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Overview of Chest Radiology Images of Coronavirus Disease 2019 (COVID-19) Patients at Undata General Hospital, Palu, Indonesia

Siti Nurhalisa[1*], Ria Sulistiana[2]

[1]Medical Education Study Program, Faculty of Medicine, Universitas Tadulako, Palu, Indonesia

[2]Department of Radiology, Faculty of Medicine, Universitas Tadulako, Palu, Indonesia

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***Corresponding author:** Siti Nurhalisa

E-mail address: *nurhalisa_siti09@gmail.com*

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A B S T R A C T

Introduction: Making a diagnosis of COVID-19 requires quite sophisticated technology and tools. To make a diagnosis of COVID-19, a technology and tool are needed that can identify the presence of the genetic material of the SARS-CoV-2 virus. However, the existence of PCR tools cannot be spread evenly in various regions of Indonesia because the tools are quite difficult to operate and require adequate laboratory facilities. The radiological image of the chest is a promising supporting examination to be developed as a supporting examination to diagnose COVID-19. This study aimed to obtain an overview of chest radiology images of COVID-19 patients at Undata General Hospital, Palu, Indonesia. **Methods:** This study is a descriptive observational study. A total of 20 research subjects participated in this study. Observations of chest radiological images are presented in a univariate manner in the form of the frequency distribution of data using SPSS software. **Results:** Study subjects with mild degrees of COVID-19 had normal chest X-rays. Meanwhile, research subjects with moderate degrees of COVID-19 generally have a chest X-ray photo in the form of an infiltrate. Study subjects with severe COVID-19 had a chest X-ray image in the form of consolidated-ground glass opacity. **Conclusion:** The more severe the degree of COVID-19 is in line with the higher the inflammation in the lung tissue, so a radiological image of the thorax appears in the form of a consolidated-ground glass opacity image.

1. Introduction

COVID-19 is an infectious disease caused by a new coronavirus that was first detected in humans at the end of 2019 in Wuhan, China. This new Coronavirus is called SARS-CoV-2 and can be spread from human to human through airborne droplets produced when someone coughs, sneezes, or talks. COVID-19 can cause a variety of symptoms, ranging from mild symptoms such as fever and cough to more severe symptoms such as pneumonia and even death. COVID-19 has become a global pandemic and has influenced the lives of millions of people around the world. In Indonesia, there are more than 4 million

Establishing a diagnosis of COVID-19 requires quite sophisticated technology and tools. To make a diagnosis of COVID-19, a technology and tool are needed that can identify the presence of the genetic material of the SARS-CoV-2 virus. PCR (polymerase chain reaction) technology is a technology that is quite effective in detecting the presence of SARS-CoV-2 genetic material. However, the existence of PCR tools cannot be spread evenly in various regions of Indonesia because the tools are quite difficult to operate and require adequate laboratory facilities.[6-10] Therefore, other more visible diagnostic tools are needed to be used in various parts of Indonesia. The radiological picture of the chest is a promising supporting examination to be developed as a

supporting examination to diagnose COVID-19. This study aimed to obtain an overview of chest radiology images of COVID-19 patients at Undata General Hospital, Palu, Indonesia.

2. Methods

This study is a descriptive observational study. This study used secondary data obtained from the medical records installation of Undata General Hospital, Palu, Indonesia. A total of 20 research subjects participated in this study, and the research subjects met the inclusion criteria. The inclusion criteria were patients who had already confirmed COVID-19 and who are being treated at Undata General Hospital, and who have complete medical record data. This study was approved by the medical and health research ethics committee of the Faculty of Medicine, Universitas Tadulako, Palu, Indonesia. This study made observations of the sociodemographic and clinical data of COVID-19 patients. Observation of the radiological picture was carried out descriptively. Data analysis was performed using SPSS software version 20 for Windows. Univariate analysis was performed to present the frequency distribution of each data variable test.

3. Results and discussion

Table 1 presents the sociodemographic, clinical, and radiological frequency distribution of study subjects. The majority of research subjects are female, the majority work as self-employed, and the majority of education is senior high school. The majority of research subjects had a dry cough as their chief complaint. The majority of research subjects were also treated at the Undata General Hospital in Palu, Indonesia, with moderate degrees of COVID-19. Study subjects with mild degrees of COVID-19 had normal chest X-rays. Meanwhile, research subjects with moderate degrees of COVID-19 generally have a chest X-ray photo in the form of an infiltrate. Research subjects with severe COVID-19 had a thorax photo image in the form of consolidated-ground glass opacity.

Table 1. Distribution of sociodemographic, clinical, and radiological frequency of study subjects.

No.	Variable	Frequency	Percentage (%)
1.	Gender		
	Male	9	45
	Female	11	55
2.	Occupation		
	Not working	5	25
	Civil servant	6	30
	Self-employed	9	45
3.	Recent education		
	Senior high school	11	55
	Diploma	5	25
	Bachelor degree	4	20
4.	Main complaint		
	Dry cough	8	40
	Fever	5	25
	Anosmia	3	15
	Shortness of breath	4	20
5.	COVID-19 degree		
	Mild	7	35
	Moderate	9	45
	Severe	4	20
5.	Overview of chest radiology images		
	Normal	7	35
	Infiltrate	10	50
	Consolidate-ground glass opacity	3	15

The results of this study are in line with several studies which explain differences in X-ray images along with the degree of damage to lung tissue. Normal chest X-ray images and/or infiltrates are found in conditions where the lung tissue is not severely inflamed.[11-15] If there is severe inflammation to the point that fluid or severe inflammation is found in the lung tissue, a chest X-ray image will appear in the

form of a consolidated-ground glass opacity image. Several other studies have stated that chest radiology images are not appropriate when used as a basis for making a diagnosis but are more appropriate when used in assessing the degree and progression of inflammation in lung tissue due to COVID-19.[16-20]

4. Conclusion

The more severe the degree of COVID-19 is in line with the higher the inflammation in the lung tissue, so a radiological image of the thorax appears in the form of a consolidated-ground glass opacity image.

5. References

1. Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19) Int J Surg. 2020; 76: 71–6.
2. Udugama B, Kadhiresan P, Kozlowski HN, Malekjahani A, Osborne M, Li VYC, et al. Diagnosing COVID-19: The disease and tools for detection. ACS Nano. 2020; 14: 3822–35.
3. World Health Organization. COVID-19 Weekly epidemiological update-8 December 2020.
4. Pascarella G, Strumia A, Piliego C, Bruno F, Del Buono R, Costa F, et al. COVID-19 diagnosis and management: a comprehensive review. J Intern Med. 2020; 288: 192–206.
5. Aljondi R, Alghamdi S. Diagnostic value of imaging modalities for COVID-19: Scoping Review. J Med Internet Res. 2020; 22: e19673.
6. Wiersinga WJ, Rhodes A, Cheng AC, Peacock SJ, Prescott HC. Pathophysiology, transmission, diagnosis, and treatment of coronavirus disease 2019 (COVID-19): A Review. JAMA. 2020; 324: 782–93.
7. Araujo-Filho JAB, Sawamura MVY, Costa AN, Cerri GG, Nomura CH. COVID-19 pneumonia: What is the role of imaging in diagnosis? J Bras Pneumol. 2020; 46: e20200114.
8. Gandhi D, Ahuja K, Grover H, Sharma P, Solanki S, Gupta N, et al. Review of X-ray and computed tomography scan findings with a promising role of point of care ultrasound in COVID-19 pandemic. World J Radiol. 2020; 12: 195–203.
9. Rubin GD, Ryerson CJ, Haramati LB, Sverzellati N, Kanne JP, Raoof S, et al. The role of chest imaging in patient management during the covid-19 pandemic: a multinational consensus statement from the Fleischner Society. Chest. 2020; 158: 106–16.
10. Farias LPG, Fonseca EKUN, Strabelli DG, Loureiro BMC, Neves YCS, Rodrigues TP, et al. Imaging findings in COVID-19 pneumonia. Clinics (Sao Paulo) 2020; 75: e2027.
11. Revel MP, Parkar AP, Prosch H, Silva M, Sverzellati N, Gleeson F, et al. European society of radiology (ESR) and the European society of thoracic imaging (ESTI) COVID-19 patients and the radiology department - advice from the European society of radiology (ESR) and the European society of thoracic imaging (ESTI) Eur Radiol. 2020; 30: 4903–9.
12. Landete P, Quezada Loaiza CA, Aldave-Orzaiz B, Muñiz SH, Maldonado A, Zamora E, et al. Clinical features and radiological manifestations of COVID-19 disease. World J Radiol. 2020; 12: 247–60.
13. Wong HYF, Lam HYS, Fong AH, Leung ST, Chin TW, Lo CSY, et al. Frequency and distribution of chest radiographic findings in patients positive for COVID-19. Radiology. 2020; 296: E72–E78.
14. Ng MY, Lee EYP, Yang J, Yang F, Li X, Wang H, et al. Imaging profile of the COVID-19 infection: Radiologic findings and literature review. Radiol Cardiothorac Imaging. 2020; 2: e200034.
15. Kim ES, Chin BS, Kang CK, Kim NJ, Kang YM, Choi JP, et al. Korea National Committee for clinical management of COVID-19. Clinical course and outcomes of patients with severe acute respiratory syndrome coronavirus 2 infections: A preliminary report of the first 28 patients from the Korean Cohort Study on COVID-19. J Korean Med Sci. 2020; 35: e142.
16. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet. 2020; 395: 507–13.
17. Cellina M, Panzeri M, Oliva G. Chest radiography features help to predict a favorable

outcome in patients with coronavirus disease 2019. Radiology. 2020; 297: E238.

18. Jacobi A, Chung M, Bernheim A, Eber C. Portable chest X-ray in coronavirus disease-19 (COVID-19): A pictorial review. Clin Imaging. 2020; 64: 35–42.
19. Lomoro P, Verde F, Zerboni F, Simonetti I, Borghi C, Fachinetti C, et al. COVID-19 pneumonia manifestations at the admission on chest ultrasound, radiographs, and CT: single-center study and comprehensive radiologic literature review. Eur J Radiol Open. 2020; 7: 100231.
20. Lemmers DHL, Abu Hilal M, Bnà C, Prezioso C, Cavallo E, Nencini N, et al. Pneumomediastinum and subcutaneous emphysema in COVID-19: barotrauma or lung frailty? ERJ Open Res. 2020; 6.