Int.J.Curr.Res.Aca.Rev.2020; 8(9): 1-7

EXCELLENT PUBLISHERS

International Journal of Current Research and Academic Review

ISSN: 2347-3215 (Online) Volume 8 Number 9 (September-2020)

Journal homepage: http://www.ijcrar.com

doi: https://doi.org/10.20546/ijcrar.2020.809.001

Initial Experience with Covid-19 Chest X-Rays

G. Balachandran* and D.N.B. Jyoti Basu

Department of Radiology & Imaging Sciences, S.L.I.M.S., Pondicherry, India

**Corresponding author*

Abstract

COVID-19 patients who were referred to our medical college hospital, after a throat swab test, had chest x-ray done initially. The chest x-ray findings were analysed by two of our hospital experienced radioloigsts. Of the 74 cases studied, majority of patients were elderly. Fifty-seven cases showed abnormal chest x-ray findings. The lesions were bilateral in thirty-four cases; The most common finding was consolidation, especially in the lung periphery. Nine patients had co-morbidities like Cardiac failure, bronchiectasis. We developed a modified scoring system in chest x-ray to help us to grade the severity of the disease and prognosticate the probable outcome. Of the 48 cases studied, there were two deaths. In each of death cases the follow up x-ray showed progressive disease pattern. Twenty patients were discharged after they had clinical improvement .The purpose of this paper presentation is to share our initial experience of chest x-ray findings in COVID-19 cases. As on date there is no Indian literature where adult covid suspected chest x-rays were studied.

Article Info

Accepted: 10 August 2020
Available Online: 20 September 2020

Keywords

COVID
CHEST X-RAYS

Introduction

The new coronavirus is a highly infectious disease, causing Lung infection resulting in pneumonia that may progress to severe respiratory distress and death in some cases . Real-time reverse transcription polymerase chain reaction(RT-PCR) of viral nucleic acid, is the diagnostic gold standard. The serologic examination has several limitations due to the high number of false-negative tests and the delayed results. Radiological evaluation of patients with clinical suspect of COVID-19 is mandatory, especially in the pandemic situation. While waiting for RT-PCR results, In order to have a rapid evaluation of thoracic involvement ,chest x-ray (CXR) examination is most valuable. Further it is cost-effective ,easily available, with reasonably less radiation dose and can be carried out in the ward itself. The recent COVID-19 radiological literature focuses primarily on computed tomography (CT) findings, which is more sensitive and specific than chest X-ray(CXR)(1).But performing CT scan is not easy during this pandemic, considering not only the excessive radiation exposure especially to younger patients but also the mandatory scanner disinfection procedures that have to take place, since we have to strictly follow the guidelines given by W.H.O.

As part of local government initiative COVID suspected cases were initially examined and throat swab was taken at a community health centre. Later they were referred to our medical college hospital for admission, imaging studies, and further care. On an average 5-10 chest x-rays were taken in the covid ward. from the month of july 2020 to September, 2020. These studies are still ongoing, hence this preliminary repot. The case material is for the

first three months of admission in covid wards only. The facility for chest x-ray is available in the bedside itself. X-rays were taken with a portable unit, with The reporting is done immediately and sent via PACS to the COVID centre.

The purpose of this paper presentation is to share our initial experience of chest x-ray findings in COVID-19 cases.

Materials and Methods

All patients from COVID ward were referred for chest x-ray. All the patient had chest x-ray taken from a dedicated mobile x-ray unit., stationed near the covidward. This way we were able to prevent unnecessary patient movement, thereby reducing chances of cross-infection. Round the clock services were available. The images were read by a CR reader and reports transmitted via PACS to the COVID centre. The chest x-rays were selected from July 2020 to September, 2020 for our initial study. Appropriate safety measures, for the patient, public, personnel and equipments were followed scrupulously, as prescribed by the W.H.O. guidelines.

CXR finding

The characteristic COVID-19 chest imaging findings as described in recent literature survey include the presence of -Bilateral, "patchy" or "confluent, bandlike" ground glass opacity or consolidation Predominantly in a peripheral and mid-to-lower lung zone distribution.

The Nonspecific x-ray findings were grouped according to type of abnormality--mass-like lesion, upper lung zone predominant, ill-defined bibasilar, focal/unilateral, Pleural effusion.

In our cases we looked for the above findings and categorised the COVID findings. We also developed a scoring system to assess the severity and grade the disease.

CXR scoring system

Some radiologists used a software called "COVID-19 score" when performing chest radiography scoring on patients potentially infected by coronavirus disease pneumonia (2). We developed a simple scoring system, which is easy to perform, can be repeated, and easily used by all.

This scoring takes into account all the major features found in chest x-ray of new COVID-19 suspected cases.

The lungs are divided into six zones, by drawing two horizontal lines, onpostero-antrior view (see CXR in Fig. 1 and Fig. 2).

Line A- is drawn at the level of carina

Line-B- is drawn at the level of inferior pulmonary vessel

Each zone numbered as 1,2,3,4,5,6 as in the CXR.

Upper zones (*1 and 4*): are above the line A

Middle zones (*2 and 5*): is between Line A and line B

Lower zones (*3 and 6*): below the line-B

Assign points for different CXR findings ,as mentioned below.

For unilateral lesion a score of 3 and bilateral lesion 6 are assigned.

For mild/moderate involvement in each zone the score assigned is 1

For severe involvement in each zone the score assigned is 2

For peripheral zone involvement 2 and central zone -1 are assigned.

For upper zone, mid zone and lower involvement the score assigned is 1 each

For focal lesion 1 and diffuse lesion 2 are assigned.

Maximum score for typical CXR findings are=14.

Case no 42- Typical bilateral peripheral opacities. The patient also had bilateral bronchiectasis

Observations

Two of our department's experienced radiologists studied the x-rays independently. Radiographic features including consolidation, ground-glass opacities (GGO), pulmonary nodules and reticular–nodular opacities were diagnosed according to the Fleischer Society glossary of

terms. Moreover, CXRs were assessed for the presence of a specific distribution of the disease (mostly peripheral or perihilar predominance); side of involvement (right or left lung) or bilateral disease; upper or lower zones or diffuse predominance. All thoracic images were also assessed for evidence of other associated pulmonary pathology (cardiomegaly, hilarenlargement, pleural effusion, pneumothorax). Finally, to quantify the extent of COVID-19 lung involvement, a severity scoring system was applied .The scores were separately assessed by each of the two radiologists

Results and Discussions

Of the seventy –four cases studied there were 55 males and 19 females (Table-1). The age wise distribution of cases is shown in Table-2. The youngest patient in our study was thirteen years of age and the oldest was eighty –three years of age. Abnormal chest x-ray findings were seen 57 cases and normal findings seen in seventeen cases (Table-3). The major findings seen in the chest –xray that were suggestive of COVID-19 infection like-consolidation, ground-glass opacities (GGO), pulmonary nodules and reticular–nodular opacities are grouped in the Table-4. Consolidation with air bronchogram was the most common finding in our study (3).The distribution of the lesions in the lungs are shown in the Table 5. Bilateral lung lesions and lower zone predominance was seen most commonly seen in our study. The co-morbidities seen in our study are shown in Table-6. Uncommonly unilateral hilar lymphadenopathy was seen in three of our cases.In our study there were two deaths-both the cases showed florid lung changes in follow-up x-rays taken four days after admission. Twenty patients were discharged after clinical improvement was noticed. Ten patients required ventilatory support.

Representative chest x-rays of some of our cases are shown in the figures (Fig.3-Fig.6).

Table.1 Total no.of cases studied

Case	numbers
Male	55
Female	19
total	74

Table.2 Age-wise distribution of the cases

Age (years)-group	Number
10-20	1
21-30	3
31-40	18
41-50	9
51-60	23
➢ 60	20

Table.3 CXR Findings (n=74)

No.of cases with abnormal findings	No.of cases with normal findings
57	17

Table.4 Major CXR findings (N=48)

MAJOR RADIOLOGICAL FINDINGS	NO.
consolidation,	20
ground-glass opacities (GGO),	14
pulmonary nodules	9
reticular–nodular opacities	5

Table.5 Distribution of lesions

		No.		No.
1.Distribution pattern	Peripheral	10	Central /perihilar	9
2.uni/bilateral lesions	unilateral	14	bilateral	34
3.Zonal predominance	upper	2	lower	16
4.distribution areas	Focal	4	diffuse	7

Table.6 Co-morbidities seen (N=9)

CO-morbidities	No.
Cardiomegaly	2
CCF	2
Pleural effusion.	1
Hilar enlargement =lymph node	3
Bronchiectasis	1

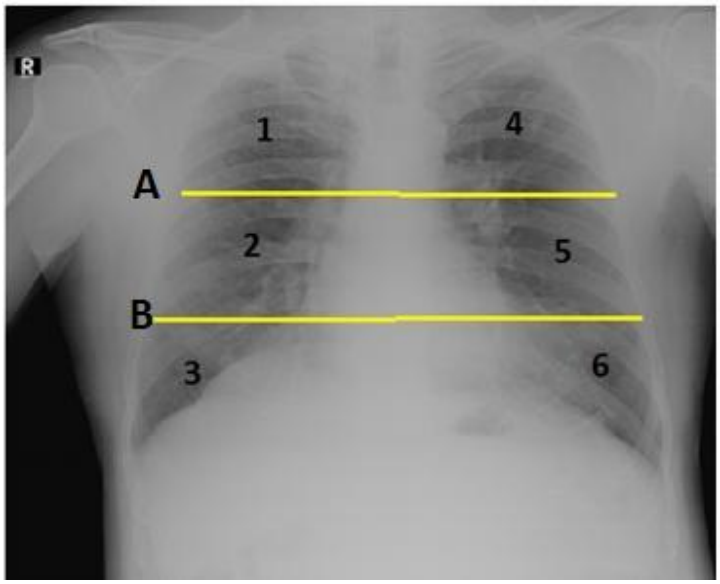

Fig.1 Chest x-ray showing scoring system

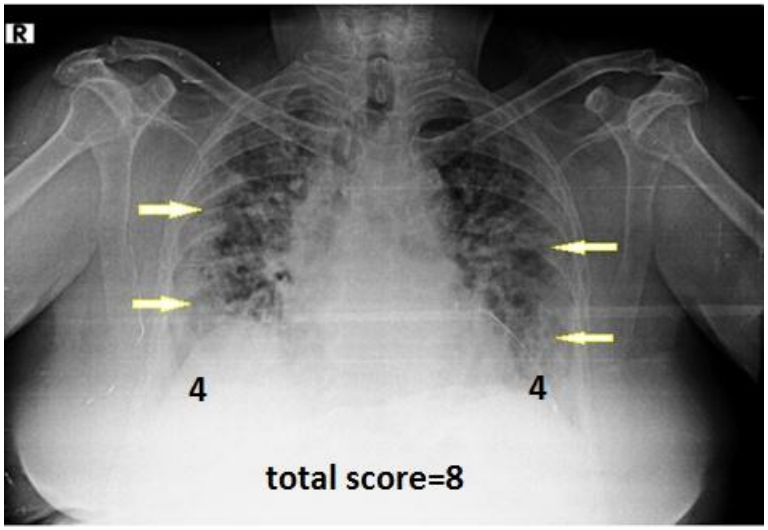

Fig.2 CXR showing scoring system in one of our case

Fig.3 CXR of 58 yrs old showing lower zone opacities L > R side. Incidentally left hilar lymphadenopathy is seen

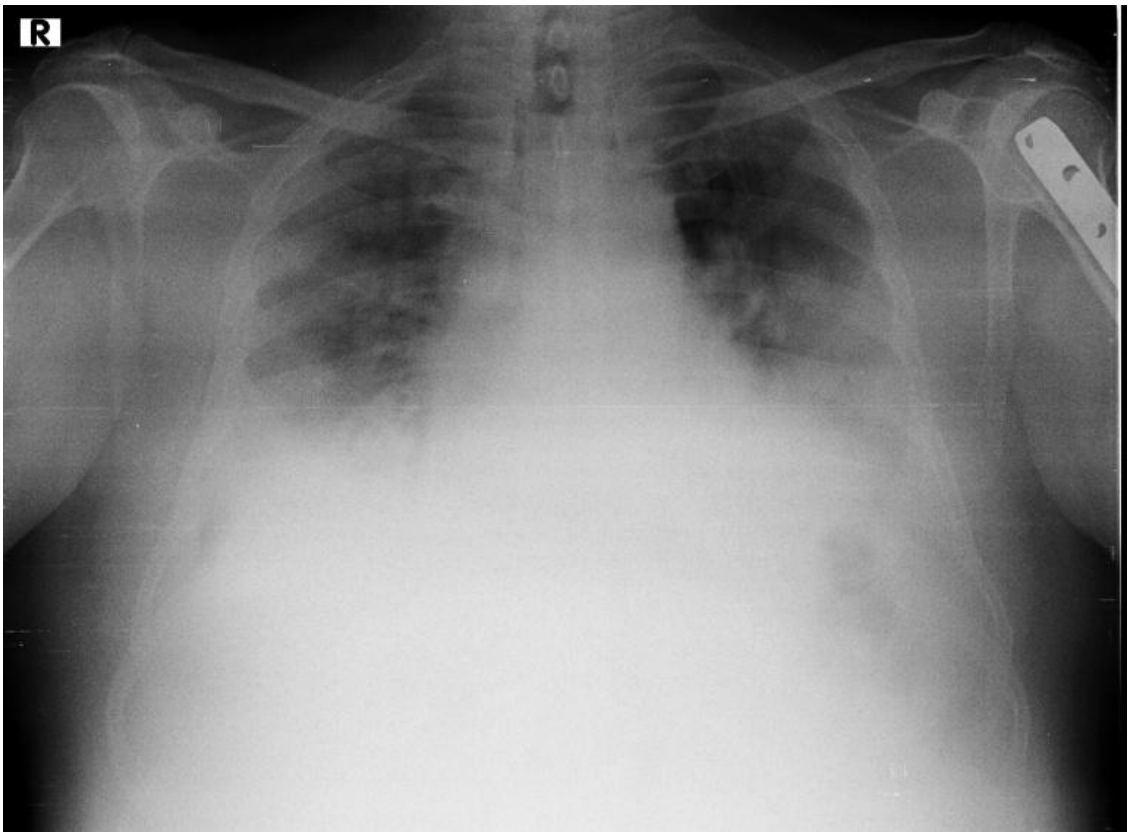

Fig.4 CXR of 68 yr. old showing bibaslaropacity, obscuring domes of diaphragm

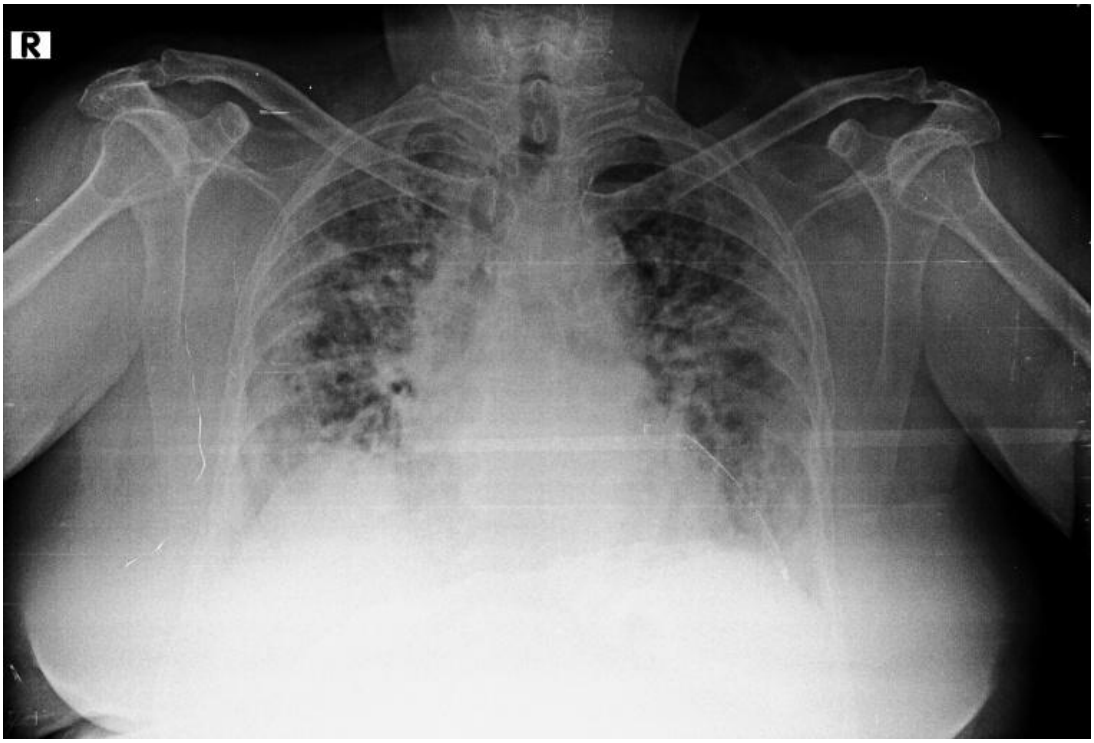

Fig.5 CXR of 70 years old showing bilateral peripheral lung opacities. Incidentally bronchiectasis is seen in both lungs

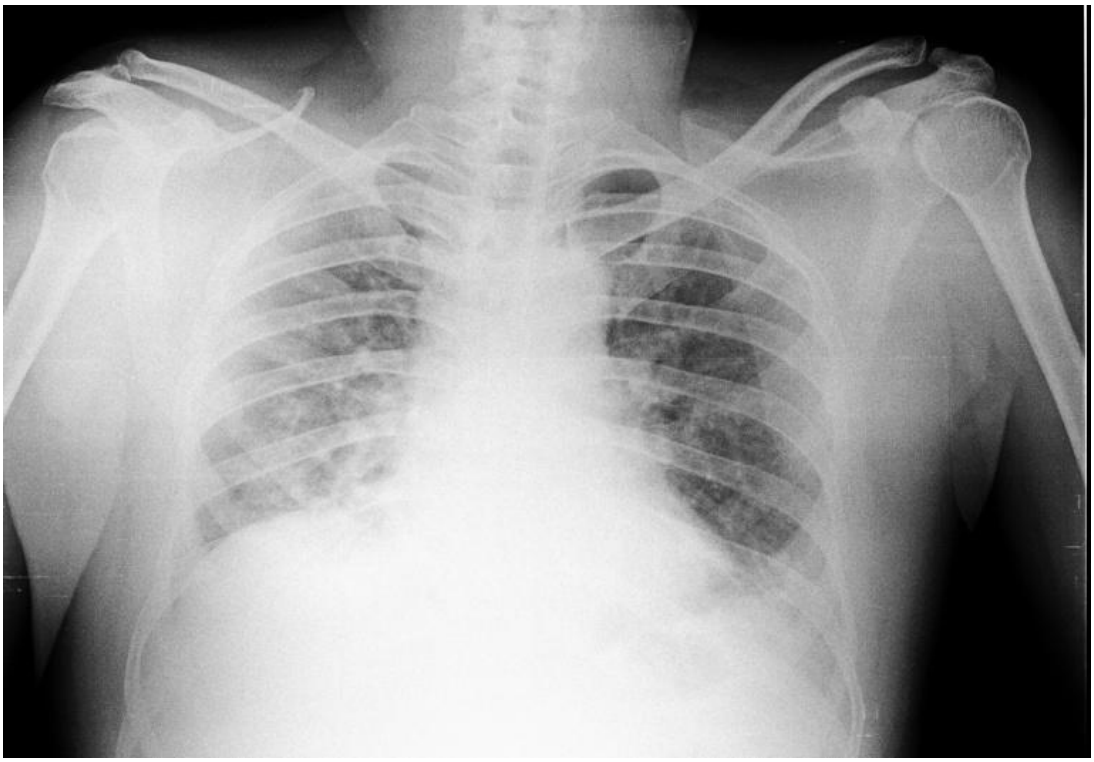

Fig.6 CXR of 56 yrs. old showing reticulo=nodular lesions in right mid, lower zones and left lower zone.

The purpose of this study is to share our initial experiences in CXR findings of suspected COVID-19 cases. Our hospital is located in a rural area ,about 15 km from the main town. CXR is useful to identify patients who require intensive care. Some patients who had normal CXR were discharged after their RT-PCR results also were normal. We were able to grade the severity of the lung lesions using simple scoring system, which any radiologist can simulate. Patients preferred CXR over CT scan for the reason-CXR are patient-friendly, cost-effective and results were given quickly. Some of our patients were advised CT scan for further evaluation of equivocal CXR findings. CXR certainly has a role in this pandemic especially in our country where cost factor is a major constraint. The diagnosis of COVID-19 is currently confirmed by laboratory testing through identification of viral RNA in reverse transcriptase polymerase chain reaction (RT-PCR). Chest imaging has been considered as part of the diagnostic workup of patients with suspected or probable COVID-19 disease where RT-PCR is not available, or results are delayed or are initially negative in the presence of symptoms suggestive of COVID-19. Imaging has been also considered to complement clinical evaluation and laboratory parameters in the management of patients already diagnosed with COVID-19 (4). As on date our study is the single largest collection of adult chest x-rays of COVI-19 suspected cases, in the Indian medical literature.

References

1. DilettaCozzi, Marco Albanesi, Edoardo Cavigli,et al; Chest X- ray in new Coronavirus Disease 2019 (COVID- 19) infection: findings and correlation with clinical outcome mjune,2020, La radiologia medica (English translation)
2. Silvia Bagnera1, Francesca Bisanti2, Claudia Tibaldi, et al., Performance of Radiologists in the Evaluation of the Chest Radiography with the Use of a "new software score" in Coronavirus Disease 2019 Pneumonia Suspected Patients, Journal of Clinical Imaging Science, 2020, 10(40).
3. Soon Ho Yoon , Kyung Hee Lee , Jin Yong Kim, et al, Chest Radiographic and CT Findings of the 2019 Novel Coronavirus Disease (COVID-19): Analysis of Nine Patients Treated in Korea, Korean J Radiol 2020 Apr;21(4):494-500.
4. Use of chest imaging in COVID-19: a rapid advice guide, WHO/2019-nCoV/Clinical/Radiology_ imaging/2020.1

How to cite this article:

Balachandran, G. and Jyoti Basu, D.N.B. 2020. Initial Experience with Covid-19 Chest X-Rays. *Int.J.Curr.Res.Aca.Rev.* 8(9), 1-7. doi: https://doi.org/10.20546/ijcrar.2020.809.001