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Analysis of emergency department admissions of a chest diseases hospital during the early period of SARS-CoV-2 outbreak

Yasemin Söyler, Feza Uğurman

ORCID:
Yasemin Söyler: 0000-0002-0507-0767
Feza Uğurman: 0000-0001-9267-8326

Abstract:

BACKGROUND AND AIM: COVID-19 shares similarities with lung diseases and causie difficulties in the management. The aim of this study is to describe demographic, clinical, laboratory, and radiological characteristics of patients who admitted to the emergency department (ED) of a chest diseases hospital and how we managed these patients.

MATERIALS AND METHODS: ED admissions from March 11, 2020, to May 11, 2020 were retrospectively evaluated. Patients were divided into two groups as probable COVID-19 (P-COVID-19) and non-COVID-19. The data were analyzed and compared.

RESULTS: A total of 223 patients, of which 31.8% were P-COVID-19 and 68.2% were non-COVID-19, were included. The mean age was 49.14 ± 18.05 years in P-COVID-19 group and 59.17 ± 17.32 years in non-COVID-19 group ($P < 0.001$). The most common symptoms in all patients were dyspnea (26.5%) and cough (21.1%). In P-COVID-19 group, cough, dyspnea, and fever were the most common symptoms, and the presence of fever was statistically significantly higher ($P = 0.03$). Increased C-reactive protein, sedimentation, and D-dimer levels were observed in 61.5%, 70.9%, and 52.6% of patients, respectively. Laboratory findings showed no significant differences between two groups. All patients underwent chest X-ray examination and 42.6% of them had pathological findings. 56.3% of P-COVID-19 patients had normal chest X-rays. Bilateral involvement on HRCT was more frequent in P-COVID-19 group than non-COVID-19 group (47.8% vs. 36.7%, $P < 0.001$). The presence of ground-glass opacity (GGO) was statistically significantly higher in P-COVID-19 group ($P < 0.001$).

CONCLUSIONS: The presence of fever and GGO with bilateral involvement on HRCT could be used for the early detection and triage of suspected patients in ED.

Keywords:

COVID-19, emergency department, ground-glass opacity, severe acute respiratory syndrome-coronavirus-2 outbreak, triage decision

Clinic of Chest Diseases, Ataturk Chest Diseases and Thoracic Surgery Training and Research Hospital, Health Sciences University, Ankara, Turkey

Address for correspondence:
Dr. Yasemin Söyler, Pınarbaşı Mah, Sanatoryum Caddesi, Keçiören 06280, Ankara, Turkey.
E-mail: dryaseminsoyler@gmail.com

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Introduction

Coronaviruses (CoVs) have been identified as human pathogens in the 1960s, and several outbreaks have been seen in recent years related to CoV such as the severe acute respiratory syndrome (SARS) in 2003 and the Middle East Respiratory Syndrome in 2012.[1] When these outbreaks had almost been forgotten, a previous unknown CoV disease, currently named as CoV disease 2019 (COVID-19), caused by the newly described SARS-CoV-2 (SARS-CoV-2) has emerged.[2] On December 31, 2019, the first human cases of pneumonia of unknown etiology were documented in Wuhan, China, and with each passing day, more cases were detected worldwide. When there were more than 118,000 new cases and over 4200 deaths in 114 countries, the World Health Organization declared COVID-19 as a global pandemic on March 11, 2020.[3] On similar days, the first COVID-19 case was detected in our country, and there were more than 5,263.500 confirmed cases and 47.500 deaths so far.[4]

COVID-19 manifests with a wide clinical spectrum ranging from asymptomatic patients to severe ill patients including septic shock and multi organ dysfunction. The most common symptoms include fever, cough, and tiredness/weakness, whereas respiratory distress and chest pain are infrequent but important symptoms.[5] COVID-19 shares some similar clinical, radiological, and laboratory characteristics with pulmonary viral/bacterial infections and some lung diseases.[6,7] Due to these similarities, managing the differential diagnosis procedure and triage of patients under quarantine rules is important for preventing transmission between patients and maintaining routine health-care systems. In this study, we reviewed emergency department (ED) admissions during the early period of SARS-CoV-2 outbreak in a chest diseases hospital and stated which factors might be valuable in triage decision.

Materials and Methods

Study design and population

We designed an observational study. Patients who were admitted to ED from March 11, when the first case was confirmed in our country, to May 11, 2020, were evaluated retrospectively. According to the guidelines, patients with at least one of the signs and symptoms of fever or acute respiratory disease (difficulty of breath and cough), and if the diagnosis of COVID-19 cannot be ruled out with the current clinical presentation, and a history of coming abroad within 14 days before the onset of symptoms or a close contact with the confirmed COVID-19 patient, classified as possible cases. The possible case definition was changed about 2 weeks later and all those with difficulty of breath or cough and fever were accepted as possible cases.[8] After initial assessment in ED if any of patients met the definition of a possible case, they were transferred to isolated departments in the hospital and real-time reverse transcription polymerase chain reaction (RT-PCR) tests of nasopharyngeal swab specimen were performed. Their corona-specific treatments were initiated in line with our local guidelines.[9] Patients with only extra-pulmonary symptoms or irrelevant conditions and patients who were under 18 years old were excluded from the study. The rest of the patients with lung diseases were accepted as non-COVID-19 patients.

Data collection

To obtain data, electronic medical record system of our hospital and Public Health Management Systems were used. We collected patients' demographic (age, sex, and comorbidities), clinical, laboratory (complete blood count, serum biochemistry, erythrocyte sedimentation rate [ESR], C-reactive protein [CRP], D-dimer, lactate dehydrogenase [LDH], aspartate aminotransferase [AST], alanine aminotransferase [ALT]) and radiographic (chest X-ray and high-resolution chest tomography [HRCT], if necessary) data on admission. Laboratory findings were evaluated according to the normal ranges of our hospital's laboratory values and <1000 lymphocytes/μL was defined as lymphopenia. The final decision of all patients after initial assessment (discharge or hospitalization) and RT-PCR test results was recorded.

Finally, a total of 223 patients were enrolled into the study and they were grouped as P-COVID-19 and non-COVID-19.[8] Their data analyzed and compared.

This study has been approved by both the Institutional Ethics Committee with the number May 25, 2020/675 and the Republic of Turkey, Ministry of Health with the number 2020-05-25T14_34_05. Written informed consent was waived because of the retrospective nature of the study.

Statistical analyses

All statistical evaluations were performed through the Statistical Package for the Social Sciences, software version 15 for Windows (SPSS Inc., Chicago, IL, USA). Demographic features of the study were analyzed with the descriptive statistics. The data were expressed as mean ± standard deviation or percentage. The Chi-square tests were used for nonparametric analyses between the groups. Parametric variables were analyzed by the Student's *t*-test. Any $P < 0.05$ was considered statistically significant.

Results

Demographic and clinical characteristics

A total of 223 patients (138 males, 85 females, mean age 55.98 ± 18.13 years) were included in the study, of

which 71 (31.8%) were P-COVID-19 and 152 (68.2%) were non-COVID-19. The mean age of P-COVID-19 group was 49.14 ± 18.05 years, whereas the mean age of non-COVID-19 group was 59.17 ± 17.32 years ($P < 0,001$). Sex distribution (male/female) was 44/27 in P-COVID-19 group and 94/58 in non-COVID-19 group. A majority of all patients (68.2%), (49.2% of P-COVID-19 patients and 76.9% of non-COVID-19 patients) had one or more comorbidities including cardiac pathologies, neurological diseases, diabetes mellitus, hypertension, chronic renal failure, thyroid pathologies, and malignancies. In total, 33.1% of patients had multiple comorbidities (28.1% of P-COVID-19 patients and 35.5% of non-COVID-19 patients, $P = 0.003$). Chronic obstructive pulmonary disease (COPD), asthma, lung cancer, pulmonary thromboembolism, and idiopathic pulmonary fibrosis (IPF) were the most common underlying diseases in non-COVID-19 group. After initial assessment, while 26.8% of P-COVID-19 patients were hospitalized in the quarantined services for waiting RT-PCR test results and treatment, 27.6% of non-COVID-19 patients were transferred to standard services for further examination and treatment (p = 0.21).

The most common symptoms on admission in all patients were dyspnea (26.5%), followed by cough (21.1%). The symptom distribution of two group was significantly different between two groups (p = 0.014). In P-COVID-19 group, cough, dyspnea, and fever were the most common symptoms, respectively. In non-COVID-19 group, dyspnea, cough, and chest pain were the most common symptoms, respectively. Among P-COVID-19 patients, 7% of them admitted to ED with fever alone, which was significantly higher than non-COVID-19 patients ($P = 0.03$). Among non-COVID-19 patients, 30.2% of them admitted to ED with dyspnea alone, which was significantly higher than P-COVID-19 patients ($P = 0.002$). Chest pain was significantly higher in non-COVID 19 patients (p =0.04). Tiredness/weakness was similar between two groups (p = 0.2). The baseline characteristics and symptoms of all patients are shown in Table 1.

Laboratory findings

We analyzed complete blood count, serum biochemistry (creatinine, LDH, ALT, and AST), ESR, CRP, and D-dimer. Among all study groups, 45.2% of patients had increased white blood cell (WBC) count, whereas 12.3% of patients had lymphopenia. Lymphopenia was observed in 9.3% of P-COVID-19 patients ($P = 0.39$). Serum ALT and AST levels were increased in 18.3% and 11.3% of patients, respectively. Among all patients, 33% of them had increased LDH levels. Increased CRP levels, ESR levels, and D-dimer levels were observed in 61.5%, 70.9%, and 52.6% of patients, respectively, and there were no significant differences between two groups ($P = 0.21$, 0.12, and 0.33, respectively). The details of laboratory parameters are shown in Table 2.

Radiological findings

On ED admission, all patients underwent chest X-ray examination and 42.6% of them had pathological findings (consolidation, asymmetric opacity, atelectasis, nodule/mass, and pleural effusion). The mean age was 66.1 ± 14 in patients with abnormal chest X-ray and it was 48.4 ± 16.6 in patients with normal chest X-ray with significance ($P < 0.001$). According to sex, 41.1% of female patients and 43.4% of male patients had abnormal chest X-ray ($P = 0.78$). In total, 55.9% of patients with comorbidities had abnormal chest X-ray, which was significantly higher than patients without comorbidities (55.9% vs. 14%, $P < 0,001$). The frequency of RT-PCR test was 32.6% in abnormal chest X-ray group, it was 31.2% in normal chest X-ray group without significance ($P = 0.88$). From the another point of view, 56.3% of P-COVID-19 patients had normal chest X-rays. Chest X-ray findings were also compared with various laboratory parameters. WBC, neutrophil count, CRP, D-dimer and LDH were higher in abnormal chest X-ray group with significance ($P < 0.01$, 0.002, <0.01, <0.01, and 0.001, respectively). There was also no relationship between hospitalization and chest X-ray findings ($P = 0.08$).

HRCT was performed in 42.6% ($n = 95$) of all patients. Of them, 31.3% ($n = 70$) patients had pathologic findings. Bilateral involvement was observed in 42.1% ($n = 40$) of patients and more frequent in P-COVID-19 group than non-COVID-19 group with significance (47.8% vs. 36.7%, $P < 0.001$). The most common pathological findings were ground-glass opacity (GGO) ($n = 10$, 21.7%), consolidation ($n = 10$, 21.7%) and combination of GGO and consolidation ($n = 8$, 17.3%) in P-COVID-19 group and consolidation ($n = 11$, 22.4%) and mediastinal lymphadenopathy enlargement ($n = 6$, 12.2%) in non-COVID-19 group [Figure 1 and Table 3]. The presence of GGO was significantly higher in P-COVID-19 group ($P = 0.03$). Pleural effusion was accompanied by other findings in ten patients.

Discussion

COVID-19 is a novel disease. Full clinical spectrum of COVID-19 is unknown yet and patients also may not always have typical features, especially in the presence of concomitant pulmonary pathologies. In addition, there are some difficulties in the management of patients, especially in specific branch hospitals, due to the clinical, laboratory and radiological similarities between COVID-19 and lung diseases.

In this study, we reported the demographic, clinical, laboratory, and radiological characteristics of 223 patients,

Table 1: The baseline characteristics and symptoms of patients on emergency department admission

Characteristics	All patients, *n* (%)	P-COVID-19 group, *n* (%)	Non-COVID-19 group, *n* (%)	*P*
Age (years±SD)	55.98±18.13	49.14±18.05	59.17±17.32	0.001 *
Sex (male/female)	138/85	44/27	94/58	0.98 *
Comorbidity	152 (68.2)	35 (49.2)	117 (76.9)	<0.001*
Hospitalization	61 (27.3)	19 (26.8)	42 (27.6)	0.21 *
Symptoms				
Dyspnea	56 (26.5)	13 (18.3)	46 (30.2)	0.002 *
Cough	47 (21.1)	19 (26.7)	28 (18.4)	0.47 *
Fever	8 (3.6)	5 (7)	3 (1.9)	0.03 *
Tiredness/weakness	10 (4.5)	5 (7)	5 (3.2)	0.20 **
Chest pain	27 (12.1%)	5 (5.6%)	23 (15.1%)	0.04 *
Chest pain+ Dyspnea	12 (5.4%)	2 (2.8%)	10 (6.5%)	0.04 *
Gastrointestinal symptoms (+ respiratory symptoms)	9 (4)	3 (4.2)	6 (3.9)	0.92 **
Dyspnea + chest pain	12 (5.4)	2 (2.8)	10 (6.5)	0.04 *
Dyspnea, cough, fever†	56 (25.1)	17 (23.9)	39 (25.6)	0.78 *
Sore throat	7 (3.1)	5 (7)	2 (1.3)	0.03 *
Total patients (*n*)	223	71	152	

†Combination of two and/or more symptoms. P-COVID-19: Possible COVID-19, SD: Standard deviation, Data are expressed as n (%). Pearson Chi-square test (*) and Fisher's Exact test (**) were applied for data analysis. p < 0.05 is significant

Table 2: Laboratory findings of patients on emergency department admission

Laboratory findings	Normal range	All patients	P-COVID-19 group	Non-COVID-19 group	*P*
WBC (×10^9/L)	4.5-12.6	9.9±6	10.8±9.4	9.6±3.6	0.18
Lymphocyte count (×10^9/L)	1.2-3.3	2.5±4.7	3.1±8.3	2.1±1.3	0.16
Neutrophil count, (×10^9/L)	2.1-8.8	6.9±9.6	8.1±16.3	6.3±3.5	0.19
LDH (U/L)	0-250	243±120	222.2±87.5	255.8±136	0.16
CRP (mg/L)	0-5	39.2±65.2	43.2±73.7	37.4±61.4	0.21
ESH (mm/L)	0-20	42±31.1	51±35.1	33.6±25	0.12
D-dimer (mg/L)	0-0.5	1.45±1.9	1.6±2.5	1.3±1.3	0.33
Total patients (*n*)		223	71	152	

†There was no significant difference between P-COVID-19 group and non-COVID-19 group. P-COVID-19: Possible COVID-19, WBC: White blood cell, LDH: Lactate dehydrogenase, CRP: C-reactive protein, ESH: Erythrocyte sedimentation rate, The data were expressed as mean ± standard deviation. *Student T-test was applied for data analysis. p < 0.05 is significant. There was no significant difference between P-COVID-19 group and non-COVID-19 group.

Table 3: Radiological findings of patients on emergency department admission

Radiological findings	All patients, *n* (%)	P-COVID-19 group, *n* (%)	Non-COVID-19 group, *n* (%)	*P*
Chest X-ray	223	71	152	
Normal	128 (57.4)	40 (56.4)	88 (27.9)	0.827
Abnormal	95 (42.6)	31 (43.6)	64 (42.1)	
HRCT	95	46	49	
GGO	37 (38.9%)	23 (50%)	14 (28.6%)	0.032
Consolidation	44 (46.3%)	22 (47.8%)	22 (44.9%)	0.775
LNE	23 (24.2%)	7 (15.2 %)	16 (32.7%)	0.047
HRCT	95	46	49	
Normal	25 (11.2)	11 (23.9)	14 (28.5)	
GGO	14 (6.3)	10 (21.7)	4 (8.2)	
Consolidation	21 (9.4)	10 (21.7)	11 (22.4)	
LNE	7 (3.1)	1 (2.1)	6 (12.2)	
GGO + consolidation	12 (5.4)	8 (17.3)	4 (8.2)	
GGO + LNE	5 (2.2)	2 (4.3)	3 (6.1)	
Consolidation + LNE	6 (2.7)	2 (4.3)	4 (8.2)	
GGO + LNE + consolidation	5 (2.2)	2 (4.3)	3 (6.1)	
Laterality on HRCT	95	46	49	
Bilateral involvement	40 (42.1%)	22 (47.8%)	18 (36.7%)	< 0.001
Unilateral involvement	30 (31.5)	13 (28.2)	17 (34.6)	
Total patients (*n*)	223	71	152	

P-COVID-19: Possible COVID-19, HRCT: High resolution computed tomography, GGO: Ground glass opacity, LNE: Lymph node enlargement, Data are expressed as n (%). *Pearson Chi-square test was applied for data analysis. p < 0.05 is significant

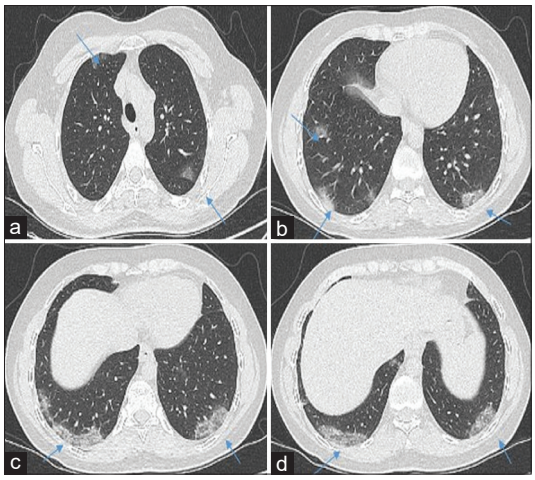

Figure 1: A 37-year-old possible COVID-19 patient presenting with fever and weakness. reverse transcription polymerase chain reaction test was confirmed as positive 24 h after emergency department admission. The high resolution computed tomography axial images show bilateral, multiple patchy areas of pure ground glass opacities in peripheral lung fields (arrows)

and to our knowledge, this is a pioneer study which is related with patients in ED of a chest diseases hospital during the early period of SARS-CoV-2 outbreak. Our findings are essential for the proper management in ED by emphasizing suspected COVID-19 patients with respiratory symptoms and their specific clinical characteristics.

Patients of all age groups can be infected with SARS-CoV-2, although the prevalence of lung diseases such as COPD, lung cancer, or IPF increases with age.[10-13] In accordance with these results, we also found that non-COVID-19 patients were older than P-COVID-19 patients. Male sex is a risk factor for both severe COVID-19 and lung diseases.[11-14] The male predominance in ED admissions in our study can be explained by these findings. According to previous studies, comorbidities were highly prevalent in severe COVID-19 patients and also patients with lung diseases.[15,16] Our study showed similar results with previous studies and this is suggesting that the prevalence of comorbidity might be a risk factor for ED admission.

The main symptoms were also similar between two groups and dyspnea and cough were the most common symptoms, as expected. Unfortunately, these conditions pose challenges for triage of our patients. Hence, finding out some reliable tools for the management in ED is very important. Although cough was the most common symptom in P-COVID-19 group, the presence of fever was significantly higher than non-COVID-19 group, consistent with previous studies.[17-19] This indicates that fever is a significant predictive factor for COVID-19 and helps early and rapid triage on admission. However, the absence of fever in COVID-19 is also frequent and afebrile patients may be misdiagnosed, if we focus on only fever.[19]

While previous studies have reported that total lymphocytes decreased in COVID-19 patients, lymphopenia was observed in a small number of patients and there was no significant difference between two groups in our study.[10,19,20] In addition, even with no statistically significance, many patients had increased CRP levels, ESR levels, and D-dimer levels in agreement with the literature.[21] Of note, laboratory parameters might not be reliable indicators of COVID-19 and seem inadequate for the differential diagnosis alone. In a previous study, they have reported that there was no radiographic or computed tomography abnormality in some cases.[19,22] In our study, more than half of RT-PCR tests were performed on P-COVID-19 patients with normal chest X-ray. In addition, chest X-ray abnormalities were more common in older patients and in patients with comorbidity, as expected. Hence, chest X-ray might not be a useful test for triage decision in ED. COVID-19 has also various radiological findings at different stages. At early stages, HRCT findings may be normal, but GGO is a dominant finding. HRCT shows mainly GGO and consolidation at later stages.[21-23] Bilateral involvement is also a typical finding in COVID-19.[22,24] In our study, we also found that the presence of GGO and bilateral involvement was significantly frequent in P-COVID-19 group. In concert with previous studies, HRCT might be more valuable in the diagnostic procedure.[25-27]

Conclusion

An early, rapid, comprehensive triage and management plays a critical role during an ongoing outbreak. Based on our study, the presence of fever and GGO with bilateral involvement on HRCT could be used for the early detection and triage of suspected patients in ED. In conclusion, this strategy helps to prevent transmission between patients and to perform diagnosis and treatment processes rapidly. We believe that further studies are warranted to develop new triage strategies and hope that our study will help on future researches.

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Conflicts of interest
There are no conflicts of interest.

References

1. Valencia DN. Brief review on COVID-19: The 2020 pandemic caused by SARS-CoV2. Cureus 2020;12:e7386.
2. World Health Organization. Naming the Coronavirus Disease (COVID-19) and the Virus that Causes It. Available from: https://www.who.int/emergencies/diseases/novel-

coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it. [Last accessed on 2020 Jul 19].
3. World Health Organization. WHO Director-General's Remarks at the Media Briefing on COVID-19; March 11, 2020. Available from: https://www.who.int/dg/speeches/detail/who-director-general-sopening-remarks-at-the-media-briefing-on-covid-19---11-march-2020. [Last accessed on 2020 Apr 10].
4. The Republic of Turkey Ministry of Health COVID-19 Daily Situation Report, June 02, 2021 Available from: URL: https://covid19.saglik.gov.tr/TR-66935/genel-koronavirus-tablosu.html. [Last accessed on 2021 June 02].
5. World Health Organization. Q and A on Coronaviruses. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answershub/q-a-detail/q-a-coronaviruses#:~:text=symptoms. [Last accessed on 2021 Oct 5].
6. Zhao D, Yao F, Wang L, Zheng L, Gao Y, Ye J, *et al*. A comparative study on the clinical features of coronavirus 2019 (COVID-19) pneumonia with other pneumonias. Clin Infect Dis 2020;71:756-61.
7. Chen H, Ai L, Lu H, Li H. Clinical and imaging features of COVID-19. Radiol Infect Dis 2020;7:43-50.
8. T.C. Sağlık Bakanlığı Halk Sağlığı Genel Müdürlüğü: COVID-19 (SARS-CoV-2 ENFEKSİYONU) REHBERİ. Bilim Kurulu Çalışması, T.C. Sağlık Bakanlığı 23 Mart, Ankara; 2020.
9. T.C. Sağlık Bakanlığı Halk Sağlığı Genel Müdürlüğü: COVID-19 (SARS-CoV-2 ENFEKSİYONU) ERİŞKİN HASTA REHBERİ. Bilim Kurulu Çalışması, T.C. Sağlık Bakanlığı 12 Ekim, Ankara; 2020.
10. Zhu W, Xie K, Lu H, Xu L, Zhou S, Fang S. Initial clinical features of suspected coronavirus disease 2019 in two emergency departments outside of Hubei, China. J Med Virol 2020;92(9):1525-1532. [doi: 10.1002/jmv. 25763].
11. Jin JM, Bai P, He W, Wu F, Liu XF, Han DM, *et al.* Gender differences in patients with COVID-19: Focus on severity and mortality. Front Public Health 2020;8:152.
12. Raherison C, Girodet PO. Epidemiology of COPD. Eur Respir Rev 2009;18:213-21.
13. George PM, Wells AU, Jenkins RG. Pulmonary fibrosis and COVID-19: The potential role for antifibrotic therapy. Lancet Respir Med 2020;8:807-15.
14. Alkhouli M, Nanjundappa A, Annie F, Bates MC, Bhatt DL. Sex differences in case fatality rate of COVID-19: Insights from a multinational registry. Mayo Clin Proc 2020;95:1613-20.
15. Richardson S, Hirsch JS, Narasimhan M, Crawford JM, McGinn T, Davidson KW, *et al.* Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized With COVID-19 in the New York City Area. JAMA 2020;323:2052-9.
16. Germini F, Veronese G, Marcucci M, Coen D, Ardemagni D, Montano N, *et al.* COPD exacerbations in the emergency department: Epidemiology and related costs. A retrospective cohort multicentre study from the Italian Society of Emergency Medicine (SIMEU). Eur J Intern Med 2018;51:74-9.
17. Singhal T. A review of coronavirus disease-2019 (COVID-19). Indian J Pediatr 2020;87:281-6.
18. Yang S, Shi Y, Lu H, Xu J, Li F, Qian Z, *et al.* Clinical and CT features of early stage patients with COVID-19: A retrospective analysis of imported cases in Shanghai, China. Eur Respir J 2020;30;55(4):2000407.
19. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, *et al.* Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med 2020;382:1708-20.
20. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, *et al.* Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 2020;395:497-506.
21. Xiong Y, Sun D, Liu Y, Fan Y, Zhao L, Li X, *et al*. Clinical and high-resolution CT features of the COVID-19 infection: Comparison of the initial and follow-up changes. Invest Radiol 2020;55:332-9.
22. Siordia JJ. Epidemiology and clinical features of COVID-19: A review of current literature. J Clin Virol 2020;127:104357.
23. Li M, Lei P, Zeng B, Li Z, Yu P, Fan B, *et al.* Coronavirus Disease (COVID-19): Spectrum of CT Findings and Temporal Progression of the Disease. Acad Radiol 2020;27:603-8.
24. Liu J, Zheng X, Tong Q, Li W, Wang B, Sutter K, *et al.* Overlapping and discrete aspects of the pathology and pathogenesis of the emerging human pathogenic coronaviruses SARS-CoV, MERS-CoV, and 2019-nCoV. J Med Virol 2020;92:491-4.
25. Yang W, Cao Q, Qin L, Wang X, Cheng Z, Pan A, *et al.* Clinical characteristics and imaging manifestations of the 2019 novel coronavirus disease (COVID-19): A multi-center study in Wenzhou city, Zhejiang, China. J Infect 2020;80:388-93.
26. Ai T, Yang Z, Hou H, Zhan C, Chen C, Lv W, *et al.* Correlation of chest CT and RT-PCR testing for coronavirus disease 2019 (COVID-19) in China: A report of 1014 cases. Radiology 2020;296:E32-40.
27. Fang Y, Zhang H, Xie J, Lin M, Ying L, Pang P, *et al.* Sensitivity of chest CT for COVID-19: Comparison to RT-PCR. Radiology 2020;296:E115-7.