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# STUDY AND EVALUATION OF COVID-19 BY HRCT CHEST

Radio-Diagnosis

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## ABSTRACT

COVID-19 (coronavirus disease-2019) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a strain of coronavirus. The first cases were seen in Wuhan, China, in December 2019 before spreading globally. The outbreak was officially recognised as a pandemic by the World Health Organization (WHO) in March 2020. The WHO declared an end to the global health emergency in May 2023 but it remains a pandemic. A definitive diagnosis of COVID-19 requires a positive RT-PCR test. Best practice advises that CT chest is not used to diagnose COVID-19, but may help assess for complications. The non-specific imaging findings are most commonly of atypical or organizing pneumonia, most commonly with a bilateral, peripheral, and basal predominant distribution.

## KEYWORDS

Covid-19, HRCT, RT-PCR, consolidation, ground glass

## INTRODUCTION

COVID-19 is an infectious disease caused by SARS-CoV-2, which emerged in late 2019 in Wuhan, China. It is part of a lineage of viral pandemics like SARS (2002-2003) and MERS (2012). COVID-19 primarily affects the respiratory system, with clinical symptoms ranging from asymptomatic to severe cases involving fever, cough, and shortness of breath. The gold standard for diagnosis is RT-PCR, but High-Resolution Computed Tomography (HRCT) is crucial for assessing lung involvement, especially in cases where RT-PCR results are delayed or inconclusive.

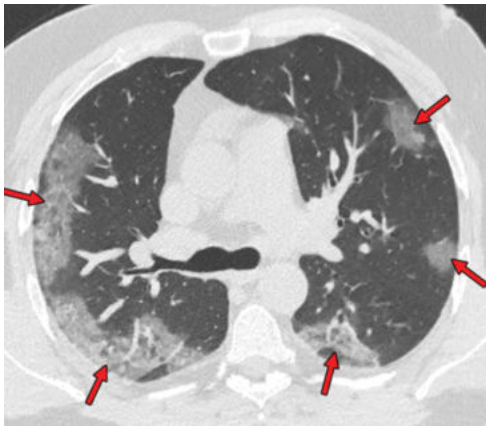
### Aims And Objectives

The study aimed to:

1. Diagnose early-stage COVID-19 using HRCT Chest to improve patient management.
2. Evaluate HRCT patterns in COVID-19 patients.
3. Compare COVID-19 with other viral diseases.
4. Grade lung involvement severity in COVID-19 infection using HRCT.

### Review Of Literature

COVID-19 was declared a pandemic in March 2020, with millions of cases and deaths globally. Imaging plays a pivotal role in understanding disease progression. While RT-PCR is the primary diagnostic tool, HRCT is valuable in identifying lung abnormalities like ground-glass opacities (GGO) and consolidations, particularly in moderate-to-severe cases. Typical CT findings include bilateral, peripheral, and basal-predominant distributions of opacities. Vaccines and antiviral treatments like dexamethasone have helped manage the disease, but variants of SARS-CoV-2 continue to challenge global health efforts.



**Chest Ct Shows Hazy Ground Glass Opacities In Both Lungs Predominantly Peripheral In Distribution (arrows).**

## MATERIALS AND METHODS

This descriptive correlation study took place at MGM Hospital, Navi Mumbai, from December 2020 to September 2022. It involved 100 patients clinically suspected of COVID-19, with or without RT-PCR confirmation. HRCT chest scans were used to evaluate lung involvement, and patients were categorized based on severity. The study excluded trauma and post-operative patients. Scans were analyzed for typical COVID-19 features, including GGOs, septal thickening, and consolidations.

### Corads Classification

**CO-RADS***
**Level of suspicion COVID-19 infection**

| | | CT findings |
|---|---|---|
| **CO-RADS 1** | No | normal or non-infectious abnormalities |
| **CO-RADS 2** | Low | abnormalities consistent with infections other than COVID-19 |
| **CO-RADS 3** | Indeterminate | unclear whether COVID-19 is present |
| **CO-RADS 4** | High | abnormalities suspicious for COVID-19 |
| **CO-RADS 5** | Very high | typical COVID-19 |
| **CO-RADS 6** | PCR + | |

## RESULTS

**Key results include:**

- **Gender Distribution:** 58% male and 42% female participants.
- **Age Distribution:** Most patients (43%) were between 61-80 years old.
- **Comorbidities:** 59% had diabetes, and 57% had hypertension.
- **Symptoms:** 93% of patients presented symptoms, with cough and fever being the most common.
- **HRCT Findings:** 97% had ground-glass opacities, 79% had airspace consolidations, and 67% showed signs of traction bronchiectasis.
- **COVID Severity:** 69% of patients had moderate COVID severity based on HRCT scores, and there was a significant correlation between HRCT findings and clinical severity.

## DISCUSSION

HRCT proved highly sensitive in detecting COVID-19-related lung involvement, even in RT-PCR-negative patients. Ground-glass opacities, crazy-paving patterns, and consolidations were consistent markers for diagnosis and grading severity. HRCT also helped identify complications like Acute Respiratory Distress Syndrome (ARDS) and

pulmonary embolism, which were more prevalent in severe cases. The study reinforces the utility of HRCT in diagnosing and managing COVID-19.

## CONCLUSION

HRCT chest imaging is an essential tool for diagnosing and managing COVID-19, particularly in cases where RT-PCR results are delayed or negative. The scan's ability to detect early lung involvement, grade severity, and guide treatment makes it invaluable during pandemics.

## REFERENCES

1. WHO 2020, "We now have a name for the #2019nCoV disease: COVID-19. I'll spell it: C-O-V-I-D hyphen one nine – COVID-19", Tweet, 11 February, viewed 11 February 2020, https://twitter.com/WHO/status/1227248333871173632
2. Gorbalenya A, Baker S, Baric R et al. Severe Acute Respiratory Syndrome-Related Coronavirus: The Species and Its Viruses – a Statement of the Coronavirus Study Group. BioRxiv. 2020;2020.02.07.937862. doi:10.1101/2020.02.07.937862
3. Enserink, M. (2020). Update: 'A bit chaotic.' Christening of new coronavirus and its disease name create confusion. [online] Sciencemag.org. Available at: https://www.sciencemag.org/news/2020/02/bit-chaotic-christening-new-coronavirus-and-its-disease-name-create-confusion [Accessed 18 February 2020].
4. "Naming the coronavirus disease (COVID-19) and the virus that causes it". Who.int. 2020. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it
5. COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU) Case Dashboard. [accessed 31 August 2022].
6. Davies N, Abbott S, Barnard R et al. Estimated Transmissibility and Impact of SARS-CoV-2 Lineage B.1.1.7 in England. Science. 2021;372(6538). doi:10.1126/science.abg3055 - Pubmed