

ORIGINAL ARTICLE

CHEST X-RAY'S FINDINGS IN SYMPTOMATIC PATIENTS POSITIVE FOR CORONAVIRUS DISEASE (COVID-19)

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ABSTRACT

Background: The coronavirus disease (COVID) flared-up as pneumonia for an unknown cause in December 2019 in Wuhan, China, and was spread swiftly outside of Wuhan to other countries, later. **Objective:** To find out the Chest X-ray's findings in positive cases for Covid-19. **Methodology:** A cross-sectional study was conducted at Department of radiology, Farooq Hospital Lahore. 150 patients of different age groups were enrolled in this study with convenient sampling technique. We included only those patients in this study who were symptomatic and have positive PCR of Covid-19 virus while the asymptomatic were excluded. **Results:** All 150 patients were with the history of positive polymerase chain reaction (PCR) of COVID and were symptomatic. 85 (56.7%) males and 65 (43.3%) females were enrolled in this study. Out of 150 patients 54 (36%) patients presented with the history of fever, 103 (68.7%) had history of diabetes, 54 (36%) had history of hypertension, 57 (38%) had history of smoking, 69 (46%) had history of cough, and all patients presented with the history of loss of smell. On X-ray 87 (58%) shows Air Space Opacification, 98 (65.3%) shows Inflammatory Process, 46 (30.7%) shows Ground Glass Appearance, 52 (34.7%) shows Consolidation, 9 (6%) shows Pleural effusion, 15 (10%) has cardiomegaly, 15 (10%) has bronchitis and 8 (5.3%) has pulmonary edema.

Conclusion: The chest X-ray is the basic modality for identifying patients with COVID-19 pneumonia and it is especially useful due to its low cost and low radiation exposure. Early changes in the lung parenchyma and consolidation and hazy pattern can be detected and that will help to reduce the rate of hospitalization due to Covid-19.

Key words: Chest X-ray, Covid-19, viral infection, pandemic disease, mortality

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INTRODUCTION

The occasions in the recent months have changed various things since the time when the COVID19 virus began in December 2019. COVID19 (Coronavirus) is an

infectious disease brought about by the SARS-CoV-2 virus.¹ Most individuals who become sick with Coronavirus do not have serious side effects and recuperate without specific therapy. In any case, a few patients

will require clinical consideration. Before long, it spread all over the planet and changed our impression of globalization and digitization forever.² As numerous nations all over the planet were secured, worldwide travel were boycotted, organizations and ventures were battling to keep up, and difficulties are arising. One of the most alarming impacts of pandemics should be visible in higher education.³⁻⁵

On January 8, 2020, an article was published about pneumonia in obscure etiology, which was distinguished in patients in Wuhan, China, and it spread through air travel. The odds were high. In which 40 pneumonia cases were for from Wuhan city of China. On January 8, 2020, this type of pneumonia was named Corona virus.⁶ Clinical examinations and the attributes of the patients became exposed soon after.⁷ Radiology assumed a significant part in the start of this pandemic circumstance. Chest X-ray was considered important in beginning phase of the disease.⁸ Through this, specialists had the ability to differentiate other patients from Coronavirus patients. Because of chest X-ray specialists observed quick movement of lung irregularities in contaminated patients, especially in emergency unit). However pneumonic effects were not clear earlier.⁹⁻¹¹ Covid 19 patients had very specific chest images that shows specific changes in radiography. Major findings involved multifocal ground haziness which most likely looks like ground glass, dominating base and fringe. Other conditions like lymphadenopathy, bronchiectasis, cavitation, pleural radiation and septal thickening were also found. [12-15] Literature shows chest x ray is one of best methods to not only see the extent but also for quantitative analysis of COVID pneumonia. [16] This study is focused to aware the medical community about the importance of chest x ray in this regard.

MATERIALS AND METHODS

Study design: Cross sectional study

Setting: Department of radiology, Farooq Hospital Lahore.

Sample size: 150 patients were enrolled in this study

Sampling technique: Convenient sampling technique.

Sample selection criteria

Inclusion criteria

- Adult cases of either gender
- We included only those patients in this study which were symptomatic and have positive PCR of Covid-19 virus

Exclusion criteria

- Asymptomatic cases
- Patients who have already started treatment

Data collection procedure

Data form 150 cases was taken, after taking an informed consent for all cases. X-ray Chest was performed in erect PA position with hands on the back of patient. We guided the patient to take a deep breath in and then hold for few seconds. Images were visualized on computer screen for reporting. Data was collected according to the variables like Age, gender and X-ray findings. Data was evaluated and analyzed with SPSS version 21, Microsoft Excel 2013. The quantitative data (gender) was presented in the form of descriptive statistics, mean $\pm$ S.D, and qualitative data was presented by percentage, frequency and bar charts or pie charts. Collected data was stored in Microsoft Excel and was analyzed using same tool.

RESULTS

All 150 patients were with the history of positive PCR of COVID and were symptomatic. There were 85 (56.7%) males and 65 (43.3%) female in this study. Out of 150 patients, 54 (63%) patients had history of fever, 103 (68.7%) were with the history of diabetes, 54 (36%) were with the history of hypertension, 57 (38%) were with the history

of smoking, 69 (46%) were with the history of cough, and all patients were with the history of loss of smell. In this study different age groups were selected. On X-ray, 87 (58%) shows Air Space Opacification, 98 (65.3%) shows Inflammatory Process, 46 (30.7%) shows Ground Glass Appearance, 52 (34.7%) shows Consolidation, 9 (6%) shows Pleural effusion, 15 (10%) has cardiomegaly,

15 (10%) has bronchitis and 8 (5.3) has pulmonary edema. Out of 54 patients having history of pneumonia 92.6% had Air space Opacification, 79.6% had inflammatory process, 42.6% had Ground glass appearance, 31.5% had Consolidation, 5.6% had Cardiomegaly, 3.7% had Bronchitis and 3.7% had pulmonary edema.

Table 1: Frequencies and percentages of Pathologies detected on X-ray

	Air Space Opacification	Ground Glass Appearance	Consolidation	Pleural effusion	Cardiomegaly	Bronchitis	Pulmonary edema
No	63 (42%)	104(69.3%)	98 (65.3%)	141 (94%)	15 (90%)	15 (90%)	8 (5.3%)
Yes	87 (58%)	46 (30.7%)	52 (34.7%)	9 (6%)	135 (10%)	135 (10%)	142 (94.7%)

Table 2: Frequencies and percentages of symptoms

	Fever	Cough	Diabetes	Hypertension	Smoking	O.S	Loss of smell
No	96(64%)	81(54%)	47(31%)	96(64%)	93(62%)	0	0
Yes	54(36%)	69(46%)	103(68%)	57(38%)	57(38%)	150(100%)	150(100%)

Table 3: comparison of Pathologies detected on X-ray and Pneumonia

		Pneumonia		Chi-square test	p-value
		No	Yes		
Air space Opacification	No	59 (61.5%)	4 (7.41%)	0.992	0.319
	Yes	37 (38.5%)	50 (92.6%)		
Ground glass appearance	No	73 (76%)	31(57.4%)	5.64	0.018
	Yes	23 (24%)	23 (42.6%)		
Consolidation	No	61(63.5%)	37(68.5%)	0.378	0.547
	Yes	35(36.60%)	17(31.5%)		
Pleural Effusion	No	87 (90.6%)	54 (100%)	5.38	0.020
	Yes	9 (9.4%)	0(0%)		
Cardiomegaly	No	84 (87.5%)	51(94.4%)	1.85	1.74
	Yes	12(12.5%)	3 (5.6%)		
Bronchitis	No	83 (86.5%)	52 (96.3%)	3.71	0.054
	Yes	13 (13.5%)	2 (3.7%)		
Pulmonary edema		90 (93.8%)	52 (96.3%)	0.444	0.505
		6 (6.3%)	2 (3.7%)		



Image 1: x-ray image show lungs of PCR positive patient with bilateral fibrotic lungs.



Image 2: X-ray image show lungs of PCR positive patient with Ground glass appearance

DISCUSSION

Few studies report results in agreement to findings of current study, like Ozturk T et.al directed a review Chest CT sweep and chest x-ray showed trademark radiographic discoveries in patients with Coronavirus pneumonia. The study demonstrates chest x-ray findings and patterns of radiographic changes in Coronavirus patients. A total of 88 individuals, 50 females (56.8%) and 38 males (43.2%), were brought into the medical clinic after having tested positive for Coronavirus. The mean age was 35.2 ± 18.2 years. Only 13 out of 88 (45.5%) of the patients had atypical chest x-ray finds, whereas 48 out of 88 (45%) were suggestive. For the 88 patients, a total of 190 chest x-rays were taken, and among them, there were 59/190 (31% of the total) atypical chest x-rays. Presence of the Fringe Ground Glass Opacities (GGO) was most

prominent with low curves. The GGO progression was seen for 6-11 days accounting for almost 70% of cases.¹⁷ Hassantabar S et.al published another study in which Patients that had a RT-PCR positive for Coronavirus disease were 234: 153 males and 81 females, with a mean age of 66.0. Thirteen CXRs were negative, yet the excess changes were noted for the most part. In Coronavirus, CXR showed diffused and complicated GGO at fringe area. The rate of responsiveness was found to be 68.1%. The RALE score is a good alternative for analysis of SARS-CoV-2 pneumonia where appropriate to use, but is highly dependent upon ICU confirmation. In this study, there were 150 total patients: 85 males and 65 females and all x-ray were positive. Again GGO was found with two edges on the sides.¹⁸ Basu S et.al did CXR that showed

anomalies in children with Coronavirus. As much as findings are important, the literature needs more elaboration of the type and intensity of haziness found around the chest. All studies show similar results to ours and conclude that chest x ray can be used to identify the COVID patients and differentiate them from simple pneumonia patients.¹⁹

CONCLUSION:

The chest X-ray is the basic modality for identifying patients with COVID-19 pneumonia and it is especially useful due to its low cost and low radiation exposure. Early changes in the lung parenchyma and consolidation and hazy pattern can be detected and that will help to reduce the rate of hospitalization due to COVID-19.

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