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Epidemiologic and clinical manifestation analysis of COVID-19 patients admitted to 5th Azar Hospital in Gorgan

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Abstract

Background: Severely contagious, a beta coronavirus (COVID-19) has spread worldwide since December 2019, a life-threatening disease that leads to high mortality.

Methods: This study had 200 cases referred and admitted to 5th Azar Hospital in May and June 2020. Treatment started based on signs and symptoms and confirming positive CT scan findings. RT-PCR test is done for all of them. Patients are categorized due to age, underlying diseases, CT scan findings, and mortality.

Results: Diabetes mellitus (DM) was the most frequent underlying disease (35%), following hypertension (23.5%) and cardiovascular problems (9.5%). Although the severity of CT scan findings within the expired patients' group was more than survived, the relation was insignificant (P=0.247). The mean age of cases who died was at least ten years more than survived. There was a mortality risk of 5.9 folds in cardiovascular disease (CVD) patients comparing patients free of CVD.

Conclusion: In dealing with involved COVID-19 patients considering their age and co-morbidities will help manage earlier and pay more attention to these cases.

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Highlights

Diabetes mellitus (DM) was the most frequent underlying disease in COVID-19 patients.

- Expired patients were at least ten years older than survived.
- Mortality risk in cardiovascular disease (CVD) patients was 5.9 folds higher than in patients free of CVD.

Introduction

Contagious, deadly new viral infection (COVID-19), a beta coronavirus closely similar to the SARS virus, was first seen in Wuhan, China, in December 2019 (1). An illness that invades the targets via inhaling droplets of the contaminated victims. Clinical symptoms include simple cold-like syndrome, a severe intractable fever, cough, hypoxia, and pneumonia with or without ARDS, leading to death in severely involved people.

After involvement, a series of events occur, such as activation of cytokines and chemokines with infiltration of inflammatory cells and apoptosis in the epithelial layer of the airway mucosa. Hypoxia, sepsis, and multi-organ failure are severe, leading to death (2).

Considering the global priority of the disease, it is vital to identify the epidemiological and clinical patterns of this disease and estimate its characteristics concerning the severity of the disease in order to control it (3). Studies have shown that at least one-third of cases of COVID-19 infection are asymptomatic. In addition, almost three-quarters of people who were asymptomatic at the time of PCR testing remained asymptomatic at follow-up (4).

The most reported symptoms in COVID-19 patients are fever or chills, headache, muscle or body pain, dry cough, fatigue, shortness of breath, decreased leukocytes, and radiographic evidence of pneumonia. Less reported symptoms include diarrhea, runny nose, liver and kidney damage, nausea, vomiting, lymphopenia, and thrombocytopenia. Symptoms begin 2 to 14 days after exposure to the virus (5-8).

High-resolution spiral CT scan of lungs with 98% sensitivity helps physicians to start treatment as soon as possible (9,10). RT-PCR test takes time to respond, so the patients were admitted with suspicious signs and symptoms with positive CT scan findings. The PCR test was sent for all of them. Some factors, such as the age of the patient, gender, co-morbidities, clinical condition of the patient, and drug use, are the most important predictors of clinical results and disease severity in patients (11).

5th Azar Hospital admits only adult people more than 18 years old. The treatment was based on protocols the WHO and the Ministry of Health and Treatment of Iran advised. Considering the profound impact of COVID-19 on the community, this study aimed to evaluate and report the clinical condition of patients and the symptoms involved, which can greatly help disease management in regional and national analyses. Thus, the present study aimed to survey epidemiologic and clinical manifestations of COVID-19 patients admitted to the hospital.

Methods

This cross-sectional study was done in May and June 2020 with 200 cases. Positive signs and symptoms plus active CT scan findings were the first steps of diagnosis and admission. The PCR test was sent for all of them. 5th Azar Hospital admits only adult people more than 18 years old. This hospital is a referral in Golestan province for COVID-19.

Demographic information and laboratory tests were extracted by history, medical documents, and follow-up by phone later. All data was recorded about their age, gender, underlying disease, accompanying symptoms, and involvement of other close family members. They were asked to participate in every kind of gathering and ceremony. Patients were followed for at least six months.

All cases in this study underwent a spiral CT scan of the chest and RT-PCR test. Other essential work-ups were also done to obtain more information about the patient's condition. The authors got all data history-wise, hospital medical documents, and follow-up done by phone contact. A radiologist reported all CT scans, and an emergency medicine physician reviewed them. All these patients were admitted to the hospital. A Spiral CT scan of the lungs was done and reported by a radiologist. Due to the severity of the involvement of parenchyma, the authors categorized them as mild (< 20%), moderate (20 – 50%), and severe (>50%). The abnormality of CT scan findings were ground glass opacity, pleural effusion, and consolidation (R). This study started after the agreement of the Deputy of Research of Golestan University of Medical Sciences and getting an ethical code from the Medical Ethics Committee (IR.GOUMS.REC.1399.421). Statistical evaluation was done with SPSS-16 using the chi-square test and descriptive analysis.

Results

This study had 200 cases with signs and symptoms of COVID-19. They were referred to the emergency room outpatient clinic, 5th Azar Hospital in Gorgan (north of Iran), and visited in May and June 2020. The mean age was (57.25 ± 16.8), and the age range was between 19 and 93. 5th Azar Hospital accepts adult patients. One hundred fifty-three patients (76.5%) had positive RT-PCR for COVID-19. The most common complaints were shortness of breath (n=139, 69.5%), fever (n=102, 51%), cough (n=100, 50%), weakness, and lethargy (n=92, 46%). See more information in Table 1.

Positive RT-PCR was obtained from 153 patients (76.5%). Of fifty-eight patients with severe involvement of the lungs, forty-seven (81%) had positive PCR. In other patients, this record was 106 (74.6%).

In this study, sixty-seven patients (33.5%) simultaneously had at least one close family member infected with COVID-19. Seven out of fifty-eight (12.1%) patients with severe involvement of lungs (>50%) expired, but in the mild and moderate groups, there was ten out of 142 (7%) mortality.

106 out of 142 cases (74.6%) had positive PCR tests in the mild and moderate groups. In patients with severe involvement, forty-seven out of fifty-eight patients (81%) had positive PCR tests.

One hundred thirteen (56.5%) cases had a history of recent participation in groups and gatherings.

Diabetes mellitus (DM) (n=70, 35%), hypertension (n=47, 23.5%), and cardiovascular disease (CVD) (n=19, 9.5%) were reported as major underlying diseases seen in patients. There were eighty-one (40.5%) patients without any underlying disease. Ninety-one (45.5%) had only one type, twenty (10%) had two types, seven (3.5%) had three types, and one (0.5%) had four types of underlying disease (DM, HTN, heart disease, or immune deficiency) before admission.

Table 1. Common signs and symptoms of the participants

Variables		Frequency	Percent
Pain	Yes	62	31.00
Myalgia	No	138	69.00
Cough	Yes	100	50.00
	No	100	50.00
Nasal congestion	Yes	3	1.50
	No	197	98.50
Rhinorrhea	Yes	21	10.50
	No	179	89.50
Fever	Yes	102	51.00
	No	98	49.00
Headache	Yes	53	26.50
	No	147	73.50
Vomiting	Yes	36	18.00
	No	164	82.00
Dyspnea	Yes	139	69.50
	No	61	30.50
Anosmia	Yes	10	5.00
	No	190	95.50
Gustatory problem	Yes	9	4.50
	No	191	95.50
Hearing loss	Yes	1	0.50
	No	199	99.50
Lethargy	Yes	92	46.00
	No	108	54.00
The severity of lung involvement	Mild	38	19.00
	Moderate	104	52.00
	Severe	58	29

A Spiral CT scan of the chest showed thirty-eight (19%) cases with mild (< 20%), 104 (52%) moderate (20 – 50%), and fifty-eight (29%) cases with severe (> 50%) involvement of lung parenchyma (Table 1). There was no significant difference between males and females (P> 0.05). In this study, 125 (62.5%) live in urban areas and seventy-five (37.5%) in rural areas. There were seventy (35%) patients with a history of DM. Among these seventy diabetic patients, six cases were in the expired patient group. Additionally, six out of 19 patients in the heart disease group died. Forty-seven (23.5%) patients had hypertension, and 19 (9.5%) had heart disease. There were eight expired patients among forty-seven cases of hypertension.

Correlation of CT findings with DM showed diabetic patients (n=44, 62.9%) had mild and moderate lung involvement. Severe involvement was seen in twenty-six (37.1%) cases.

Of deceased patients, three (17.6%) had no underlying disease. The remaining (n=14, 82.4%) had at least one type of disease. Seventeen (8.5%) patients expired due to COVID-19 involvement and complications. The mean age of patients who survived was 56.37±16.36, and the expired patients reported 66.70±19.77. All deceased patients expired during admission to the hospital. Although the severity of CT scan findings within the expired patients was more than survived, the relation was insignificant (P=0.247).

DM had significant relation with the severity of CT scan findings (P=0.029). Hypertension had no significant relation to the severity of CT scan findings (P=0.487). Patients with at least one type of underlying disease had a significant association (P=0.045) with patients who died. Hypertension was more in expired patients and had a significant relation (P=0.023).

CVD patients had a mortality risk of 5.9 folds compared to patients free of CVD (Table 2).

Table 2. Logistic regression of the predictors of death in study participants

Variable	Odds	CI (95%)	P-Value
Diabetes	0.671	0.212 – 2.121	0.497
Hypertension	2.510	0.838 – 7.520	0.100
Cardiovascular diseases	5.999	1.776 – 20.257	0.004

Discussion

This study reported 200 cases with clinical manifestations of COVID-19 accompanied by positive CT scan findings. All were admitted to the hospital for better evaluation of disease severity. RT-PCR has been done entirely.

In this report, the mean age was 57 years old. Similar results were seen in Wong et al. (mean=56 years old) (12), Chen et al. (13), and Shahriarirad et al. (mean=53.75 years old) studies (14). There were insignificant differences in these series. The age range was 19-93 years old. In addition , other studies confirm such findings (12,13,15).

This study had 153 (76.5%) positive RT-PCR tests. Due to the possibility of false-negative reports of PCR, medical treatment is initiated with diagnosis based on signs and symptoms with positive related CT scan findings (16).

Maximum complaints were dyspnea (shortness of breath) (n=139, 69.5%), fever (n=102, 51%), cough (n=100, 50%), weakness, and lethargy (n=92, 46%). Similar findings could be seen in other studies, confirming that fever and cough are the most common symptoms (14, 16, 17). Wong et al. reported a fever in 80% and a cough in 50% of patients (10). Adhikari et al. reported the same results (18). Guan et al. found a fever in 87.9% and a cough in 67.7% of cases (19). Wong et al. reported high fever in 22% and mild fever in 38% of patients (12).

Dyspnea (shortness of breath) was the most common symptom (69.5% of patients). Chen et al. reported dyspnea in 31% and Shahriarirad et al. in 58% of their patients in Shiraz. Headache (26.5%) and vomiting (18%) were not common findings as previous results. In many other reports, they were rare findings. Chen et al. reported headache at 8% and vomiting at 1% (13). Shahriarirad et al. found headache at 53.1% and vomiting at 25.7% (14).

Rhinorrhea (10.5%) and altered smelling sense (5%) were reported in this study. In Shahriarirad et al. study, rhinorrhea was 23% (14). Taziki et al. reported olfactory and gustatory dysfunction as a complaint of people involved with COVID-19. They reported a complete recovery in six months is 98.8% (20).

Underlying diseases, a debilitating factor in people infected with COVID-19, make a major challenge for physicians responsible for treating patients. The recent study had patients with DM (n=70, 35%), hypertension (n=47, 23.5%), and CVD (n=9, 9.5%). There were ninety-one patients (45.5%) with only one type of mentioned diseases, twenty (10%) with two types, and seven (3.5%) with three types of underlying problems. Wong et al. reported hypertension (20%) and diabetes (13%) (12). Besides, Shahriarirad et al. reported hypertension 19.5% and diabetes 14.2% (14). Additionally, Hwang et al. reported hypertension (15%), diabetes (20%), and CVD (15%) (21). Lake also reported diabetes at 20%, hypertension at 15%, and CVD at 15% (22).

Seventeen (8.5%) patients expired during admission to the hospital. Li et al. reported 5% mortality (23). Huang et al. showed 15% fatality (21). Shahriarirad et al. had 8% mortality (14). Chen et al. reported an 11% mortality rate (13). Chan et al. reported family clusters in their series. In this study, 33.5% of at least one close family member was involved simultaneously (13).

Conclusion

After the outbreak of COVID-19 in China and the spread of this infection to many countries, there were waves of infected patients referred to the 5th Azar Hospital. Based on this study (200 cases), age and underlying diseases were the main predicting factors for prognosis.

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Ethical statement

This study derived from the thesis of Haniyeh Ragimi (Intern in medical school) at Golestan University of Medical Sciences and the agreement of the Deputy of Research (GOUMS) and getting Ethical Code (IR.GOUMS.REC.1399.421). All cases signed informed consent and responded to phone calls ambitiously. All data will remain confidential.

Conflict of interest

The authors declared no conflict of interest.

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