

ORIGINAL PAPER

THERAPY AREA: OTHER

Retrospective analysis of asymptomatic COVID-19 patients presenting to emergency department

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Abstract

Objective: In this study, we aimed to investigate the clinical and demographic characteristics of asymptomatic COVID-19 cases incidentally diagnosed at the emergency department.

Methodology: This study retrospectively analysed the medical data of patients who presented to the emergency department, between March 1 and May 1, 2020, without COVID-19 symptoms such as fever, cough, myalgia on admission but were incidentally detected to have thoracic computerised tomography (CT) findings suggestive of COVID-19. The patients' sociodemographic and epidemiological characteristics, laboratory test results, clinical and radiological findings, treatment protocols and prognoses were recorded.

Results: We incidentally diagnosed COVID-19 pneumonia in 81 asymptomatic patients. All patients presented to the emergency department with traumatic injuries. Of these, 38 (46%) were injured in in-vehicle traffic accidents; 27 (34%) out-of-vehicle traffic accidents; 14 (18%) simple falls; and 2 (2%) falls from a height. Only 42 (48%) patients had a history of suspected contact with a COVID-19 positive individual. The mean time to symptom onset of 81 patients was 5 ± 2 days. An analysis based on thoracic computerised tomography findings showed that the common finding found in all patients was ground glass opacity (GGO). While 55 (68%) patients had GGO alone, 10 (12%) had additional fine reticulations; 6 (7%) had an additional halo sign; 6 (7%) had an additional air bronchogram and 4 (5%) had an additional area of consolidation. None of the patients died during follow-up, and all of them were discharged.

Conclusion: Early identification and isolation of asymptomatic patients are of great importance for reducing the speed of propagation of the COVID-19 pandemic. Incidentally diagnosed cases have made us consider that there is a need to increase the number of screening tests. We also believe that healthcare staff should suspect COVID-19 pneumonia in every patient irrespective of presentation type, place importance on the use of personal protective equipment (PPE), and not examine any patient without wearing PPE.

1 | INTRODUCTION

The novel coronavirus disease (COVID-19) is a respiratory disorder first seen in Wuhan, China in December 2019. Since the report of the

first COVID-19 case at the end of 2019 in Wuhan, China, COVID-19 has rapidly spread, first to all regions of China and then to whole world.¹ The virus is spread via respiratory droplets between humans and has spread across the world in a short time, forcing WHO to

declare COVID-19 as a pandemic on 11 March 2020.² As a highly contagious disease, COVID-19 mainly manifests itself by fever, fatigue, dry cough, anorexia, myalgia, dyspnoea and sputum production.³ The exact incidence of asymptomatic COVID-19 infections remains unknown, and the so-called 'asymptomatic transmitters' have a major role in disease spread. Although the incidence of asymptomatic COVID-19 infections remains unclear, it has been considerably high in various studies. Almost all passengers of Diamond Princess Cruise Ship were screened for COVID-19 infection, and about 17% of the passengers tested positive. Among 634 patients with a positive test, 328 (almost half the number) were asymptomatic at the time of diagnosis.⁴ Another study similarly reported that 27 (56%) of 48 cases with a positive test were asymptomatic at the time of diagnosis, 24 of whom developed the disease symptoms within 1 week.⁵ Likewise, there are several reports in the literature stating that thoracic CT images may be suggestive of COVID-19 pneumonia in asymptomatic cases.^{6,7} Although the reverse transcription-polymerase chain reaction (RT-PCR) test is the gold standard for the diagnosis of COVID-19, its high false negativity rate inevitably leads to missed COVID-19 diagnoses particularly in asymptomatic cases, which contributes to disease spread and treatment delay.⁸ As the early identification and isolation of particularly the asymptomatic cases would reduce disease spread considerably, the clinicians should suspect COVID-19 in every patient and manage each case accordingly. After the identification of the first case in Turkey on 10th of March and the declaration of COVID-19 pandemic by the World Health Organization shortly thereafter, new regulations have been put into effect at Emergency Departments, which mandated the establishment of dedicated outpatient clinics for suspected COVID-19 cases and examination of them in a separate area from other urgent cases. Despite efforts aimed to make such a distinction between COVID-19 cases and others, some cases of COVID-19 pneumonia have been incidentally identified at other areas of the emergency departments not dedicated to COVID-19 patients. Hence, we aimed to investigate the clinical and demographic characteristics of asymptomatic COVID-19 cases that were incidentally diagnosed at our emergency department.

2 | METHODOLOGY

On 28 March 2020 a front triage system was established at the Emergency Department of Batman District State Hospital, and all patients presenting to the hospital have started to be evaluated first in that front triage since then. Patients with suspected COVID-19 have started to be examined at COVID-19 outpatient clinics that have been physically separate from the emergency department. Patients without suspicious symptoms such as fever, cough, myalgia, and sore throat have continued to be examined at the regular emergency department. Our study retrospectively reviewed the medical data of patients presenting to the emergency department between 1 March 2020 and 1 May 2020, who were asymptomatic (without suggestive symptoms such as fever, cough, myalgia) on admission

What's known

- First reported in Wuhan city, China and known to spread by droplets, the novel coronavirus disease (COVID-19) has spread globally, taking hold of the entire world.
- Apart from symptomatic cases presenting with symptoms like fever, dyspnoea, fatigue, dry cough, anorexia and myalgia, there is also an unknown number of asymptomatic cases (1).

What's new

- Incidentally diagnosed cases have suggested us to consider that there is a need for performing more screening tests; we also believe that healthcare staff should suspect COVID-19 pneumonia in every patient irrespective of the presentation type, place importance on the use of personal protective equipment (PPE), and not examine any patient without wearing PPE.
- For this purpose, it would be very beneficial to regularly remind all healthcare staff of the importance of PPE and the need for suspecting of COVID-19 disease in every patient in order to protect healthcare personnel from disease transmission.

but had incidentally detected thoracic computerised tomography findings suggestive of COVID-19 pneumonia, and a positive reverse transcription-polymerase chain reaction (RT-PCR) test. The patients' sociodemographic and epidemiological characteristics, laboratory parameters, clinical and radiological findings, treatment protocols, and prognoses were recorded. The disease course was recorded in three groups, namely Mild disease (no or mild pneumonia), Severe disease (eg with dyspnoea, hypoxia, or >50 percent lung involvement on imaging within 24-48 hours), Critical disease (eg with respiratory failure, shock or multiorgan dysfunction). Patients whose medical records could not be accessed via the hospital automation system and those younger than 18 years of age were excluded.

2.1 | Statistical analysis

IBM SPSS Statistics for Windows, Version 22.0 (Armonk, NY: IBM Corp.) software package was used to perform the statistical analyses of the study data. Normality of the distribution of the study data was analysed using Kolmogorov-Smirnov test. Descriptive statistics included mean \pm standard deviation for normally distributed variables and median (min-max) for non-normally distributed variables. Mann Whitney-U test was used to compare non-normally distributed quantitative variables, and independent samples t-test to compare normally distributed quantitative variables. Statistical significance was set at $P < .05$.

3 | RESULTS

A total of 9476 patients presented to the emergency department between 1 March 2020 and 1 May 2020. All of them were evaluated at the front triage and referred to the emergency department upon exclusion of COVID-19 infection. Among 13,476 patients who presented to the emergency department, 81 (0.4%) were incidentally found to have COVID-19 pneumonia but all of them were asymptomatic. The mean age of patients was 41.2 ± 13.7 years. 47 (58%) of them were male and 34 (42%) female. All patients presented to the emergency department with traumatic injuries, which included 38 (46%) patients injured in in-vehicle traffic accidents; 27 (34%) out-of-vehicle traffic accidents; 14 (18%) simple falls; and 2 (2%) falls from a height. Forty-two (52%) patients lacked a history of a suspected contact with COVID-19 whereas 39 (48%) patients had close relatives having a history of Umrah (religious visit to Mecca, Saudi Arabia) (Table 1). Sixty-four (79%) patients had mild disease, 17 (21%) had severe disease, but none had critical disease. Leukopenia and lymphopenia were observed in the severe disease group ($P < .01$). D-dimer and lactate dehydrogenase values were statistically significantly higher in the severe cases compared with the mild cases ($P < .01$), whereas albumin was low in the severe cases ($P < .01$) (Table 2). An analysis based on thoracic computerised tomography findings showed that the common finding found in all patients was the ground glass opacity (GGO). Fifty-five (68%) patients had GGO alone; 10 (12%) had additional fine reticulations; 6 (7%) had an additional halo sign; 6 (7%) had additional an air bronchogram and 4 (5%) had an additional area of consolidation. It was noted that the majority of lesions were bilateral and peripherally located. The lesions were bilaterally located in 43 (54%) patients and unilaterally located in 38 (46%) patients, of which 22 (58%) were located in the right lung and 16 (42%) in the left lung. Sixty-three (78%) patients had a peripheral lesion location, whereas 18 (22%) had centrally located lesions (Table 3). None of the patients needed Invasive mechanical ventilation and intensive care unit admission during their follow-up. Eleven patients were scheduled to undergo an orthopedic operation by the department of orthopedics. All patients received standard COVID-19 therapy (Hydroxychloroquine with or without Azithromycin). The duration of hospital stay was significantly longer

TABLE 1 Demographic characteristics and types of emergency department presentation

Number of patients (n)	81
Age (mean \pm SD)	41.2 ± 13.7
Male sex n (%)	47 (58%)
History of contact with COVID-19	42 (48%)
Type of emergency department presentation (%)	
In-vehicle traffic accident	38 (46%)
Out-of-vehicle traffic accident	27 (34%)
Simple fall	14 (18%)
Fall from a height	2 (2%)

TABLE 2 Comparison of the patients in the Mild disease and Severe disease groups with respect to their demographic characteristics and Laboratory findings of patients on admission to hospital

	Mild disease	Severe disease	P value
The number of patients (n)	64 (79%)	17 (21%)	<.01
Age (mean \pm SD)	38.1 ± 12.6	42.3 ± 12.5	.351
Male sex n (%)	38 (59%)	9 (52%)	.437
Duration of hospital stay	11 ± 5	21 ± 6	.01
White blood cell count, $\times 10^9/L$	6.8 (3.7-7.9)	11.0 (6.8-13.1)	<.01
Neutrophil count, $\times 10^9/L$	5.2 (3.0-6.9)	11.8 (6.0-12.3)	<.01
Lymphocyte count, $\times 10^9/L$	1.1 (0.8-1.2)	0.5 (0.2-0.9)	<.01
Platelet count, $\times 10^9/L$	152 (143-249)	189 (154-271)	.39
Prothrombin time, s	10.2 (9.1-12.3)	12.7 (10.1-13.8)	.014
Activated partial thromboplastin time, s	26.9 (23.5-35.2)	26.5 (22.2-33.1)	.53
D-dimer, mg/L	0.4 (0.3-0.7)	2.9 (0.9-13.8)	<.01
Lactate dehydrogenase, U/L	292 (245-361)	397 (331-564)	<.01
Albumin, g/L	33.6 (29.1-37.2)	26.8 (25.1-31.2)	<.01
Alanine aminotransferase, U/L	29 (18.3-39.2)	38.9 (28.5-91.3)	.41
Aspartate aminotransferase, U/L	32.3 (26.6-39.7)	39.1 (29.8-61.7)	.23
Total bilirubin, mmol/L	11.6 (10.1-12.8)	13.9 (10.2-31.4)	.08
Creatinine, $\mu\text{mol/L}$	68.2 (55.8-74.6)	74.7 (56.0-81.2)	.71

in the severe cases than the mild cases ($P = .01$). None of the patients died during follow-up, and all of them were discharged.

4 | DISCUSSION

COVID-19 pneumonia was first seen in Wuhan, China in December 2019 and has spread all over the world since then, becoming a global health crisis. There are currently more than 7 million COVID-19 patients worldwide. As much as 30%-60% of these patients are asymptomatic or mildly symptomatic.⁸ Our hospital established a front triage system on 28 March 2020 to physically separate patients with suspected COVID-19 and other patients and to examine the two groups in separate areas. By means of this triage system, patients with symptoms of COVID-19 infection, such as fever, cough, dyspnoea, myalgia and others, have been referred to COVID-19 outpatient clinics that

TABLE 3 Tomographic findings in asymptomatic COVID-19 patients

Characteristics	The number of patients n (%)
Pure GGO	55 (68%)
GGO + fine reticulation	10 (12%)
GGO + halo sign	6 (7%)
GGO + air bronchogram	6 (7%)
GGO + consolidation	4 (5%)
Distribution	
Unilateral	38 (46%)
Right-sided	22 (58%)
Left-sided	16 (42%)
Bilateral	43 (54%)
Transverse distribution	
Peripheral	63 (78%)
Central	18 (22%)

are physically separate areas from the emergency department. During that period, incidentally identified COVID-19 pneumonia cases have called our attention so that we decided to analyse the medical records of such asymptomatic cases who presented to the emergency department between 1 March 2020 and 1 April 2020. Among 9476 patients who presented to the emergency department in that 1-month period, 41 (0.4%) were incidentally found to have COVID-19 pneumonia. As the patients presented with traumatic injuries, a thoracic computerised tomography was taken, which enabled early diagnosis and isolation of COVID-19 cases by showing typical signs of COVID-19. There are no sufficient literature data as to the contagiousness and prevalence of asymptomatic cases.^{6,9} Early detection and isolation of asymptomatic cases is an important strategy especially for COVID-19 disease and other diseases that are spread by respiratory droplets. Isolation of asymptomatic carriers would be directly responsible for a reduction in the speed of the disease propagation. On the other hand, a failure to take adequate patient anamnesis as a result of emergency department overcrowding and a failure to suspect of the COVID-19 disease in trauma patients due to presentation type would result in non-compensable consequences. In the light of our experiences, we believe that every patient presenting to hospitals should be suspected to have COVID-19, and health personnel should avoid contact with any patient without wearing personal protective equipment (PPE). In order to maintain the high level of protective measures taken in the first days of the pandemic, hospital management should regularly inform healthcare staff about the importance of wearing PPE and maintaining a high degree of suspicion for COVID-19 in every patient they encounter.

5 | CONCLUSION

Early identification and isolation of asymptomatic COVID-19 cases have an important role for reducing the rate of disease propagation

of the COVID-19 pandemic. Incidentally diagnosed cases have made us think that a greater number of COVID-19 tests need to be done. We also believe that healthcare staff should suspect COVID-19 pneumonia in every patient irrespective of the type of presentation, place importance on the use of personal protective equipment (PPE), and not examine any patient without wearing PPE. We are also of the opinion that during the pandemic, healthcare staff should be regularly informed by hospital managements about the importance of wearing PPE and assuming every patient as COVID-19 positive.

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DISCLOSURE

The authors have declared no conflicts of interest for this article.

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