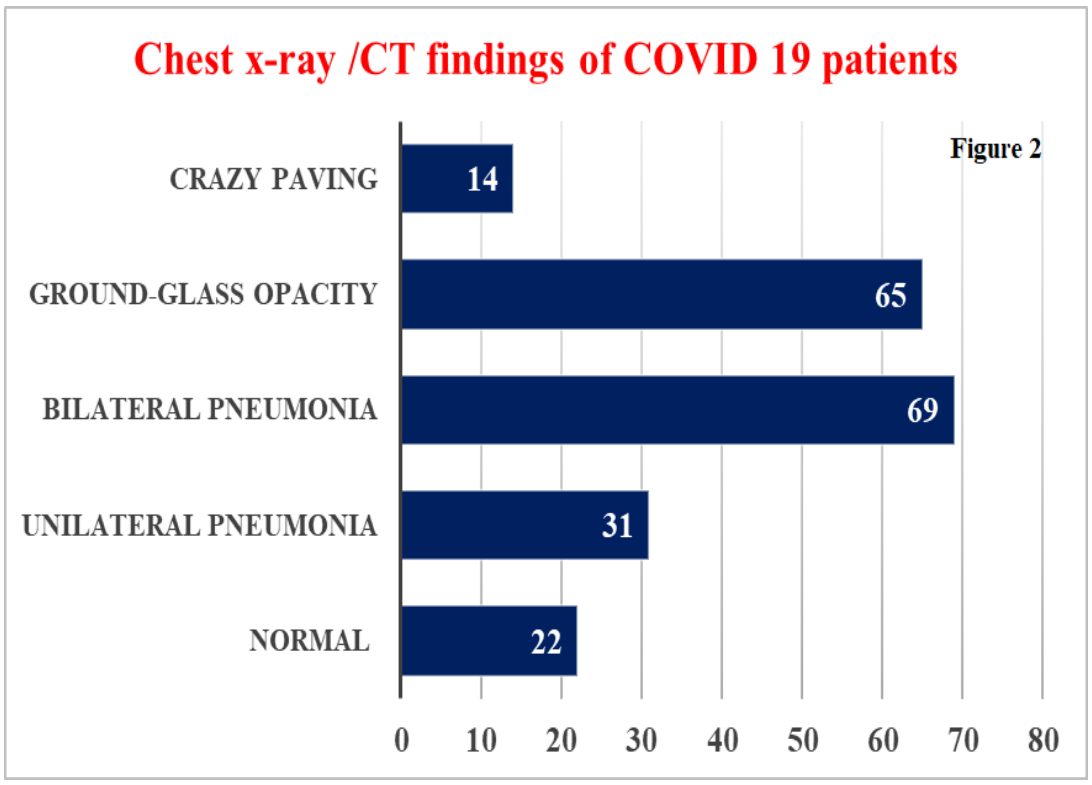

Figure (1): Radiographic findings of patients with COVID-19 on admission.

The prevalence of comorbidities among studied patients with COVID 19

According to the current study results the prevalence of COVID-19 comorbidities, as shown in table (1I and figure (2), the most common comorbidities identified in these patients were hypertension [142 (38.4%)] and diabetes [132 (35.6%)]. The less common comorbidities were COPD, chronic liver disease, chronic renal disease, ischemic heart disease, malignancy as well as patients on immunosuppression.

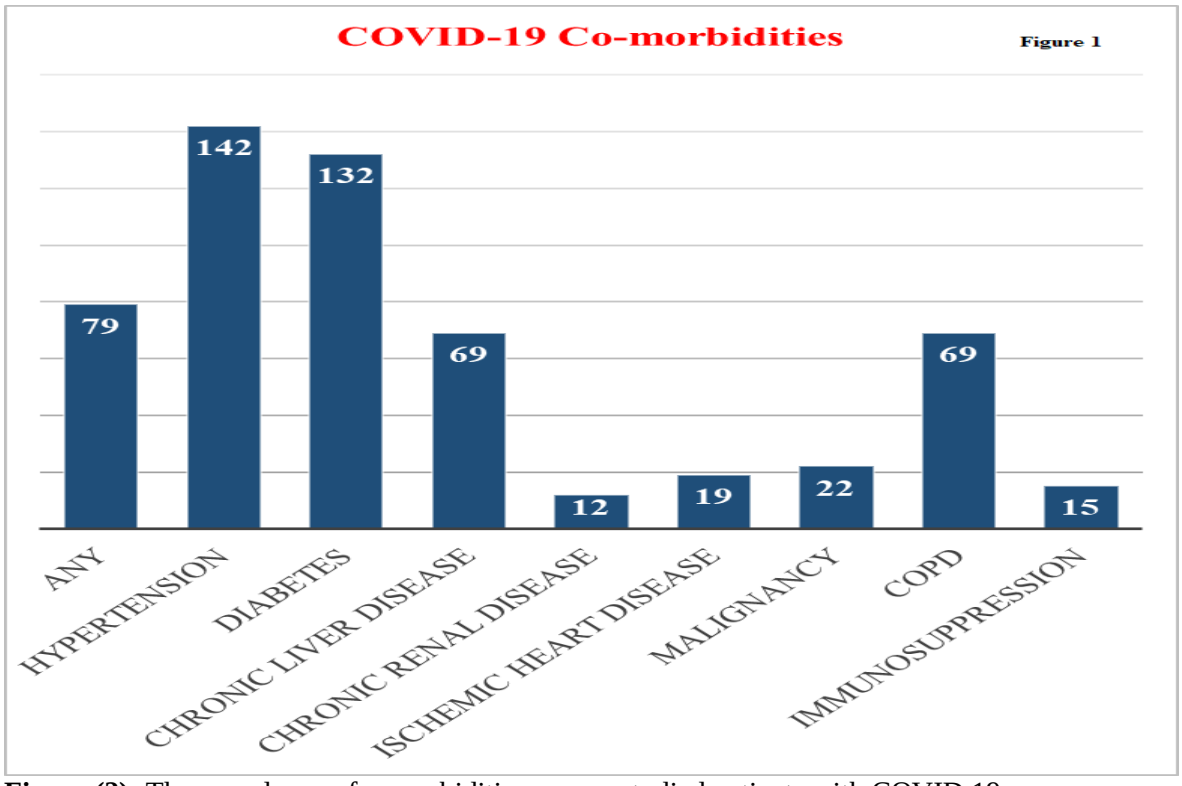

Figure (2): The prevalence of comorbidities among studied patients with COVID 19.

DISCUSSION

More interesting, recently published studies reported that SARS-CoV-2 virus can affect all individuals irrespective of age, gender, and ethnicity, but to varying degrees [11]. According to the current study results among 370 Egyptian patients with COVID 19, the prevalence of males was 52.1% and prevalence for females was 47.9% and their mean age was 40.2 ±14.74 years.

Another Egyptian study was conducted on sample of ESNA Quarantine Hospital's patients, observed that the mean age of patients was 55.5 ± 10.1 and male prevalence was 77.8% that was more common than female (22.2%) in mild to moderate (n= 36). However, in severe/critical group in the same study the mean age of patients was 62.6 ± 10.1 years and male prevalence was 66.7% that was more common than female (33.3%) [12]. The difference between our study results and ESNA results is due to different study sample size and time of the study as this study was conducted early in the pandemic.

Regarding the clinical manifestation of COVID 19 patients, the current study observed that the most common manifestations were myalgia [355 (95.9%)], fatigue [291 (78.6%)], headache [235 (63.5%)], fever [247 (66.8%)] and cough [213 (57.6%)]. According to **Ghweil *et al.*** [12] the commonest manifestations were fever (83.3%), dry cough (47.2%) and dyspnea (42.4%). Most COVID-19 cases remain asymptomatic or present with relatively mild flu-like symptoms, increasing the risk of transmission and the significant spread of SARS-CoV-2 [13].

As stated above, SARS-CoV-2 infects people of all age groups, but individuals aged above 60 years, along with comorbidities such as diabetes, COPD, and cardiovascular diseases, are at a higher risk of developing infection [14]. According to the current study results, the prevalence of co morbidities were hypertension [142 (38.4%)], diabetes [132 (35.6%)], and the least common comorbidities were COPD, chronic liver disease, chronic renal disease, ischemic heart disease, malignancy as well as patients on immunosuppression.

Growing evidence highlights the ability of SARS-CoV-2 to infect and damage multiorgan systems is dependent on the expression/distribution pattern of the host angiotensin-converting enzyme 2 receptor (ACE2) [15, 16].

Concerning the role of comorbidities, such as diabetes and obesity in increasing the severity of COVID 19, they up regulate ACE2, leading to an increase in viral load within various tissues and organs. Furthermore, in diabetic and obese patients, increased ACE2 shedding from the cell surface promotes ACE2 redistribution in the body and accumulation in the lungs [17]. According to **Kumar *et al.*** [18], a reduction in the baseline expression of ACE2 in the vasculature in diabetic and obese persons causes endothelial dysfunction, which contributes to the increased incidence of thrombotic events in COVID-19 patients.

As regards the prevalence of normal finding in both x ray and CT chest findings, they were 22 (5.9%) and regarding pneumonia, the prevalence of unilateral pneumonia was 31 (8.4 %) and that of bilateral pneumonia was 69 (18.6%). Also, ground glass opacity prevalence was 65 (17.8%) and lastly crazy paving prevalence was 14 (3.7%). **Ghweil *et al.*** [12] reported that the radiological finding was variable according to severity of COVIDS 19 infection.

CONCLUSION

The commonest clinical manifestations of confirmed cases of COVID-19 were myalgia, fatigue, headache, fever, and cough and the most prevalent comorbidities associated with COVID 19 patients were hypertension and diabetes.

Declaration of Competing Interest: The authors declare that they had no known competing financial interests.

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