


How to Deal with COVID-19 Pandemic: A Radiologic Approach

Naciye Sinem Gezer 

Department of Radiology, Dokuz Eylül University School of Medicine, İzmir, Turkey

Cite this article as: Gezer NS. How to deal with COVID-19 pandemic: Radiological approach. Turk Thorac J 2020; 21(3): 219-20.

Received: 31.03.2020

Accepted: 01.04.2020

Available Online Date: 16.04.2020

Dear Editor,

Coronavirus disease (COVID-19) is a newly emerging respiratory disease of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) origin, which was first identified in 2019 in Wuhan, the capital of China's Hubei province, and has since spread worldwide. The World Health Organization (WHO) declared the outbreak to be a Public Health Emergency of International Concern and recognized it as a pandemic on 11 March [1, 2]. The total number of COVID-19 cases is not known mainly due to limited testing, but it is certain that the total number of COVID-19 cases is higher than the number of known confirmed cases.

The standard diagnostic method of testing for COVID-19 is real-time reverse transcription polymerase chain reaction (RT-PCR) test which is very specific but has a lower sensitivity of 65-95% [3, 4]. This means that the test can be negative even when the patient is infected. Another problem is that there is a waiting period of up to 2 days for the test result to be available. Since everyday large numbers of patients with infection or suspected infection apply to the hospitals, adequate testing capacity for SARS-CoV-2 is lacking worldwide.

Role of radiologists is indispensable in the management of COVID-19. Although chest computed tomography (CT) has been excluded from COVID-19 diagnostic criteria, it contributes to the early detection of lung abnormality, suggestion of disease severity and possible co-infection in hospitalized patients. Also, physicians appear to be applying to CT to decide whether to perform testing in cases where RT-PCR testing is difficult to provide [4]. Chest CT can also help rectifying false negatives obtained from RT-PCR test during early stages of disease development [4]. But it should always be kept in mind that CT findings may also be normal in 2-4 days after the onset of the symptoms. Additionally, the findings on chest imaging in COVID-19 are not specific and overlap with other infections. Based on these concerns, the American College of Radiology recommends that "CT should not be used to screen for or as a first-line test to diagnose COVID-19 [5]. Considering the growing population of people undergoing CT scans in a pandemic, health risk to an individual from exposure to radiation should be considered and unnecessary CT exams should be avoided. Low dose chest CT may be the choice especially in young patients who has suspicious findings for COVID-19 and for follow-up in patients diagnosed with COVID-19.

In the literature, typical CT findings frequently seen in COVID-19 pneumonia and the change of these findings over time in the course of the disease are well described. In fact, what is expected from the radiologist should be to tell how much radiological findings are similar to COVID-19 pneumonia. The exclusion of other diseases such as organized pneumonia, other viral pneumonias such as influenza, drug toxicity, connective tissue diseases with similar findings can only be made by the consultant physician.

Pneumonia is classified as community-acquired or hospital-acquired, based on different microbial causes and patient factors, which need different management strategies. In the case of a pandemic, both radiological and clinical approaches should be specific to suspected patients and the microorganism. In such a period, all decisions should be made by considering pandemic. The workflow in the radiology departments should be planned according to the existing facilities, again considering that there is a pandemic. Solutions that can meet excessive demand must be produced. For this reason, it is

Address for Correspondence: Naciye Sinem Gezer Department of Radiology, Dokuz Eylül University Hospital School of Medicine, İzmir, Turkey

E-mail: drsinemgezer@gmail.com

©Copyright 2020 by Turkish Thoracic Society - Available online at www.turkthoracj.org

not possible to create a single protocol that is most appropriate to be implemented in every institution. In this dynamic process, different protocols may be applied at different times in the same institution.

On 16th March 2020 British Society of Thoracic Imaging (BSTI) proposed a radiology decision tool for suspected COVID-19 patients, suggesting the use of chest X-ray and CT in certain clinical conditions. This algorithm was based on a structured radiology reporting system for both chest X-ray and CT, which we are currently using in our institution. BSTI suggested chest X-ray for clinically stable patients with fever and respiratory symptoms in the first stage [6]. As the most frequent imaging finding is GGO, X-ray can be insufficient for diagnosis of COVID-19. Certainly, a normal radiography would not exclude the disease, but the question is, does an infiltration that cannot be seen on chest X-ray require CT in a clinically stable patient? Additionally, we know that CT and even the PCR test result may be false negative if it is the early stage of the disease. Thus, BSTI recommends CT for the seriously ill patients with uncertain or normal chest X-ray findings and if any complication is suspected during the follow up [6]. Radiological Society of North America (RSNA) recommended considering whether imaging (both X-ray and CT) will impact patient management prior to ordering and using CT sparingly and reserved for hospitalized, symptomatic patients with specific clinical indications [7].

Bilaterally lower zone predominant opacities in a chest X-ray would suggest COVID-19 in a suspected case. Although, the sensitivity of chest X-ray for diagnose of COVID-19 is known to be low (30-60%), still there are cases that chest X-ray is sufficient. The advantages of radiography in such a pandemic are that surfaces of X-Ray machines can be easily cleaned and radiation dose of chest X-ray is lower than chest CT. Another important advantage of chest X-ray is that portable radiography units can be used in order to minimize the risk for contamination of healthy individuals and the staff. It is also crucial to reduce the number of CT examination and workload of the radiology department in pandemic, because appropriate infection control procedures should be followed before scanning subsequent patients. After each CT imaging the room downtime is known to be between 30 minutes to 1 hour for room decontamination and passive air exchange [8].

An effective way of reducing radiological workload and combating pandemic is to use structured reporting templates. There are differently structured reports of COVID-19 recommended by various radiologic societies or used in many original researches in the literature which are slightly different from each other. The main motivations of using structured reporting are facilitating radiological diagnosis and improving report quality. It is also useful for education, planning scientific research and development of algorithms to improve disease management. One of the reasons why the template proposed by BSTI is preferred in our institution is that BSTI also offers a radiological flow chart prepared according to this format. The CT patterns are classified as classic COVID-19, probable COVID-19, indeterminate and non-COVID and each pattern has been described in detail. Moreover, the severity of the disease is quantified as mild and moderate/severe. RSNA also recommends

structured reporting to enhance the referring provider's understanding of radiological findings, thereby allowing better integration into clinical decision making [9]. RSNA classifies the CT patterns as typical appearance, indeterminate appearance, atypical appearance, and negative for pneumonia. A different classification called CO-RADS is proposed for radiologists in the Netherlands which is based on the level of suspicion of COVID-19 infection is graded from very low/CO-RADS 1 up to very high/CO-RADS 5. According to our experiences, no matter whichever is preferred, any structured report ensures that the clinician has a clear idea of the radiological findings of the disease and enables future implementation of diagnostic and therapeutic algorithms.

In conclusion, we believe that the flow charts, which are specially developed for the current local conditions and that are open to update, will be useful in combating the COVID-19 pandemic. We agree that it is necessary to use the structured reporting template in order to create these charts in the best way.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

1. Hui DS, Azhar EI, Madani TA, et al. The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health—The latest 2019 novel coronavirus outbreak in Wuhan, China. *Int J Infect Dis* 2020;91:264-6. [Crossref]
2. "WHO Director-General's opening remarks at the media briefing on COVID-19". World Health Organization (WHO) (Press release). 2020 Mar 11. Retrieved 2020 March 12. Available from: URL: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---27-march-2020>
3. "2019 Novel Coronavirus (2019-nCoV) Situation Summary". Centers for disease control and prevention; 2020 Jan 3. Archived from the original on 2020 Jan 26. Retrieved 2020. Available from: URL: <https://www.cdc.gov/coronavirus/2019-ncov/index.html>
4. Bai HX, Hsieh B, Xiong Z, et al. Performance of radiologists in differentiating COVID-19 from viral pneumonia on chest CT. *Radiology* 2020:200823. [Crossref]
5. "ACR Recommendations for the use of Chest Radiography and Computed Tomography (CT) for Suspected COVID-19 Infection". American College of Radiology. 2020 March 22. Available from: URL: <https://www.acr.org/Advocacy-and-Economics/ACR-Position-Statements/Recommendations-for-Chest-Radiography-and-CT-for-Suspected-COVID19-Infection>
6. Thoracic imaging in COVID-19 Infection. Guidance for the reporting radiologist. British Society of Thoracic Imaging. Version 2. Available from: URL: <https://www.bsti.org.uk/standards-clinical-guidelines/clinical-guidelines/covid-19-bsti-statement-and-guidance/>
7. Mossa-Basha M, Meltzer CC, Kim DC, et al. Radiology department preparedness for COVID-19: Radiology Scientific Expert Review Panel 2020 Mar 18. Available from: URL: <https://www.rsna.org/covid-19> [Crossref]
8. An P, Ye Y, Chen M, et al. Management strategy of novel coronavirus (COVID-19) pneumonia in the radiology department: a Chinese experience. *Diagn Interv Radiol* 2020.