



# INTERNATIONAL JOURNAL OF CURRENT MEDICAL AND PHARMACEUTICAL RESEARCH

ISSN: 2395-6429, Impact Factor: 4.656

Available Online at [www.journalcmpr.com](http://www.journalcmpr.com)

Volume 7; Issue 02(A); February 2021; Page No.5531-5533

DOI: <http://dx.doi.org/10.24327/23956429.ijcmpr202102957>



Research Article

## ROLE OF HRCT THORAX IN COVID-19 IRRESPECTIVE OF COVID-19 RTPCR

Kandarp M Patel<sup>1</sup>., Naresh Kumar<sup>2</sup>., Shivani Bansal<sup>3</sup> and Ashok Kumar<sup>4</sup>

<sup>1,4</sup>General Medicine, Santosh Medical College & Hospital, Ghaziabad, India

<sup>2,3</sup>Medicine, Santosh Medical College & Hospital, Ghaziabad, India

### ARTICLE INFO

#### Article History:

Received 15<sup>th</sup> November, 2020

Received in revised form 7<sup>th</sup> December, 2020

Accepted 13<sup>th</sup> January, 2021

Published online 28<sup>th</sup> February, 2021

#### Key words:

RT-PCR, COVID 19, HRCT, Pneumonia

### ABSTRACT

**Background:** As COVID-19 declared pandemic by WHO, early diagnosis and treatment of COVID-19 is essential. COVID Antigen and RTPCR tests are commonly done to make this diagnosis. Currently we are using RT-PCR for diagnosis of COVID-19 and sensitivity of the test is 60-70% but CT has high sensitivity towards identification in early phase of disease and it also correlates with severity of disease. In view of that our aim of study is role of HRCT thorax in COVID-19 irrespective of COVID-19 RTPCR status.

**Methodology:** This was a Randomized Retrospective observational study conducted in SANTOSH hospital Ghaziabad, from march 2020 to November 2020. 25 subjects were included after detailed history, physical examination, relevant routine investigations, Chest X-RAY, CT chest, COVID-19 RTPCR, inclusion and exclusion criteria who were divided into two age groups. Then they were assessed for co-relation between CT severity score and severity of symptoms, co-morbidities, and age.

**Results:** The diagnosis of COVID 19 is mainly done by COVID antigen and RT-PCR. CT has high sensitivity as compared to RT-PCR in early diagnosis of COVID 19. CT scoring is highly correlated with the severity of the patient's symptoms, age and co-morbidities. we found that individuals with older age and co-morbidities are more likely to be getting infected with COVID-19 and most of them had DM as the comorbidity.

**Conclusion:** CT has high sensitivity as compared to RT-PCR in early diagnosis of COVID 19. Our study showed that CT scan was advised to all the patients and we found that there is an evidence of COVID 19 like pneumonia and all the patients became positive on subsequent RT-PCR repetitions. Nonetheless, our findings reinforce the need for repeated testing in patients with suspicion of SARS-Cov-2 infection on CT Scan.

Copyright © 2021 **Kandarp M Patel et al.** This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

### INTRODUCTION

Corona virus disease 2019 (COVID -19) is a highly contagious disease caused by Severe acute respiratory syndrome coronavirus 2 (SARSCoV-2). The disease was firstly described in Wuhan city of China where several cases of pneumonia of unknown etiology were reported in the month of December.<sup>1</sup> Then the disease started rapidly spreading in China and gradually engulfing other countries as well and consequently was declared as global pandemic outbreak on March 11th 2020.<sup>2</sup> The diagnosis is made primarily by RT-PCR test (Real Time Polymerase Chain Reaction) where specimen are obtained from upper respiratory tract (naso-and oropharyngeal samples). This method is rapid, sensitive and specific however the results of the test are not immediately available as well as the sensitivity reported in several studies ranges from 42% to 83% depending on symptom duration, viral load, and test sample quality that implicates that the chances of getting the false negative results should not be ignored.<sup>3-7</sup> False-negative

cases have important implications for isolation and risk of transmission of virus to other communities as well.

Radiological investigations like Chest X-Rays showed little diagnostic value in early stages, whereas chest Computed Tomography (CT) showed a high sensitivity for the diagnosis of COVID-19, particularly important in COVID-19 patients with false negative RT-PCR result, assuming a role for the CT as a primary tool for COVID-19 diagnosis in the COVID epidemic areas.<sup>8-10</sup> A non-contrast high resolution CT chest plays a very crucial role in both diagnosis and assessing the severity of disease. Most importantly one can monitor the progression of disease and can start patient management well within the early course of the disease. Bilateral evidence of ground-glass opacities (GGO) with or without consolidation with posterior and peripheral distribution represents the most characteristic appearance of COVID-19 pneumonia.<sup>11-12</sup>

\*Corresponding author: **Kandarp M Patel**

General Medicine, Santosh Medical College & Hospital, Ghaziabad, India

## AIMS AND OBJECTIVES

### Aim

To assess the role of HRCT Thorax in COVID-19 irrespective of COVID-19 RT-PCR report.

### Primary Objective

1. To study the sensitivity of HRCTThorax for early diagnosis of COVID-19.
2. To assess the relationship of COVID-19 symptoms with CT severity score.

### Secondary Objective

1. To assess the relationship of Age with COVID-19.

## METHODS

**Site of the study:** The present retrospective observational study was done at Santosh Hospital, Ghaziabad, India; over a period from March 2020 to November 2020.

**Sample Size:** 25 subjects aged between 20-80 years were enrolled that fulfilled the following inclusion and exclusion criteria.

### Inclusion Criteria

1. History of fever, cough, breathlessness, loose stools.
2. COVID RT-PCR negative.
3. X ray showing consolidation.
4. CT scan showing COVID 19 Like features.

### Exclusion Criteria

1. Patients with CT severity score – Zero
2. Other cause of Acute Febrile illness like Malaria, Enteric, Dengue and Urinary tract infection were also excluded.
3. Acute pneumonia involving the apex of lung with history of fever more than 2 weeks were excluded.

### Data collection & Statistical methods

A pre-designed, self-administered proforma was designed keeping the objectives of the study at the centre point. The purpose of the study was explained to the patient and informed consent was obtained. Patients were selected for study which satisfies all criteria. In the construction of the proforma, utmost care was taken to make it broad based, so that all the aspects desired to be studied could be incorporated in its body. The subjects were selected and evaluated by detailed medical history, physical examination, systemic examination, Chest X-ray PA view, HRCT chest, COVID-19 RT PCR and routine investigations. Patients were monitored during the period of hospital stay to note their outcome. All patients were followed up to discharge or other outcomes, whether in the department or after being transferred to other wards. Follow up data were retrieved from digital and written patient records, including discharge letters and any other relevant documentation. The data collected was entered on pre-designed proforma and it was then tabulated in master chart with the help of Microsoft excel spread sheet. The categorical variables were presented as frequencies and percentage. The data was analysed with the help of SPSS Trial Version 22 statistical package.

### CT Severity Scoring System:<sup>4</sup>

Affected lung (percentage per lobe)	Points
less than 5%	1
5-25%	2
25-50%	3
50-75%	4
75-100%	5

  

CT Score	CT Severity
<8	MILD
9-15	MODERATE
>15	SEVERE

### Observations

**Table 1** Age distribution among the subjects

Age range	Patients	Percentage (%)
20-50 years	7	28.0
50-80 years	18	72.0
Total [N=25]	25	100

**Table 2** Comorbidities

Age range	With Comorbidities		Without Comorbidities	
	Patients	Percentage (%)	Patients	Percentage (%)
20-50 years	3	17.65	4	50.0
50-80 years	14	82.35	4	50.0
Total [N=25]	17	68.0	8	32.0

Age range	Diabetes Mellitus		Hypertension		Hypo/Hyper Thyroidism	
	Patients	Percentage (%)	Patients	Percentage (%)	Patients	Percentage (%)
20-50 years	2	20.0	1	20.0	0	0
50-80 years	8	80.0	4	80.0	2	100
Total [N=25]	10	58.82	5	29.41	2	11.77

**Table 3** Co-relation of CT Severity score with RT-PCR

CT Severity Score	Patients (N)	Percentage (%)	Severity of symptoms	Initial RT-PCR	Subsequent Repeat RT-PCR
Mild (<8)	2	8.0	Less	NEGATIVE	POSITIVE
Moderate (8-15)	18	72.0	More	NEGATIVE	POSITIVE
Severe (>15)	5	20.0	More	NEGATIVE	POSITIVE

## DISCUSSION

COVID-19 regarded as a highly contagious disease and has created a chaotic situation at every front. The clinical course of the disease is unpredictable and ranges from asymptomatic or subclinical to critical disease like ARDS or MODS which may require ventilator support and ICU care. There is no specific treatment or vaccination available till date and no prognostic bio-markers to identify the patients requiring immediate medical attention. There is a limitation of RT-PCR assay which has shown to be a limited sensitivity when performed on samples from upper respiratory tract (naso-oro-pharyngeal swab) and the test results are also time taking with false negative possibility. Growing evidence shows that sensitivity of nasopharyngeal swabs may be insufficient if taken at a single time and heavily relied on technical characteristics of the test and the sample collection method. Low sensitivity of RT-PCR also implies that a large number of COVID-19 patients would not be quickly diagnosed and may lead to further spread of the disease. As compared to RT-PCR, CT chest has high sensitivity and can identify the disease in early stage and hence the potential carrier of the virus can be isolated in the initial stage only. Our study also confirmed that all the patients presented with COVID-19 like features were initially negative for RT-PCR but chest x-ray showed pneumonia like features [consolidation]. So we did CT chest

for all the patients where we found that there is evidence of COVID-19 pneumonia [CT Findings in majority of the patients were bilateral ground glass opacities with or without consolidation] and on subsequent repetition of RT-PCR tests, all the patients became positive. After that all the patients were referred to designated COVID hospital.

In our study we found that individuals with older age and comorbidities are more likely to be getting infected with COVID-19 and most of them had DM as the comorbidity. As DM leads to immune-compromised state, hyperglycaemic state, which leads to uncontrollable serious infection in COVID-19 patients. We also found that CT severity score >8 had more severe symptoms requiring more oxygen demand and more aggressive management.

In support of these clinical observations, Orsi *et al* concluded that CT scan could be used to diagnose and discharge patients with negative imaging results and clinical stability without waiting for the results of the RT-PCR as there is a high chance of false negative result of the test.<sup>13</sup> In another study Pan *et al*, GGO was recognizable in all the disease stages, consolidation was the most common finding in stage 3. They stated that GGO and consolidations often with a bilateral and peripheral lung distribution could be considered as the CT hallmark of COVID 19 pneumonia.<sup>14</sup> Performance of chest CT scan in diagnosing COVID-19 pneumonia, with RT-PCR as reference standard was carried out on 1014 patients suspected of SARS-CoV-2 infection by Ai *et al*. Dynamic conversion of RT-PCR results were analyzed for the patients with negative RT-PCR and they found that 75% had positive CT chest findings.<sup>4</sup> Our study showed 100 % sensitivity of CT scans. This is a hospital based small study of a shorter duration. A prospective study with large sample size and follow up evaluation will supplement the role of CT scan in diagnosis of COVID 19.

## CONCLUSION

CT has high sensitivity as compared to RT-PCR in early diagnosis of COVID 19. Our study showed that CT scan was advised to all the patients and we found that there is an evidence of COVID 19 like pneumonia and all the patients became positive on subsequent RT-PCR repetitions. Nonetheless, our findings reinforce the need for repeated testing in patients with suspicion of SARS-Cov-2 infection on CT Scan.

## References

1. Wuhan Municipal Health Commission. Report of clustering pneumonia of unknown etiology in Wuhan City. 2019. [<http://wjw.wuhan.gov.cn/front/web/showDetail/2019123108989>].

2. World Health Organization website. WHO Director-General's opening remarks at the media briefing on COVID-19. 2020.<https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-COVID-19>.
3. Li Y, Yao L, Li J *et al*. Stability issues of RT-PCR testing of SARS-CoV-2 for hospitalized patients clinically diagnosed with COVID-19. *J Med Virol* Published online March 26, 2020.
4. Ai T, Yang Z, Hou H, Zhan C, Chen C, Lv W, *et al*. Correlation of chest CT and RT-PCR testing in coronavirus disease 2019 (COVID-19) in China: a report of 1014 cases. *Radiology*. 2020;26:200642.
5. Wang W, Xu Y, Gao R *et al*. Detection of SARS-CoV-2 in different types of clinical specimens. *JAMA* Published online March 11, 2020.
6. Zou L, Ruan F, Huang M *et al*. SARS-CoV-2 viral load in upper respiratory specimens of infected patients. *N Engl J Med* 2020;382(12):1177–1179.
7. Corman VM, Landt O, Kaiser M *et al*. Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR. *Euro Surveill* 2020;25(3).
8. Li Y, Xia L. Coronavirus disease 2019 (COVID-19): role of chest CT in diagnosis and management. *AJR Am J Roentgenol*. 2020;4:1–7.
9. Salehi S, Abedi A, Balakrishnan S, Gholamrezanezhad A. Coronavirus disease 2019 (COVID-19): a systematic review of imaging findings in 919 patients. *AJR Am J Roentgenol*. 2020;14:1–7.
10. Huang P, Liu T, Huang L, *et al*. Use of chest CT in combination with negative RT-PCR assay for the 2019 novel coronavirus but high clinical suspicion. *Radiology*. 2020;295:22–3.
11. Wang D, Hu B, Hu C, *et al*. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *China JAMA*. 2020.
12. Chung M, Bernheim A, Mei X, *et al*. CT imaging features of 2019 novel coronavirus (2019-nCoV). *Radiology*. 2020.
13. Orsi MA, Oliva AG, Cellin M [2020] Radiology department preparedness for COVID 19 facing an unexpected outbreak of the disease. *Radiology* 295;E8-E8.
14. Pan F, Ye T, Sun P, Gui S, Liang B, Li L *et al*, Time course of lung changes on chest CT during recovery from 2019 novel coronavirus pneumonia, *Radiology* 2020;13;200370.

### How to cite this article:

Kandarp M Patel *et al* (2021) 'Role of HRCT Thorax in Covid-19 Irrespective of Covid-19 RTPCR', *International Journal of Current Medical and Pharmaceutical Research*, 07(02), pp 5531-5533.

\*\*\*\*\*