ISSN 2515-8260 Volume 10, Issue 1, 2023

CLINICAL AND RADIOLOGICAL CORRELATION IN COVID 19 DISEASE

Dr. Vishnu Prabhakar[1], Dr. Shailesh Meshram[2], *Dr. Harsha Elizabeth Meleth[3], Dr. M S Barthwal[4], Dr. Deepu Palal[5]

1. Third Year resident, Department of Respiratory Medicine, Dr. D.Y. Patil Medical College Hospital and Research Centre, Dr. D.Y. Patil Vidyapeeth, Pune, Maharashtra, India.
2. Assistant professor, Department of Respiratory Medicine, Dr. D.Y. Patil Medical College Hospital and Research Centre, Dr. D.Y. Patil Vidyapeeth, Pune, Maharashtra, India.
3. Third year Resident, Department of Respiratory Medicine, Dr. D.Y. Patil Medical College Hospital and Research Centre, Dr. D.Y. Patil Vidyapeeth, Pune, Maharashtra, India.
4. Professor, Head of the Department, Department of Respiratory Medicine, Dr. D.Y. Patil Medical College Hospital and Research Centre, Dr. D.Y. Patil Vidyapeeth, Pune, Maharashtra, India.
5. Third Year resident, Department of Community Medicine, Dr. D.Y. Patil Medical College Hospital and Research Centre, Dr. D.Y. Patil Vidyapeeth, Pune, Maharashtra, India.

Corresponding Author*

Dr. Harsha Elizabeth Meleth, Department of Respiratory Medicine, Dr. D.Y. Patil Medical College Hospital and Research Centre, Dr. D.Y. Patil Vidyapeeth, Pune, Maharashtra, India.

E - mail: harshaelizabethmeleth@gmail.com

ABSTRACT

Background: Severe Acute respiratory Syndrome Coronavirus 2 (SARS-Cov-2/COVID 19) infection was firstly described in Wuhan, China during December 2019. Covid 19 patient can present with numerous clinical presentations ranging from Asymptomatic to critical clinical courses. HRCT thorax findings proved to be crucial in assessing the clinical course of patients requiring treatment.

Materials And Methods: It was a cross sectional study done in Dr D Y Patil Medical College. Patients >12 years of age who were RT PCR Positive for COVID 19 and met the inclusion criteria were selected for the study. After which they were categorized in to mild moderate category according to guidelines. HRCT was done for all patients and CT severity score was also assessed

Results: We evaluated a sample population of 100 patients. The most predominant symptoms in the moderate category were shortness of breath. The most common radiological abnormality noted was Ground glass opacity (50%) with 43patients in mild and 7 patients in moderate category. Lung involvement in mild stage was only 20 to 40% when compared to that of moderate category where the lung involvement was 50 to 60% and this showed statistical significance

Conclusion: CT scoring could help to identify patient's risk and predict outcome of patient with COVID 19 Pneumonia. The extent of lung involvement is highly correlated with parameters of disease such as clinical staging. Finally, our study strongly supports the use of chest CT in patient with the covid 19 pneumonia, which could be used as a tool for rapid and effective method to evaluate the lung involvement. It can also help in taking clinical decision.

Keywords: COVID 19, RT PCR, Radiology

INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS- CoV-2) or COVID-19, was initially described in Wuhan, China, December 2019[1]. This outbreak has transformed into a worldwide healthcare emergency, and COVID 19 Disease was declared as pandemic by the World Health Organization[2]. The pathogen was found to be a new RNA virus from the beta coronavirus family and was named "severe acute respiratory syndrome coronavirus 2" (SARS-CoV-2)[3].

COVID‐19 patients can present with a wide range of clinical presentations, from asymptomatic to severe life-threatening course or death. COVID‐19 can be diagnosed by various methods such as history of exposure, clinical features, and reverse transcriptase–polymerase chain reaction (RT‐PCR) assay from specimens obtained by oropharyngeal or nasopharyngeal swab, combined with imaging modalities such as HRCT Thorax which helps in finding the percentage of lung involvement[4].

As per the Ministry of Health and Family Welfare Directorate General of Health Services, COVID 19 disease is staged as MILD, MODERATE, and SEVERE[5]. Patients presenting with clinical features of uncomplicated upper respiratory tract infection such as fever, cough, sore throat, nasal congestion, malaise, headache, without evidence of breathlessness or hypoxia are categorized as Mild. Moderate disease is characterized with the clinical features of pneumonia with no signs of severe disease i.e., adolescent or adult with presence of clinical features of dyspnea and or hypoxia, fever, cough including Spo2 <94%, RR >/=24 per minute. Severe disease is characterized as Adolescent or adult with clinical signs of pneumonia plus one of the following:

1. Respiratory rates >30/min,
2. Spo2, 90% on room air.

HRCT has a high sensitivity in patients infected by SARS- CoV-2, the reason why it is largely used to help patient management[6]. Positive HRCT findings were often found in patients with moderate and severe disease even in mild disease. Numerous HRCT findings almost always co-exist in all clinical types. Thus, multiple findings may be more strongly associated with clinical types than single HRCT findings.

Most common pattern noted in HRCT thorax in COVID 19 are bilateral, subpleural, ground-glass opacities with air bronchograms, ill-defined margins, and a slight predominance in the right lower lobe. Abnormal lung CT findings can be present even in asymptomatic patients, and lesions can rapidly evolve into a diffuse ground-glass opacity predominance or consolidation pattern[7].

Patients with mild and moderate disease have a good prognosis when compared to severe disease. However, when COVID-19 pneumonia develops to severe and critical levels, pulmonary edema, respiratory failure, shock, and multiple organ failure can eventually cause death. In the current health emergency, a highly sensitive test like HRCT would allow to speed-up diagnostic workflow and establish isolation at admission.

METHODOLOGY

It is a cross sectional observational study. Study period was from October 2020 to July 2022. Sample size were calculated assuming the SD of mild category to be 4, alpha error to be 0.01 and power to be 0.95, minimum sample size is 63[6]. The software used is G*Power 3.1.9.2. the final sample size is 100 RTPCR Positive covid 19 patient.

ISSN 2515-8260 Volume 10, Issue 1, 2023

Inclusion criteria were all COVID-19 patients detected by RT PCR, age >12 years, patients who were willing to undergo HRCT scan. Exclusion criteria were Bed ridden and critically ill patients, Asymptomatic patients, pregnant females.

The study was conducted in Dr. D.Y. Patil Medical College after obtaining approval from the institutional Scientific committee, Ethical committee and informed consent from the patient.

Materials used were Pre designed Performa and HRCT Thorax

METHODS USED

Symptomatic patients aged above 12 years diagnosed to have COVID-19 by RT-PCR were selected from those patients who were admitted to Covid ward in Dr. D Y. Patil Medical College Hospital and Research Centre, Pimpri, Pune. Eligibility was assessed by fulfilling the inclusion and exclusion criteria and after obtaining informed written consent. Participants were asked for a detailed clinical history and symptoms pertaining to COVID 19 disease which was followed by general examination and systemic examination and based on these details the patients were clinically grouped to different stages- mild and moderate according to the guidelines[5]

MILD CATEGORY: Patient with uncomplicated upper respiratory infection or if patient presented with on and off cough, sore throat, nasal congestion, malaise, headache and without evidence of hypoxia. MODERATE CATEGORY: Patient present with clinical features of pneumonia with the clinical features of hypoxia including Spo2 <95% on room air (range 90 – 94%), Respiratory rate more than or equal to 24 per minute.

HRCT scan was done for all patients included in the study: In HRCT Thorax, the CT patterns found in COVID 19 disease was noted and CT severity index was also assessed (lung involvement).

RESULTS

The present study was a cross sectional observational study done at the Department of Respiratory Medicine, Dr D Y Patil medical college from October 2021 – July 2022. 100 Covid 19 RT-PCR positive patients admitted in the Covid ward and met all inclusion criteria were included for statistical analysis

	CLINICAL STAGING		
GENDER	**MILD (%)**	**MODERATE (%)**	**Total**

ISSN 2515-8260 Volume 10, Issue 1, 2023

MALE	45 (64.29)	25 (35.71)	70
FEMALE	21 (70)	9 (30)	30
TOTAL	66 (66)	34 (34)	100

TABLE: 1 CORRELATION OF CLINICAL STAGING WITH GENDER WISE DISTRIBUTION

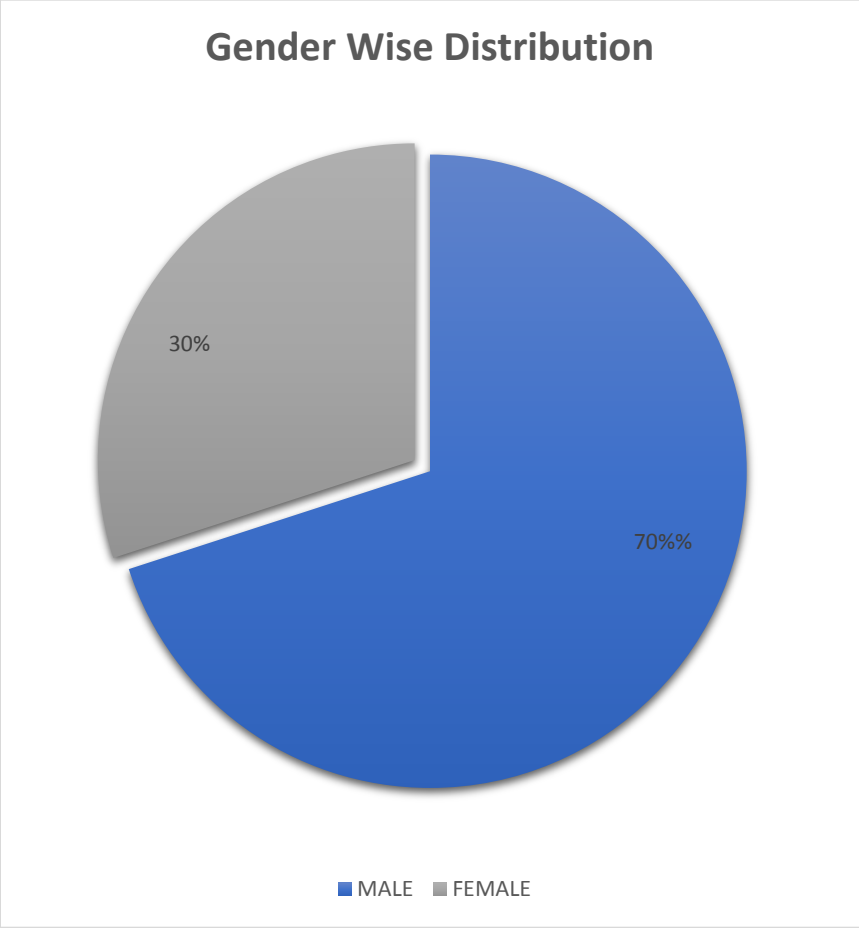

FIGURE 1: GENDER WISE DISTRIBUTION

Above pie chart represents the distribution of male and female in our study. Of the 100 patients, 70% were male and 30% were female. In the male patients, 45(64.29%) were mild category and 25 (35.71%) were moderate category. Of the 30 female patients 21(70%) and 9 (30%) were in mild and moderate category respectively.

ISSN 2515-8260 Volume 10, Issue 1, 2023

	CLINICAL STAGING		
COMORBIDITIES	**MILD**	**MODERATE**	**Total**
DIABETES MELLITUS	19	7	26
HYPERTENTION	12	7	19
CHRONIC KIDNEY DISEASE	1	0	1
CORONARY ARTERY DISEASE	1	1	2
ASTHMA	1	1	2
ANEMIA	1	0	1
CONGENITAL AR	1	0	1
HYPERLIPIDEMIA	1	0	1
HYPOTHYROIDISM	3	1	4
OBESE	0	1	1
SEIZURE DISORDER	2	0	2
TOTAL	42	19	62

TABLE:2 CORRELATION WITH COMORBIDITIES

Our study showed that 26% and 19% of the Covid positive patients were having Diabetes Mellitus and Hypertension as comorbidity respectively. When the association of comorbidities to the clinical stages were compared there was no statistical significance noted.

ISSN 2515-8260 Volume 10, Issue 1, 2023

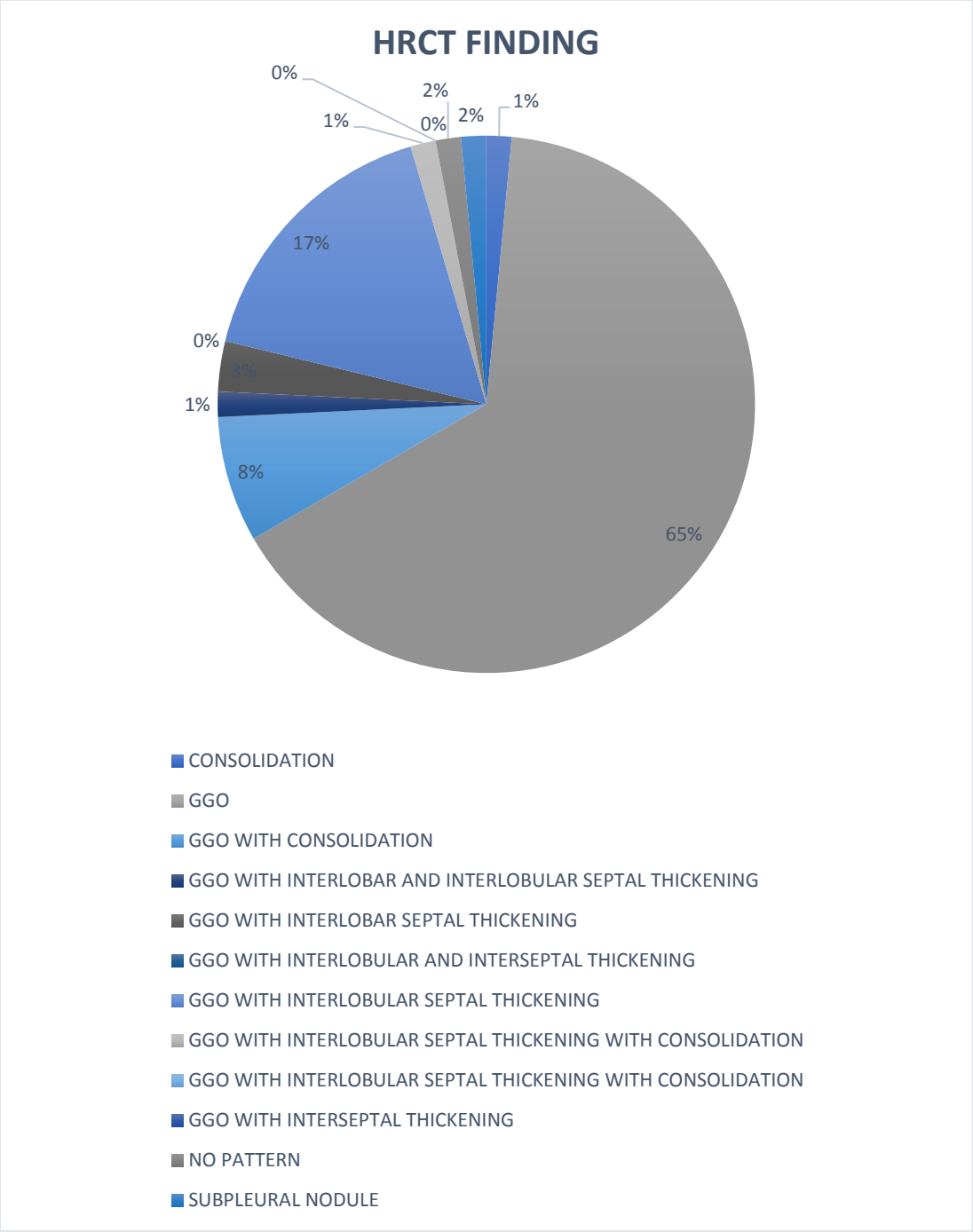

FIG: 2 PIE CHART DEMONSTRATING PERCENTAGE OF HRCT FINDING

ISSN 2515-8260 Volume 10, Issue 1, 2023

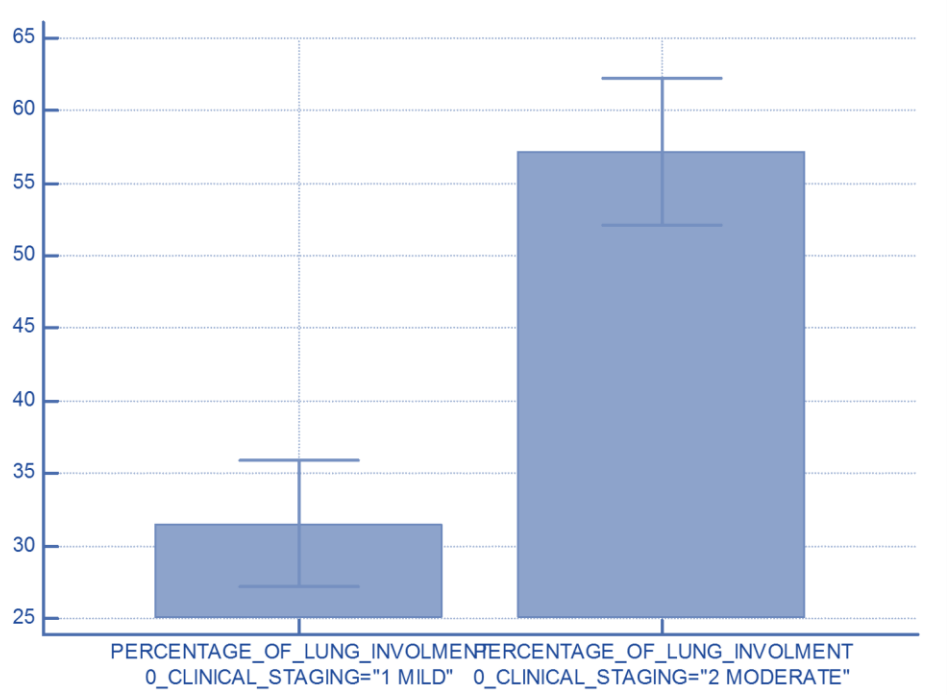

FIGURE: 3 BAR GRAPH SHOWING THE PERCENTAGE OF LUNG INVOLVEMENT IN MILD AND MODERATE CLINICAL STAGING

After comparing with clinical staging and lung involvement (CT Severity score), lung involvement in mild stage was only 20 to 40% when compared to that of moderate category where the lung involvement was 50 to 60% and this showed statistical significance.

DISCUSSION

We investigated clinical and radiological correlation in COVID 19 Disease in 100 hospitalized patients in mild and moderate category. The study showed that majority of the patient were in mild category this is similar to the studies done in China[8] and Italy[9]. These finding would be due to several factors such as age and other demographic changes. The mean age in our study was 46.29.

In our study male patients were more compared to females, which is comparable to other studies done in China by Guan W-jN et al[10] and New York by Goyal p et al[11]. The reason for this difference can be attributed to gender-based immunological differences or they could also be because of behavioral patterns such as smoking. However, there should be more studies or researches which focuses the gender differences in COVID 19 Disease.

Our study showed that 26% and 19% of the Covid positive patients were having Diabetes Mellitus and Hypertension as comorbidity respectively, these results were almost similar when

compared to a study conducted by Guan W-Jn et al[10]. Patients with comorbidities like Diabetes Mellitus and Hypertension have high risk of developing ARDS as a complication of Covid 19 Disease.

It was observed that, cough (74%), fever (63%) and shortness of breath (37%) were the most common symptoms in the patients. The most predominant symptom in patients of moderate category was shortness of breath (76.47%) when compared to that of mild category (16.66%). In another study conducted in Saudi Arabia by Shabrawishi et al[12] 47(31.3%) out of 150 patients were asymptomatic.

CT modality is a non-invasive imaging with high accuracy rate. Available data published in recent literature revealed that almost all patients with covid 19 disease were having characteristic CT picture of Ground glass opacity (GGO) with or without interlobar septal thickening[1].

In our study it was observed that the most common HRCT Thorax findings were ground glass opacity (50%), Ground glass opacity with interlobular septal thickening (24%), followed by Ground glass opacity with consolidation (16%), in agreement with the previous studies. Other patterns noted were GGO with interlobar septal thickening, GGO with interseptal thickening and subpleural nodule.

In our study we also assessed the CT severity index which showed that there was 50 to 68% of lung involvement in patients of moderate category with a confidence interval of 52.13 – 62.22 whereas the lung involvement in patients of mild category were from 17 to 45% with a confidence interval of 27.17 – 35.86.

CONCLUSION

CT scoring could help to identify patient's risk and predict outcome of patients with COVID-19 pneumonia. The extent of lung involvement is highly correlated with parameters of disease such as clinical staging.

Finally, our study strongly supports the use of chest CT in patients with COVID-19 pneumonia, which could be used as a tool for rapid and effective method to evaluate the lung involvement. it can also help in taking clinical decisions.

Future larger studies are expected to better clarify its impact on clinical decision-making, waiting for larger clinical trials.

ISSN 2515-8260 Volume 10, Issue 1, 2023

REFFERANCES

1. Huang C, Wang Y, Li X et al (2020) Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 395:497–506.
2. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020.
3. Xu X, Chen P, Wang J, et al. Evolution of the novel coronavirus from the ongoing Wuhan outbreak and modelling of its spike protein for risk of human transmission. Sci China Life Sci 2020.
4. Zu ZY, DiJiang M, Xu PP, Chen W, Ni QQ, Lu GM, et al. Coronavirus Disease2019(COVID- 19): A Perspective from China, Radiology (2020)200490
5. www.mohfw.gov.in National Clinical Management Protocol COVID-19 MoHFW
6. Ai T, Yang Z, Hou H et al (2020) Correlation of chest CT and RTPCR testing in coronavirus disease 2019 (COVID-19) in China: a report of 1014 cases. Radiology 200642.
7. X Han MD et al Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: a descriptive study
8. Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. JAMA. 2020; 323(13):1239–42.
9. Livingston E, Bucher K. Coronavirus Disease 2019 (COVID-19) in Italy. JAMA. 2020; 323(14):1335–
10. Guan W-j, Ni Z-y, Hu Y, Liang W-h, C-q Ou, J-x, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. 2020.
11. Goyal P, Choi JJ, Pinheiro LC, Schenck EJ, Chen R, Jabri A, et al. Clinical Characteristics of Covid-19 in New York City. 2020
12. Shabrawishi M, Al-Gethamy MM, Naser AY, Ghazawi MA, Alsharif GF, Obaid EF, et al. (2020) Clinical, radiological and therapeutic characteristics of patients with COVID-19 in Saudi Arabia. PLoS ONE 15(8) e0237130