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General Medicine

STUDY OF CORRELATION OF CT SCAN CHEST FINDINGS WITH THE SEVERITY OF THE DISEASE IN COVID-19 PATIENTS

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ABSTRACT **INTRODUCTION:** The virus designated as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is the etiological agent of the corona virus induced disease-19 (COVID-19) which is declared as pandemic by World Health Organisation (WHO) on 11th March,2020. This virus mainly affects respiratory system. Study of CT scan chest findings is essential to grade the severity of the disease.

AIMS AND OBJECTIVES: To study CT scan chest findings in severely affected covid-19 patients.

MATERIALS AND METHODS: INCLUSION CRITERIA: Patients positive for COVID-19 by RTPCR test.

EXCLUSION CRITERIA: Patients with the history of COPD. RESULTS: In this study 100 COVID-19 patients were taken. Among these 50 patients were asymptomatic to mildly symptomatic, CT scan chest of these patients was normal to minimal changes. In another group of 50 patients, who were severely symptomatic had CT scan chest severe findings in 30%, moderate findings in 60% and mild findings in 10%.

CONCLUSION: Our study suggests that it is better to take CT scan of chest for COVID-19 patients, to know the severity of the disease, thereby giving effective treatment to prevent morbidity and mortality from COVID-19.

KEYWORDS : CT Scan Chest; Severe Acute Respiratory Syndrome; Covid-19; RTPCR Test; Ground Glass Opacities.

INTRODUCTION:

The virus designated as severe acute respiratory syndrome coronavirus-2 (SARS–CoV-2) is the etiological agent of the corona virus induced disease-19 (COVID-19) which is declared as pandemic by World Health Organisation (W.H.O.) on 11th March, 2020.[1-5] Till now globally 54.4 million people are infected, 35 million have recovered and 1.3-2 million deaths occurred due to COVID-19. In India, 8.85 million people are affected and 1,30,000 deaths occurred due to COVID-19.

SARS-CoV-2 is a respiratory system targeting virus with wide spectrum of manifestations from asymptomatic to critical illness with pneumonia, Acute Respiratory Distress Syndrome and death. Vaccine or specific medication for managing COVID-19 are still evolving and various treatment protocols are being used worldwide.[4-7] Therefore it is essential to early identification of the severity of the disease to prevent morbidity and mortality. The available investigations to know the severity of the disease are lymphocytopenia, inflammatory markers (d-Dimer, c-reactive protein, LDH and serum ferritin) and CT scan chest. One of the main system affected in COVID-19 patients is respiratory system. In our study 100 COVID-19 patients were taken, who were tested positive by RTPCR test. Among these, 50 patients were asymptomatic to mildly symptomatic. And in another group 50 COVID-19 severely symptomatic patients were taken. Asymptomatic patients were without any symptoms. Mildly symptomatic patients were with mild fever and cough with oxygen saturation more than 94. Severely symptomatic patients were in need of oxygen supplementation and admitted in COVID-19 ICU ward with breathlessness.

Chest CT severity score (CSS)[8] is done to evaluate the extent of pulmonary involvement in COVID-19 patients with 83% sensitivity and 94% specificity to identify severe involvement. It is done by scoring the percentages of each of the five lobes that is involved.

Table 1: Lobar Score

Score	Involvement
1	<5% involvement
2	5% - 25% involvement
3	26% - 49% involvement
4	50%-75% involvement
5	>75% involvement

Total CT scan chest score is the sum of the individual lobar scores and can range from 0 (no involvement) to 25 (maximum involvement).

Table 2: Total CT Scan Severity Score

Score	CT scan severity
<8	Mild
9-15	Moderate
>15	Severe

AIMS AND OBJECTIVES:

COVID-19 involves commonly respiratory system. To know the severity of the disease CT scan chest was taken for all of these COVID-19 patients. CT scan chest findings were scored depending upon the number of lobes involved. These findings were compared with the severity of the disease.

MATERIALS AND METHODS:

In this study we took total 100 COVID-19 patients, who were admitted in S.V.R.R.G.G. Hospital, which is a state COVID-19 management hospital. All these patients were tested positive for SARS-CoV-2 by RTPCR test.

Inclusion Criteria:

- Patients who are positive for COVID-19 by RTPCR test.
- Age >18 years

Exclusion Criteria:

- Age <18years
- Patients with history of chronic obstructive pulmonary diseases.

RESULTS:

In this study total 100 COVID-19 patients were taken. In this group 50 patients were asymptomatic and mildly symptomatic. Other group of 50 patients were severely symptomatic. For all these patients CT scan chest was taken.

Table 3: CT Scan Chest Score In Asymptomatic And Mildly Symptomatic COVID-19 Patients

S.No.	CT scan chest severity	CSS (0-25)	No. of patients	Percentage
1	Normal	O	45	90%
2	Mild	<3	5	10%
3	Moderate	9-15	0	0
4	Severe	16-25	0	0

Table 4: CT Chest Severity In Severe COVID-19 Patients

S.No.	CT scan chest severity	CSS (0-25)	No. of patients	Percentage
1	Mild	0-8	5	10%
2	Moderate	9-15	30	60%
3	Severe	16-25	15	30%

In our study CT scan chest was normal in 45 patients of asymptomatic and mildly symptomatic COVID-19 patients (90%). Only 5 mildly symptomatic patients (10%), CT scan shows mild CSS. In severe COVID-19 patients CT scan of chest of 5 patients (10%) had mild changes. In this study 30 severe COVID-19 patients (60%) had moderate CSS in their CT scan chest. Out of 50 severe COVID-19 patients, 15 patients (30%) CT scan chest had severe changes (bilateral peripheral ground glass opacities, CSS>15).

DISCUSSION:

Thin section chest CT is more sensitive than chest radiography, showing abnormal changes in the lung parenchyma in early stages of disease.[19,20.] For these reasons, chest CT scan has become a forefront diagnostic method during the outbreak of COVID-19 in China.[18] The typical imaging manifestations of early COVID-19 are patchy, rounded, segmental or subsegmental ground glass opacities, with or without consolidation.[20] Lesions are multiple and asymmetrically distributed and are more common in the peripheral areas.[11,21,22.]

In this study we want to know the CT scan chest findings associated with severity of the disease in COVID-19 patients. In our study 100 patients of COVID -19 were taken, who were tested positive for SARS-CoV-2 by RTPCR test. Among all these patients 50 were asymptomatic to mildly symptomatic and other group of 50 were severely symptomatic. For all these patients CT scan chest was taken. In the first group of asymptomatic patients 40 patients were males and 10 patients were females, the age varies from 40-60 years. In the severe symptomatic group 45 patients were males and 5 patients were females, the age varies from 40-65 years. For all these patients routine and special investigations like complete blood count, blood sugar, renal function tests, liver function tests, d-Dimer, c-reactive protein, LDH and serum ferritin were done.

In this study, we found majority if the patients' CT scan chest, in asymptomatic to mildly symptomatic group was normal (90%), only 10% had mild changes (CSS<3). CT scan chest of severe COVID-19 patients had CSS of mild in 10%, moderate in 60% and severe in 30%. This is comparable with the following study. Ran Yang et.al study found that CSS was high in severe patients compared to mild patients.[8]

CONCLUSION:

Our study shows CT scan chest scoring is a reliable indicator of the severity of the disease in COVID-19 patients. In COVID-19 patients, it is better to know the stage of the disease as early as possible to prevent morbidity and mortality. It is better to take CT scan chest in COVID-19 patients, after that patients who have moderate to severe changes have to be transferred and treated in COVID-19 ICU ward with effective treatment to prevent morbidity and mortality from COVID-19.

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