

Clinical Characteristics of a Group of Patients Confirmed with COVID-19 at a Hospital in Tehran, Iran: A Retrospective Case Report

Samira Vaziri¹, Fatemeh Mohammadi¹, Mojdeh Daneshmand², Sanaz Yazdani¹,
Reza Mosaddegh¹, Mahdi Rezaei¹, Kamyar Shokraee³, Saeed kalantari^{4*}

¹*Emergency Medicine Management Research Center, Iran University of Medical Sciences, Tehran, Iran.*

²*Department of Pharmacology, Shahid Beheshti University of Medical Sciences, Tehran, Iran.*

³*Minimally Invasive Surgeries Research Center, Iran University of Medical Sciences, Tehran, Iran.*

^{4*}*Antimicrobial Resistance Research Center, Iran University of Medical Sciences, Tehran, Iran.*

^{4*}*Kalantari.s@iums.ac.ir Tel*

Abstract: Introduction: *The present study examines clinical features of patients infected with the 2019 severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) leading to the coronavirus disease 2019 (COVID-2019) in Rasool Akram hospital, Tehran, Iran.*

Materials and methods: *This was a retrospective case report performed at Rasool Akram hospital, Tehran, Iran. A total of 77 patients referred to the hospital with SARS-Covid-2 infection. Data of the present study has been collected from March 5th to April 5th 2020.*

Results: *Intensive care unit (ICU) has admitted 20 patients out of 77 patients. Among this sample, 23 patients were infected with acute respiratory syndrome and the other 18 remaining passed away. The calculated mean age of the patients admitted to the ICU was 60.8, 18 out of whom had deceased. In our results, male patients outnumber female patients where male patients account for 62.33% and female patients account for 37.66% of the whole study population. The most frequent and usual signs of this disease first reported as respiratory distress or dyspnea (54.54%), coughs (54.54%) and myalgia (25.97). Only 3.89% of the patients had chest pain or chest discomfort. The most common comorbidities among those patients taken in the ICU and or deceased were diabetes, cardiovascular problems, hypertension and endocrine system problems. Out of 18 deaths, 11 (61.11%) cases had comorbidities. Among radiography and CT-scan results, 62.79% of the patients had involvement on chest radiography and 98.15% of the patients showed consolidation with ground glass opacities and 83.33% showed pleural effusion on their scan results.*

Conclusion: *Having as much thorough information as possible about the characteristics of the patients infected with this virus helps us make better and sooner judgmental calls and more accurate diagnosis.*

Keywords: *Coronavirus, SARS-Cov-2, Exposure, Incubation Period, Comorbidities.*

1. INTRODUCTION

The Wuhan Municipal Health Commission in Wuhan City, Hubei province, China announced a cluster of 27 pneumonia similar to acute respiratory syndrome cases (consisting of seven severe cases) of unknown etiology along with a similar link to Wuhan's Huanan Seafood Wholesale Market that is a wholesale fish and live animal market On December 31, 2019 [1, 2].

The China CDC distributed a report on a new and fatal virus (later named SARS-CoV-2) and called it as the main reason for 15 of the 59 cases of pneumonia in January. After that, publicly and preliminary analysis of genome sequence attributed to the virus revealed a new coronavirus (SARS-CoV-2) clusters related to the SARS- CoV clade and it was different from the known core genome of bat CoVs [3]. The virus was then renamed by WHO to COVID-19 as in Coronavirus disease 2019.

Except to china, there were a lot of cases and patients with this virus in other countries including Thailand, Japan and South Korea by January 20th, 2020. These reports took researchers' attention to this sudden prevalent of virus in the world [4]. The WHO announced the prevalent of the COVID-19 as a worldwide health emergency. It was reckoned that primarily the virus had been transmitted from animals and then it got spread via human to human contact[5]. The virus has since spread rapidly across China as well as various parts of the world. Some European countries declared imported patients infected with COVID-19 from Italy that was the epicenter in Europe. After that, a lot of reports were received about local transmitting of COVID-19 some particular European countries.

The number of patients infected with this virus grew increasingly in the way that till 10 March 2020, the cases of COVID-19 were 10,000 in Italy and exceeded 1,000 in Spain, France, and Germany, and this virus was prevalent quickly in other remaining European countries[6, 7]. In addition, Iran as an Asian country announced that 43 cases admitted to hospital with the laboratory confirmation of this virus. 8 patients out of this 43 passed away from 19 February to 23 February 2020. Three exported patients with this virus were recognized in Iran and proposed an underlying burden of disease in this country more than that value identified by reported and confirmed cases. Therefore, a large epidemic in Iran could further fuel distribution of COVID-19 in all over the world [8, 9].

Since then the virus has caused huge lockdowns in these regions more or less and apparently there is still a long way to find a vaccine or a cure [10] [11]. According to WHO, at least 1,848,439 cases have been confirmed until now among which 117,217 deaths have been recorded and 213 countries are involved. These numbers are mounting up daily and supposedly the outbreak is going to spread further[4].

Despite the rising concerns about this global crisis, clinical data are yet to be thoroughly inclusive. Today, the therapeutic approaches and strategies concerning this infection are only assistant and supportive. Preventing and inhibiting this virus distribution is the first and best option right now. In deed, trying to reduce its transmission is just available weapon and a bulk of examinations is required on this virus [12].

The present study conducted and analysis on clinical characteristics and laboratory confirmations of the patients infected with covid-19 in a training hospital located in Tehran, Iran hopefully to offer insights in diagnosis, screening, possible treatment options and related outcomes of that matter.

2. MATERIAL AND METHOD

Participants: this study investigated the clinical characteristics of the patients infected with covid-19 in Rasool Akram hospital, Tehran, Iran. A large number of patients admitted to hospital with signs of acute respiratory syndrome caused by the new SARS-Covid-2 in February [13]. These signs included fever, cough, and fatigue, sputum production, headache, hemoptysis, diarrhea, dyspnea, and lymphopenia [14].

The nature of infection in human with SARS-Cov-2 was in correspondence of the interim guidance attributed to the World Health Organization [15]. Inclusion criteria considered those patients with infection confirmed by laboratory and their chest involvement confirmed by radiography. The procedure of data collection was consistent with the start of patients admitted with this virus in the hospital. For collecting data about Epidemiological and drug history, researchers took advantage of interview with each patient.

All patients were interviewed for collecting data and finding something that is important based on close contact with a patient infected by SARS-Cov-2 or a suspected patient. In order to collect the laboratory, radiography and CT scan results, a group of doctors who have been treating patients with SARS-Cov-2, gathered and reviewed the data collected by employing a standard case report form. However, due to shortness of time, a number of data were unavailable therefore the conclusion based on this study may not be extensible.

Laboratory confirmation and treatment: At the time of admission, specimens derived from patient' sputum and throat swab were collected in order to conduct a real time reverse transcription polymerase chain reaction (RT-PCR) test and find out confirmed SARS-Cov-2 cases. The findings of the present study were gained after 48-72 hours. Owing to shortage of PCR kits and predicting an epidemic situation in the future, Iranian medical doctors used the results of chest CT and positive reverse-transcription polymerase chain reaction (RT-PCR) equally. It was shown that chest CT indicates more sensitivity than RT-PCR for diagnosing COVID-19 and it would help early detection of the infection [3, 16, 17]. Laboratory tests consisted of a complete blood cell count, serum biochemistry and arterial oxygen pressure measurement at the beginning of admission into the hospital. Patients were interviewed to obtain data related to comorbidities and drug history. Treatment protocol included antibiotics, hydroxychloroquine, Kaletra, Oseltamivir, corticosteroids, nasal oxygen therapy and in end stage cases intubation. According to the latest protocol for treating COVID-29 patients in the hospitals in Iran, Ceftriaxone and Azithromycin for patients with pneumonia and Vancomycin, Imipenem and Azithromycin for patients suffering from acute respiratory distress syndrome and patients taken in the ICU, are considered as the antibiotics used in the hospitals.

Procedure of data analysis: medians and percentage values for all variables and patients were assessed in each category. All collected data has been analyzed with SPSS software, version 22.0.

Patient and public involvement: the present study had a retrospective design and it did not consider any patient in designing this examination, defining research questions, and employing instruments. Researchers did not requested patients to assist them in interpreting and writing the results.

3. RESULTS

Epidemiological characteristics: A time frame between March 5th and April 5th 2020 was selected to examine clinical features of 77 patients infected with COVID-19 confirmed by laboratory. With respect to age factor, the age of Fifteen (19.48%) participants was in the range of 19-40 years, thirty three (42.85%) were aged 41-65 years, one patient (1.29%) was aged less than 18 and twenty one (27.27%) patients were 66 years old and older. The median

of ages was 52. The male population was 48 (62.33%) and the female population was 29 (37.66%).

Clinical features: According to the interviews, a number of patients had coexisting factors, nineteen (28.35%) of whom had diabetes, eleven (16.41%) had cardiovascular problems, eighteen (26.86%) suffered from hypertension, one (1.49%) had liver disease, three (4.47%) had chronic lung disease, four (5.97%) had chronic kidney disease, two (2.98%) had hypothyroidism, three (4.47%) had nervous system disease, seven (10.44%) had obesity (based on BMI over 30), two (2.98%) had malignancies or immunological problems. Clinical findings showed that fifteen patients (19.48%) had a temperature equivalent or more than 37.8 Degree Celsius. After measuring respiratory rates among the patients, fifty eight (75.32%) had a respiratory rate between 12 and 25 breaths per minute whereas thirteen (16.88%) had a respiratory rate more than 25 breaths per minute. Heart rate measures for one (1.29%) patient was less than 59 beats per minute, fifty (64.93%) between 60 and 100 beats per minute and twenty two (28.57%) more than 100 beats per minute. Patients complained about symptoms as sore throat or dry throat (1.29%), myalgia (25.97%), rhinitis or recurrent sneezing (3.89%), headache (10.38%), nausea and vomiting (10.38%), diarrhea (6.49%), chest pain or chest discomfort (3.89%) and respirational distress or dyspnea (54.54%).

Table 1: Personal and clinical characteristics of 70 patients infected with covid19 related disease in Rasool Akram hospital, Tehran, Iran. Values are numbers unless stated otherwise

Characteristics	all patients (n=77)	patients admitted to the ICU	deceased patients
median age	52		
age groups			
≤18	1(1.29%)		
19-40	15(19.48%)		
41-65	33(42.85%)		
≥66	21(27.27%)		
Sex			
Male	48(62.33%)		
Female	29(37.66%)		
coexisting conditions			
Diabetes	19(28.35%)	5	4
Cardiovascular Problems	11 (16.41%)	6	5
Hypertension	18 (28.86%)	5	4
Liver disease	1 (1.49%)		
chronic lung disease	3 (4.47%)		
Chronic kidney disease	4 (5.97%)	1	0
Endocrine system disease	2 cases of hypothyroidism	2	2
Nervous system disease	3(4.47%)	1	1
obesity (based on BMI) over 30	7(10.44%)	1	1
Malignancies/Immunological Problems	2 (2.98%)		
patients deceased with comorbidities	11 (61.11%)		
clinical findings			
oral temperature ≥37.8 or shivers	15(19.48%)		
respiratory rate			
12≤ x ≤25	58(75.32%)		
≥25	13(16.88%)		
heart rate (entry rate)			
≤59	1(1.29%)		
60≤x≤100	50(64.93%)		
> 100	22(28.57%)		
sore throats or dry throat	1(1.29%)		
Myalgia	20(25.97%)		
rhinitis or recurrent sneezing	3(3.89%)		
Headache	8(10.38%)		
nausea and vomiting	8(10.38%)		
Diarrhea	5(6.49%)		
chest pain or chest discomfort	3(3.89%)		
respirational distress or dyspnea	42(54.54%)		

oxygen saturation (at room temperature)			
<90	19(24.67%)		
95≤x≤100	30(38.96%)		
Cough (dry or expectoration)	43(55.84%)		
Others (e.g. GI discomforts, shivers, loss of appetite, fatigue)	67(87.01%)		
time interval between onset of early symptoms and first hospital admission (days)			
<10days	37(48.05%)		
10≤x≤14	16(20.77%)		
>14	2(2.59%)		
percentages do not total 100% owing to missing data			

Other symptoms such as dry cough, shivers, loss of appetite, abdominal cramps, dizziness and fatigue were seen among sixty seven (87.01%) of the patients. With respect the time interval between the start of virus signs and first referring (as in days) to the hospital by patients, data revealed that that thirty seven of whom (48.05%) had gone to the hospital in less than 10 days, sixteen (20.77%) had gone to the hospital between 10 to 14 days and it took more than 14 days for two (2.59%) patients to do so.

When patients admitted to the hospital, care unit staffs took 8 blood cell out of 71 patients (11.26%) and confirmed leucopenia (white blood cell count $<4 \times 10^9/L$) and 11 out of 71 patients (15.49%) indicated lymphopenia (lymphocyte count $<1.0 \times 10^9/L$; table 2). The level of C - reactive protein was more than 10mg/L in 42 of the patients (59.15%) and in 4 (5.63%) patients its level was less than 10 mg/L. Lactate dehydrogenase levels in forty two (59.15%) patients were above 245 unit/L. Abnormalities observed on chest computed tomograms (CT-scans) or radiographs were seen in the patients' disease document. Fifty three (98.15%) participants indicated consolidation with ground glass opacities. Fifty two (96.29%) patients showed peripheral distribution. 83.33% showed pleural effusion on their scan results. Forty (74.07%) patients showed bilateral/ multi-lobar involvement. Rounded opacities was detected in 26 (48.15%) patients. In forty three (79.62%) patients lymphadenopathy was obvious and forty five (83.33%) patients had pleural effusion (table 2). According to the drug history of the patients, three (5.45%) patients were taking ACE inhibitors, eight (14.54%) patients were taking ARB inhibitors and twenty seven (49.09%) patients were taking other kinds of drugs such as Metformin. Among seventy two patients, twenty three (31.94%) patients suffered from acute respiratory distress syndrome after admission and twenty (27.77%) patients were taken in the intensive care unit (ICU) ultimately with a mean age of 60.8. Sixty eight (94.44%) patients received antibiotic therapy, sixty seven (93.05%) patients received antiviral therapy and hydroxychloroquine. Nasal oxygen therapy was given to sixty six (91.66%) patients and eighteen (25%) patients had to go through intubation. Out of seventy two patients, fifty four (75%) patients were discharged and eighteen (25%) deaths were recorded. It is important to notice that out of 18 deaths, 11 (61.11%) cases had comorbidities. Criteria for discharge include fever reduction for at least three days, observed improvement in chest radiography, and viral clearance in samples from the lower respiratory tract.

4. DISCUSSION

Iran reported 50468 cases infected with new corona virus rapidly since February 15th and the number of patients extended rapidly [18]. It was observed that large number of cases was not identified with severe symptoms due to the incubation period. Most of the patients were male and their age range in adult.

According to the data, comorbidities play a great role in making the disease more severe leading to ICU admission and death. The laboratory test indicated that patients were under the effect of mild illness. Many cases were admitted to the hospital in the early days of symptoms during the first 10 days.

A wide variety of antibiotics and antivirals were administered to the patients among which, antibiotics such as azithromycin, antivirals such as Oseltamivir and hydroxychloroquine were used to a more extent. It is noteworthy that most of the patients had to receive nasal oxygen therapy but the intubation rate was rather small. In results related to CT-scans and radiographs, it is notable that although symptoms in most of the patients are not quite severe, but the thoracic region is seriously involved and since Bilateral distribution of ground glass opacities (GGO) with or without consolidation in posterior and peripheral lungs is the cardinal hallmark of COVID-19, it shows that this virus is truly aggressive towards lungs and long term consequences appear to be a threat to the infected patients. Although RT-PCR is the best standard for a definitive diagnosis of COVID-19 infection, [19] the high false negative rate [5] and unavailability of RT-PCR assay in the onset of prevalence restricted prompt diagnosis of infected patients. Radiological investigation of thin slice chest CT has a significant role in opposing disease [20]. Given that the availability of the corona virus test kits in Iran are quite poor, therefore using CT-scans and radiographs is a promising way to diagnose the possibly infected patients in time. It should be mentioned that chest radiography cannot show the sensitivity in detecting ground-glass opacity (GGO) and may indicate normal results in the onset of infection [21]. Therefore, it is not suggested as the first option in imaging modality of COVID-19. However, bilateral multifocal consolidation can be observed in patients with severe symptoms and to some extent fused into massive consolidation with small pleural effusions.

5. CONCLUSION

In the process of controlling COVID-19 outbreak, early recognition and isolation of patients is important especially in those with false negative RT-PCR or without symptoms. Although bilateral GGO and consolidation are the predominant imaging characteristics in COVID-19, chest CT manifestations are various in different patients and stages. This paper collected data about laboratory findings, symptoms and the typical and atypical CT manifestations in Covid-19 confirmed patients and represented the related statistical data hopefully to inform and help practitioners to make the right diagnosis in time and to have a better perspective of what the world is dealing with currently.

6. LIMITATIONS OF THIS STUDY

This study has some limitations like other examinations. First, only 77 patients took part in this study while a large number of cases were continually being referred to the hospital as data were being collected. Then, data was collected on a short population of patients. Secondly, our study was performed in a hospital in Tehran and there might be different clinical characteristics among patients confirmed with Covid-19 in other cities. Thirdly, due to missing data, the numbers calculated are not total 100%. Finally, most patients had not been discharged while submitting the study. Therefore, this study is unable to estimate neither the case fatality rate nor the predictors of fatality.

Declaration of interest: None

7. REFERENCES

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