

ROLE OF FOLLOW UP HIGH RESOLUTION COMPUTED TOMOGRAPHY LUNG IN POST COVID 19 INFECTION.

Radio-Diagnosis

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ABSTRACT

Background: The novel Coronavirus disease 2019 (COVID-19) is an illness caused due to SARS-CoV-2 and are primarily related to the pulmonary system. High resolution computed tomography is used to radiological pattern and manifestation of post covid-19 infection after 1 and 6 months. On High resolution computed tomography small patchy, ground-glass opacity (GGO), and consolidations, interlobular septal thickening, crazy-paving pattern, parenchymal bands, traction bronchiectasis and coarse reticulation were more common in patients. **Material & Methods:** This was prospective observational study time bound study conducted in a tertiary care center in 160 patients of clinically diagnosed covid 19. HRCT was done at admission, after 1 month and at 6month with radiological finding studied and interpreted in detail. **Results:** 1) Follow up HRCT lung at one month has shown that most common finding was parenchymal bands in 97 (60.63%) cases followed by interlobular septal thickening in 93 (58.13%), ground glass opacity in 60 (37.5%), tractional bronchiectasis in 54 (33.75%), honeycombing/coarse reticular pattern/fibrotic changes in 37 (23.13%), consolidation in 25 (15.63%), air bronchogram in 05 (3.13%) & emphysematous changes in 1 (0.6%) case. 2) Follow up HRCT lung at six months has shown that most common finding was interlobular septal thickening in 42 (26.25%) followed by parenchymal bands in 40 (25%) cases, tractional bronchiectasis in 41 (26.63%), honeycombing/coarse reticular pattern/fibrotic changes in 20 (12.5%), GGO in 15 (9.38%), consolidation in 06 (3.75%) & emphysematous changes in 1 (0.6%) case. **Conclusion:** 1) HRCT is the modality which diagnoses the severity of disease and post covid 19 disease manifestation. 2) At one month there was persistence of honeycombing/coarse reticular pattern/fibrotic changes, interlobular septal thickening, parenchymal bands, tractional bronchiectasis & emphysematous changes. 3) At six months there was persistence of tractional bronchiectasis & emphysematous changes indicating persistence & irreversibility of these changes.

KEYWORDS

SARS-CoV-2- severe acute respiratory syndrome coronavirus-2, HRCT - High resolution computed tomography, GGO - Ground glass opacity.

INTRODUCTION

The novel Coronavirus disease 2019 (COVID-19) is an illness caused due to SARS-CoV-2. The World Health Organization (WHO) has declared this outbreak a global health emergency and as on April 24, 2020.⁽¹⁾ The clinical manifestations of COVID-19 are primarily related to the pulmonary system include dyspnea and cough and in severe cases, ARDS, respiratory failure, and even death can occur.⁽²⁾ High resolution computed tomography is the use of thin-section CT images (≤ 1.5 -mm slice thickness) with a high spatial frequency reconstruction algorithm to detect and characterize diseases that affect the pulmonary parenchyma.⁽³⁾ Initial CT and follow-up CT findings in COVID-19 pneumonia with different clinical types, and the dynamic changes of different clinical types will help to understand the evolution of disease. The "CT severity score" is a scoring system is used to estimate the pulmonary involvement of COVID19 related abnormalities on the basis of the area involved. Each of the five lung lobes is visually scored on a scale of 0 to 5.⁽⁴⁾

On High resolution computed tomography small patchy, ground-glass opacity (GGO), and consolidations, interlobular septal thickening, crazy-paving pattern, parenchymal bands and air bronchogram sign were more common in patients.⁽⁵⁾

AIM

- To study the radiological pattern and manifestation of post covid-19 infection on HRCT Lung after 1 and 6 months.
- To compare HRCT-Lung follow up findings after 1 & 6 months with baseline HRCT findings at admission.

MATERIAL AND METHODS

This was prospective observational study time bound study conducted in a tertiary care centre in 160 patients of clinically diagnosed covid 19 who had been admitted in the tertiary care center and hospital in medicine ward, intensive Care unit and discharged from hospital and referred for HRCT lung from medicine department were selected to enter the study and willing to participate in study from November 2020 to June 2022.

For all scanning techniques 128 slice multidetector Siemens CT Scanner is used to obtain HRCT lung. The scanning parameter is 120kV, 120mAs; matrix 512x512 scanning time 0.55s/circuit; collimator is 0.625mm; reconstruction algorithm: high spatial frequency, window, lung window.

HRCT was done at admission, after 1 month and at 6month with radiological finding studied and interpreted in detail.

After imaging data collected & analyzed for the observations & results.

RESULTS

- Baseline HRCT lung (at admission) had shown that most common finding was GGO in 125 (78.13%) cases followed by parenchymal bands in 91 (56.88%) cases, interlobular septal thickening in 88 (55%), consolidation in 68 (42.5%), honeycombing/coarse reticular pattern/fibrotic changes in 52 (32.5%), tractional bronchiectasis in 49 (30.63%), crazy paving pattern in 45 (28.13%) & air bronchogram in 30 (18.75%). Other less common radiological findings were pleural effusion (5%), lymphadenopathy (3.13%) & emphysematous change (2.5%).
- Follow up HRCT lung at one month has shown that most common finding was parenchymal bands in 97 (60.63%) cases followed by interlobular septal thickening in 93 (58.13%), ground glass opacity in 60 (37.5%), tractional bronchiectasis in 54 (33.75%), honeycombing/coarse reticular pattern/fibrotic changes in 37 (23.13%), consolidation in 25 (15.63%), air bronchogram in 05 (3.13%) & emphysematous changes in 1 (0.6%) case.

Table 1: Distribution Of Patients According To HRCT Lung Findings At One Month Follow Up. (n=160).

1) HRCT lung finding	Frequency	Percent
Air bronchogram	05	3.13
Consolidation	25	15.63
Crazy paving pattern	04	2.5
Emphysematous changes	01	0.6

Ground glass opacity	60	37.5
Honeycombing/coarse reticular pattern/fibrotic changes	37	23.13
Interlobular septal thickening	93	58.13
Lymphadenopathy	00	00
Parenchymal bands	97	60.63
Pleural effusion	00	00
Pericardial effusion	00	00
Tractional bronchiectasis	54	33.75

- 3) Follow up HRCT lung at six months has shown that most common finding was interlobular septal thickening in 42 (26.25%) followed by parenchymal bands in 40 (25%) cases, tractional bronchiectasis in 41 (26.63%), honeycombing/coarse reticular pattern/fibrotic changes in 20 (12.5%), GGO in 15 (9.38%), consolidation in 06 (3.75%) & emphysematous changes in 1 (0.6%) case.

Table 2 : Distribution Of Patients According To HRCT Lung Findings At 6 Months Follow Up (n=160).

HRCT lung finding	Frequency	Percent
Air bronchogram	00	00
Consolidation	06	3.75
Crazy paving pattern	00	00
Emphysematous changes	01	0.6
Ground glass opacity	15	9.38
Honeycombing/coarse reticular pattern/fibrotic changes	20	12.5
Interlobular septal thickening	42	26.25
Lymphadenopathy	00	00
Parenchymal bands	40	25
Pleural effusion	00	00
Pericardial effusion	00	00
Tractional bronchiectasis	41	26.63

DISCUSSION

- Baseline HRCT lung (at admission) had shown that most common finding was GGO in 78.13% cases followed by parenchymal bands in 56.88% cases, interlobular septal thickening in 55%, consolidation in 42.5%, honeycombing/coarse reticular pattern/fibrotic changes in 32.5%, tractional bronchiectasis in 30.63%, crazy paving pattern in 28.13% & air bronchogram in 30 (18.75%). This is consistent with Liu et al (2020)⁽⁶⁾ and Long et al (2020).⁽⁷⁾
- Follow up HRCT lung at one month has shown that most common finding was parenchymal bands in 60.63% cases followed by interlobular septal thickening in 58.13%, ground glass opacity in 37.5%, tractional bronchiectasis in 33.75%, honeycombing/coarse reticular pattern/fibrotic changes in 23.13%, consolidation in 15.63%, air bronchogram in 3.13% & emphysematous changes in 0.6% cases. This is consistent with E. Kurys-Denis et al.⁽⁸⁾ and Mengqi Liu et al.⁽⁹⁾
- Follow up HRCT lung at six months has shown that most common finding was interlobular septal thickening in 26.25% followed by parenchymal bands in 25% cases, tractional bronchiectasis in 26.63%, honeycombing/coarse reticular pattern/fibrotic changes in 12.5%, GGO in 9.38%, consolidation in 3.75% & emphysematous changes in 0.6% case. This is consistent with E. Kurys-Denis et al.⁽⁸⁾ and Mengqi Liu et al.⁽⁹⁾
- only HRCT lung findings of interlobular septal thickening associated with >60 years age group indicating covid patients with advancing age is more at risk of it. This is consistent with Xiaoyu Han et al.⁽¹⁰⁾ and Mengqi Liu et al.⁽⁹⁾

CONCLUSION

HRCT is the modality which diagnoses the severity of disease and post covid disease manifestation. Common imaging abnormalities found were ground glass opacity, parenchymal bands, interlobular septal thickening, consolidation, honeycombing/coarse reticular pattern/fibrotic changes.

At one month there was persistence of honeycombing/coarse reticular pattern/fibrotic changes, interlobular septal thickening, parenchymal bands, tractional bronchiectasis & emphysematous changes. At 6 months there was persistence of tractional bronchiectasis & emphysematous changes indicating persistence & irreversibility of these changes.

HRCT is non-invasive technique which is very useful in diagnosing

disease progression and its aftereffect by screening of post covid patients at one and six months especially those with age >60 years, with comorbidities & severe disease.



Image No 01 : 48 Year Old Male 6 Month After Covid 19 Infection Complain Of Cough On Axial Section Of Hrct Shows Tractional Bronchiectasis In Lateral And Posterobasal Segments Of Bilateral Lower Lobes.

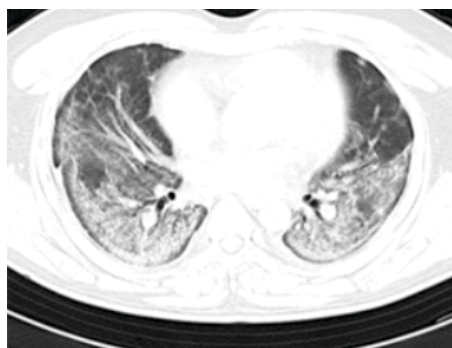


Image No 02 : 65year Female At 1 Month Of Covid 19 Infection On Axial Section Of Lung Window Shows Ground Glass Opacities Involving Bilateral Lower Lobes With Subpleural Sparing



Image No 03 : 62 Year Female After 1 Months Of Covid 19 Infection On Axial Section Of Lung Window Shows Round Glass Opacities With Intra And Interlobular Septal Thickening Giving Crazy Paving Appearance Involving Lateral Segment Of Right Middle Lobe, Superior Lingular Segment Of Left Upper Lobe Superior Segment Of Bilateral Lower Lobes

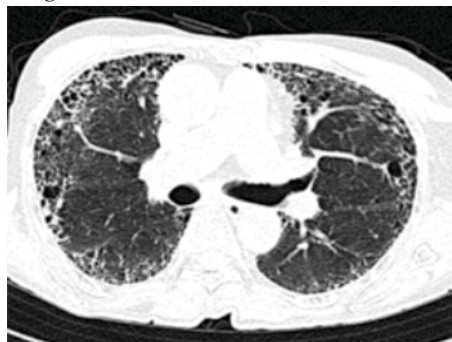


Image No 04: 82 Year Male After 6 Months Of Covid 19 Infection Complaining Of Cough On Axial Section At Subcarinal Level Of

Lung Window Shows Clustered Cystic Air Spaces In Subpleural And Peripheral In Bilateral Upper Lobes And Superior Segment Of Bilateral Lower Lobe Suggests Honeycombing.

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