



“HIGH RESOLUTION COMPUTED TOMOGRAPHY FINDINGS ON SHORT TERM FOLLOW UP IN COVID19 PATIENTS”

Radiodiagnosis

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ABSTRACT

AIMS AND OBJECTIVES:

1. To evaluate the lung findings on a short-term follow-up (1 to 3 months) on high resolution chest computed tomography (HRCT) in COVID-19 pneumonia patients, assess the resolution or persistence of lung abnormalities.
2. To identify the initial demographic, clinical and initial imaging findings that could potentially predict the persistence of lung abnormalities on follow-up.

METHODS: MDCT was performed on 128 slice PHILIPS CT Scanner machine on 80 patients from APRIL 2020 to OCTOBER 2020 in our SVP Hospital, NHLMMC, Ahmedabad. No age and gender bias were followed.

RESULT: On follow-up CT scan, out of the 80 patients, 46 (57.5 %) patients showed complete radiological resolution while 34 (42.5%) patients showed CT evidence of fibrotic changes (parenchymal bands, traction bronchiectasis, interstitial septal thickening).

CONCLUSION: Short term follow-up (1 to 3 months) on chest computed tomography (CT) in COVID-19 pneumonia survivors showed fibrotic changes in more than one third of patients. These changes were associated with older age, longer hospital stay, use of invasive/non- invasive mechanical ventilation, co-morbidities and higher initial chest CT score

DECLARATIONS:

Funding: None

Conflict of interest: None declared

KEYWORDS

INTRODUCTION:

The corona virus infection outbreak initially began in December 2019, in Wuhan, Capital of China. Since the outbreak of COVID-19 started in India, HRCT of the patients who were suspicious and those with RT-PCR positive were done at SVP Hospital. We have our own institutional experience of COVID-19 pneumonia. CT scan is helpful in diagnosis and follow-up of patients with COVID-19 pneumonia. The purpose of this study was to evaluate the lung findings on a short-term follow-up (1 to 3 months) on chest computed tomography (CT) in COVID-19 pneumonia patients, assess the resolution or persistence of lung abnormalities and to identify the initial demographic, clinical, and imaging characteristics that could potentially predict the persistence of lung abnormalities on follow-up.

MATERIALS AND METHODS

Retrospective observational study

DURATION OF THE STUDY:

From APRIL 2020 to OCTOBER 2020

STUDY SITE:

Department of Radio-Diagnosis;
SVPIMS
Smt. NHL MMC; Ahmedabad.

INCLUSION CRITERIA

All patients with positive RT-PCR result for SARS-CoV-2/Suspected for COVID during the specified period

Imaging Parameters:

All scans were performed on 128 slice PHILIPS CT Scanner.
Scan Parameters:
Slice Thickness: 1.00 mm
Collimation: 128 x 1.00
Pitch: 0.95
mAS: 160
KVP: 120

EXCLUSION CRITERIA: None

Demographic, Clinical and laboratory data was extracted from HIS and noted. It included age, presence of co-morbidities, hospital stay, non- invasive mechanical ventilation and initial CT severity score.

RESULTS:

From patients with positive RT-PCR result for SARS-CoV-2/Suspected for COVID between APRIL 2020 to OCTOBER 2020 we selected 80 patients.

HRCT scan was performed on these patients during hospital stay and in short term follow up (1 to 3 months). The radiological findings on the initial and follow up scans were compared to assess the resolution or persistence/worsening of lung abnormalities on follow up scans.

Out of the 80 patients, 46 (57.5 %) patients showed complete radiological resolution while 34 (42.5%) patients showed CT evidence of fibrotic like changes (parenchymal bands, traction bronchiectasis, interstitial septal thickening).

More than half of patients showed complete radiological resolution of lung findings. Majority of these patients showed mild initial CT findings (ground glass opacities) and absence of dense consolidation or interstitial septal thickening. The factors associated with complete radiological resolution were young age, short in hospital stay, absence of use of non-invasive mechanical ventilation, absence of acute respiratory distress syndrome and lower initial CT severity score.

More than one third of patients showed CT evidence of residual radiological lung abnormalities on follow-up scan. These findings included parenchymal bands (65%), traction bronchiectasis/interstitial septal thickening (25%), ground glass opacity (15%). Out of the 34 patients which showed residual lung abnormalities, 25 patients showed dense consolidation on initial CT scan while 5 patients showed crazy paving pattern. The factors associated with persistence/ worsening of radiological abnormalities were old age, long in hospital stay, use of invasive/non-invasive mechanical ventilation, co-morbidities and higher initial CT severity score.

Chart 1 Patterns of HRCT findings in patients with persistent radiological abnormalities

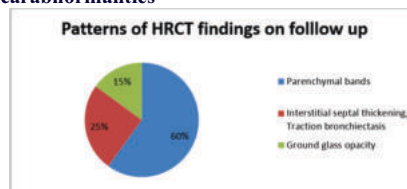
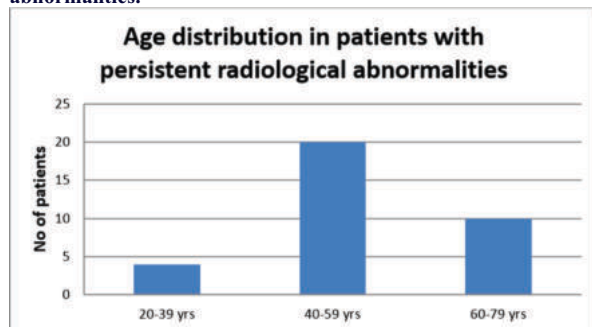


Chart 2

Age distribution in patients with persistent radiological abnormalities.

**Chart 3**

Presence of co-morbidities in patients with residual lung abnormalities.

	No of Patients (Out of 34)
Presence of Co-morbidities (Hypertension, Diabetes, IHD)	26
Nil co-morbidities	8

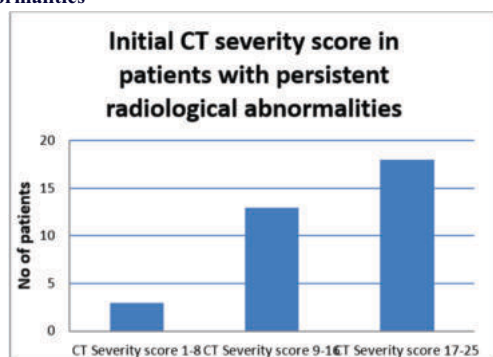
Chart 4

Presence of use of invasive/non-invasive mechanical ventilation

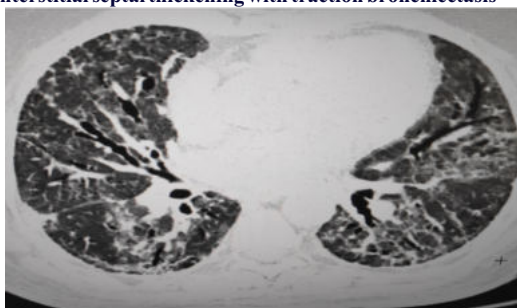
	No of patients
Use of invasive/non-invasive ventilation	30
Absent invasive/non-invasive ventilation	4

Chart 5

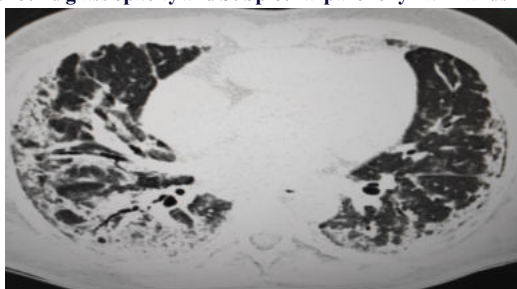
Initial CT severity score in patients with persistent radiological abnormalities

**IMAGES:**

A. Interstitial septal thickening with traction bronchiectasis



B. Ground glass opacity and Subpleural parenchymal Bands

**DISCUSSION:**

On January 30th, 2020 WHO declared COVID 19 as a sixth health emergency deserving international attention. COVID 19 is highly contagious and has spread worldwide. HRCT Thorax can be considered as standard test for prognosis of COVID 19 pneumonitis.

In our study on short term follow up of patients who either positive RT-PCR result for SARS-CoV-2 or Suspected for COVID between APRIL 2020 to OCTOBER 2020 were selected. Out of the total 80 patients observed over the defined period, 46 (57.5 %) patients showed complete radiological resolution while 34 (42.5%) patients showed CT evidence of fibrotic like changes (parenchymal bands, traction bronchiectasis, interstitial septal thickening). Majority of patients who showed complete radiological resolution had mild initial CT findings (ground glass opacities) and absence of dense consolidation or interstitial septal thickening. Out of the 34 patients which showed residual lung abnormalities, 25 patients showed dense consolidation on initial CT scan while 5 patients showed crazy paving pattern. Of the patients who showed persistent radiological abnormalities on follow-up CT scan, 60 % showed parenchymal bands as the dominant finding on follow-up scan while 25 % showed interstitial septal thickening, traction bronchiectasis and 15 % showed ground glass opacity.

The factors associated with persistence/worsening of radiological abnormalities were old age, long in hospital stay, use of invasive/non-invasive mechanical ventilation, co-morbidities and higher initial CT severity score.

Complete radiological resolution of lung abnormalities was associated with young age, short in hospital stay, absence of use of non-invasive mechanical ventilation, absence of acute respiratory distress syndrome and lower initial CT severity score.

As a result, follow up CT scan can be used to assess the persistence of lung abnormalities in patients with recurrent respiratory symptoms after recovering from COVID-19 and to assess the degree of fibrotic changes or development of interstitial lung disease. Whether or not these fibrotic changes represent permanent change in lung remains to be investigated.

These findings if present on follow-up scans with clinically apparent respiratory symptoms can help clinicians assess the need for use of bronchodilators and chest physiotherapy in order to improve patient outcomes.

CONCLUSION:

In conclusion, short term follow-up (1 to 3 months) in COVID-19 pneumonia patients showed persistence of fibrotic abnormalities in more than one-third of patients while more than half of patients showed complete radiological resolution. The patients with persistent abnormalities were older, comorbid and had more severe disease during acute phase. However long-term lung sequelae remain unknown.

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