

Prognosis of Covid 19 according to pneumonia types

Ethical approval

Republic of Turkey Ministry of Health 2021-09-18T22_38_39 numbered and Gaziantep University Medical Ethics Committee 2021/322 numbered approval have been received.

ABSTRACT

Background: Pneumonia is defined infection affecting lower respiratory tracts and lung parenchyma. According to morphology in pneumonia imaging; categorized as lobar, bronchopneumonia (lobular), and interstitial pneumonia. Covid 19 is a severe disease that causes lung damage.

Aims: In this study, it was aimed to relate patients hospitalized in Covid 19 wards with prognosis and mortality according to pneumonia types.

Study Design: Ersin Arslan Training and Research Hospital Covid Wards between August and September 2021.

Methodology: The study included with positive PCR test, 18 age and more than, with lung involvement in CT. Patients' age, gender, pneumonia types according to CT, how many lobes affected in the lung, rate of involvement of each lobe, admission in Intensive-care and mortality were analyzed. Chi Square Test was used in the statistical analysis of the data.

Results: A total of 243 patients were evaluated. The mean age was 56.7 ± 2.02 . In the patients %45.6 were male and 54.4% female (± 0.06). According to the types of pneumonia in CT; it was 51.8% lobular, 44.8% interstitial and 3.4% lobar. In CT, it were affect five lobes 68.7%, four lobes 10.6%, three lobes 9%, two lobes 3.7%, and one lobe 8% in the lung. In the study, 20.9% of the patients were admitted to the Intensive-care unit and 11.5% died.

Conclusion: Regardless of the rate of affecting in lobes; an increase in the number of affected lobes in the lung is related a poor prognosis. In lobular pneumonia, involvement of more than 50% of the four and five lobes of the lung is related with mortality. In interstitial pneumonia, more than 50% involvement of four lobes and any rate of involvement of five lobes in the lung is related with mortality.

Keywords: Covid-19, pneumonia, prognosis, types, mortality

1.INTRODUCTION

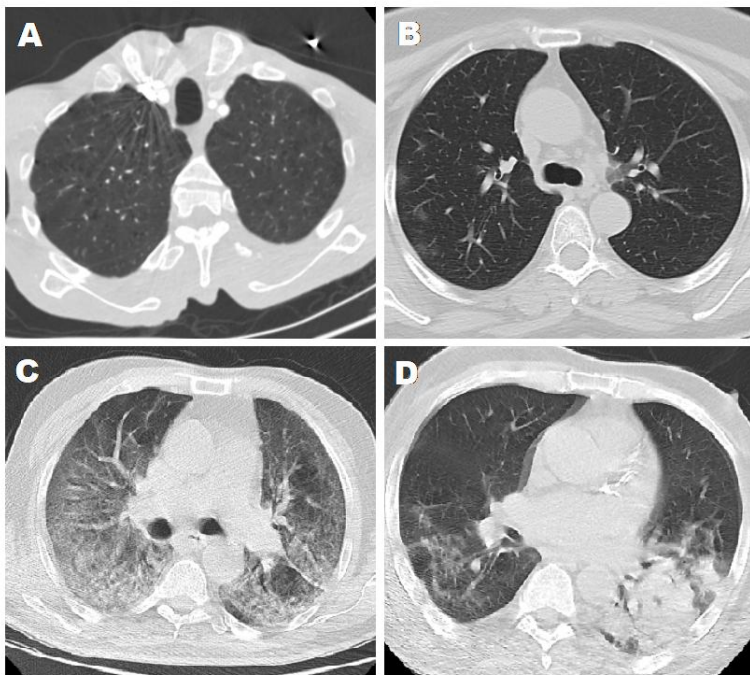
The Covid 19 pandemic, which caused tens of thousands of deaths, is the disease of severe viral infection. Pneumonia is defined infection affecting lower respiratory tracts and lung parenchyma. Bacteria, viruses, fungi, aspiration and chemical exposure can cause

pneumonia. The term pneumonia is usually an expression of inflammation involving the alveolar wall of the lung parenchyma [1]. Pneumonia is classified according to etiology (bacteria, virus, fungus), anatomical (lobar, interstitial, lobular or bronchopneumonia), clinical course (typical and atypical), origin of occurrence (communal or hospital) and immune status (immuno suppression) [2]. Anatomical classification state the widespread of lung involvement. Lobular pneumonia is inflammation of the distal minor or terminal bronchi. Lobar type is an intense consolidation determined clinically and radiologically. It can be affected together lobular, lobar and interstitial in lungs. In this study, it was aimed to examine the prognosis of viral pneumonia according to anatomical types in Covid 19.

2. MATERIAL AND METHODS

The study was done in Ersin Arslan Training and Research Hospital Covid-19 wards to cover the dates August-September 2021. The study included with positive Covid Polymerase Chain Reaction (PCR) test, 18 age and more than, with lung involvement in computerized tomography (CT). It was excluded negatives PCR test, no involvement of lung and no CT. A total of 243 patients compatible with these criteria were evaluated. Patients' age, gender, pneumonia types according to CT (figure 1), how many lobes of the lung affected, the rate of involvement of each lobe, length of hospitalized stay, admission in Intensive-care and mortality were analyzed. Chi Square Test was used in the statistical analysis of the data.

Figure 1. Types of pneumonia by anatomical classification



3. RESULTS AND DISCUSSION

A total of 243 patients were evaluated. The mean age was 56.7 ± 2.02 . In the patients %45.6 were male and 54.4% female (± 0.06). Age ranges of the patients; It was 16.8% 20-40 years, 43.2% 41-60 years and 40% more than 60 (table 1).

Table 1. Distribution of study by age and gender

	n	SD	%95 CI
Age			
20-40	41	0.49	0.06
40-60	105	0.37	0.04
>60	97	0.49	0.06
Gender			
Male	111	0.49	0.06
Female	132		

According to the types of pneumonia in CT; It was 51.8% lobular, 44.8% interstitial and 3.4% lobar. In CT, it were affect five lobes 68.7%, four lobes 10.6%, three lobes 9%, two lobes 3.7%, and one lobe 8% on the lungs. In the study, 20.9% of the patients were admitted to the Intensive-care unit and 11.5% died. Covid 19 (86% mutational) in patients admitted in hospital wards; it is more often in the age range of 46-60 years and in female. There was no statistical significance of mortality in male and female ($p < 0.2$). Admission to Intensive-care unit were more than in 20-40 ages ($p < 0.02$). Affecting 1-5 lobes on the lung is related with the admission for intensive care ($p < 0.03$). However, damaging to the 4 and 5 lobes of lungs by Covid 19 is related with both admission to intensive care ($p < 0.03$) and mortality ($p < 0.0001$). According to pneumonia types; in lobar pneumonia (2 lobes) is involvement of more than 50% of each lobe is related with intensive care admission ($p < 0.02$). In lobular pneumonia, more than 50% involvement of three lobes ($p < 0.001$), more than 50% involvement of four lobes ($p < 0.004$), and any rate five lobes are related with admission of intensive care ($p < 0.0001$). Involvement of more than 50% of the four and five lobes of the lungs is related with mortality in lobular pneumonia ($p < 0.0002$). In interstitial pneumonia, any rate involvement of the four and five lobes of the lungs is related with admission of intensive care ($p < 0.0001$) and more than 50% involvement of four lobes and any rate involvement of five lobes are related with mortality ($p < 0.04$). Accordingly, even a low rate of involvement of five lobes is related with mortality in interstitial pneumonia (table 2).

In Covid 19, little ground glass densities and interstitial variety are seen in CT in the early period and infiltration with consolidation in the progressive period. It is characterized by ground-glass densities in multiple lobes that typically affect the periphery on the lungs [3,4]. However, these tomographic findings are not specific to Covid 19, bacteria, mycoplasma, chlamydia and other viral infections can also cause it [5]. Therefore, CT and clinical findings should be compatible with each other. In the study, clinical complaints of all patients were compatible with Covid 19 and infection parameters similar. Admission to the intensive care unit was due to respiratory distress in almost all of the patients. Acute respiratory distress syndrome was mostly caused to mortality. Covid 19 causes severe lung damage, and the most important finding in patients is pneumonia. According to morphology in pneumonia imaging; categorized as lobar, bronchopneumonia (lobular), and interstitial pneumonia [6]. Therefore, prognosis and mortality were analyzed according to pneumonia type in the study. Diffuse lung involvement in interstitial and lobular pneumonia was found to be related with poor prognosis and mortality.

Table 2. Statistical analysis according to admission to intensive care and mortality

	n	Intensive-care		Mortality	
		p<	ODSS	p<	ODSS
20-40 ages	41	0.02	1.238		

Affect in lobes		243				
1 lobe	19	0.003	0.256			
2 lobes	9	0.0001	0.606			
3 lobes	22	0.01	0.215			
4 lobes	26	0.03	2.478	0.04	2.008	
5 lobes	167	0.0001	1.294	0.0001	1.770	
Pnmonia types		p<	ODSS	p<	ODSS	
Lobar Pneumonia						
2 lobes >50%		0.02	4.275			
Lobular Pneumonia						
3 lobes >50%		0.001	8.968			
4 lobes <50%		0.06	2.478			
4 lobes >50%				0.0001	5.135	
5 lobes <50%		0.0006	0.434			
5 lobes >50%		0.001	0.748	0.0002	0.357	
Interstitial pneumonia						
1 lobe >50%		0.001	0.513			
4 lobe <50%		0.0001	0.415			
4 lobes >50%				0.0001	0.225	
5 lobes <50%		0.0001	2.669	0.04	0.928	
5 lobes >50%				0.002	2.713	

4. CONCLUSION

Regardless of the rate of affecting in lobes; an increase in the number of affected lobes in lungs is related a poor prognosis. In lobular pneumonia, involvement of more than 50% of the four and five lobes of the lungs is related with mortality. In interstitial pneumonia, more than 50% involvement of four lobes and any rate of involvement of five lobes in the lung is related with mortality.

ETHICAL APPROVAL

Republic of Turkey Ministry of Health 2021-09-18T22_38_39 numbered and Gaziantep University Medical Ethics Committee 2021/322 numbered approval have been received.

REFERENCES

1. Padley SPG, Rubens MB. Pulmonary Infections. Textbook of Radiology and Imaging. In: Sutton D, editor. Edinburgh: Churchill Livingstone; pp. 131–160.
2. Ekim N. Toplum kökenli pnömonilere klinik ve tanısal yaklaşım. Türk Toraks Derneği Pnömoniler Kitabı 1995; pp. 3-22.
3. Pan Y, Guan H. Imaging changes in patients with 2019-nCoV. Eur Radiol 2020;30(7):3612-3613.
4. Jin YH, Cai L, Cheng ZS, et al. A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus (2019-nCoV) infected pneumonia (standard version). Mil Med Res. 2020;7(1):1-23.

5.Koo HJ, Lim S, Choe J, et al. Radiographic and CT Features of Viral Pneumonia. Radiographics 2018;38:719-39.

6. Reynolds JH, McDonald G, Alton H, et al. Pneumonia in the immunocompetent patient. Br J Radiol. 2010;83:998–1009.

UNDER PEER REVIEW