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Comparison study of covid-19 positive hypertensive or diabetic and non hypertensive and non-diabetic patients in tertiary healthcare

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Abstract

The rapid spread of the novel coronavirus has caused panic around the world since October 2019. High Resolution Computed Tomography (HRCT) chest played a major role in the triage and management of patients with confirmed or suspected COVID-19 pneumonia. Present study was conducted with an aim to compare HRCT severity scores among COVID-19 positive hypertensive or diabetic and non-hypertensive and non-diabetic patients.

Keywords: High Resolution Computed Tomography (HRCT), Covid-19, Diabetes, Hypertension, Comorbidities

Introduction

Patients with underlying medical disorders, including high blood pressure or diabetes, are deemed at risk for developing severe coronavirus infection. Furthermore, such patients are considered more prone to developing subsequent complications, and their risk of dying from COVID-19 is high. [1] CT has high accuracy for the diagnosis of COVID 19 by revealing the features of viral pneumonia and hence helpful in early diagnosis and proper patient management and follow-up. [2] Humanity has encountered many viruses that have threatened it at different times throughout history. [3] The recent COVID-19 pandemic has affected all aspects of society. [4] The rapid spread of the novel coronavirus has caused panic around the world since December 2019. [5] There are various research works being done presently all over the world for understanding the pathogenesis, clinical, biochemical, radiological manifestations of the disease, so that proper management can be achieved. [6] Due to the disease's novelty, the criteria that influence the severity of the condition and mortality remain largely unclear. [7] CT manifestations in hypertensive and diabetics patients' suffering from Covid-19 have not been yet described in the literature comprehensively and understanding is still developing.

However, with this background present conducted to ascertain and compare HRCT severity scores among covid-19 positive hypertensive or diabetic and non-hypertensive and non-diabetic patients in tertiary healthcare set up in north Maharashtra.

Materials and Methods

The study was done in the Department of Respiratory Medicine, Kanachur Institute of Medical Sciences, Mangalore in the month of Sept 2021.

A total of 304 patient's records were reviewed retrospectively. Incomplete and records of pregnant women's, known cases of lung diseases were excluded. Total 304 records were selected in the present study. All were covid-19 patients diagnosed by either Reverse Transcription Polymerase Chain Reaction (RT-PCR) or Rapid Antigen Test (RAT) test. High Resolution Computer Tomography (CHRCT) Chest was done. Two professors of the department of radiology had reviewed HRCT images independently and the decision of confounding images was made by consensus. HRCT severity scoring [8] calculated using percentages of each five lobes involved. Scores of individually affected lobes were added to get the total score. Score was ranged from 0 (no involvement) to 25 (maximum involvement). Depending on lobar involvement, severity was categorized as mild (0-7), moderate (08-15), and severe (16-25).⁴ (Table 01).

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Table 1: HRCT severity scoring

Sr. No	Percentages of involvement	Score	Severity	
1.	Non involvement	00		
2.	< 05 %	01	Mild	00 to 07
3.	05% to 25 %	02		
4.	26 to 49 %	03	Moderate	08 to 15
5.	50% to 75%	04		
6.	> 75%	05	Severe	16 to 25

According to RSNA experts consensus [9] the pattern of CT changes were categorized in to four types as follows.

1. Typical: Peripheral, bilateral (multilobar) GGO or multifocal GGO of rounded morphology, w/ or w/o consolidation, or visible intralobular lines (crazy paving) Reverse halo sign or other findings of organizing pneumonia.
2. Indeterminate: Absence of typical features and the presence of multifocal, diffuse, perihilar or unilateral GGO w/ or w/o consolidation and are non-rounded or non-peripheral.
 - Few very small GGO with a non-rounded & non peripheral distribution.
3. Atypical: Absence of typical or indeterminate features and presence of
 - Isolated lobar or segmental distribution w/o GGO.
 - Discrete small nodules (centrilobular, tree in bud).
 - Lung cavitations.
 - Smooth interlobular septal thickening, w/ pleural effusion
4. Negative: No CT features to suggest pneumonia

Results

In the present study, records of 304 Covid-19 positives patients admitted at a tertiary care teaching hospitals were reviewed retrospectively.

Sr. No.	Age Groups	Gender	
		Female	Male
1.	40 Yrs.	11	25
2.	41 – 45 Yrs.	24	63
3.	46 – 50 Yrs.	35	41
4.	51 – 55 Yrs.	17	47
5.	56 – 60 Yrs.	15	25
6.	≥ 61 Yrs.	00	01

- With respect to pre existing comorbidities out of 304 patients, 13.2% (40) were known cases of diabetes, 11.2% (34) were hypertensive. The combined percentage of pre existing diabetes and hypertension (DM-HTN) comorbidities was found to be 24.34% (74). Other morbidities noted were chronic obstetrics pulmonary disease (COPD) (n-1), tuberculosis (n-1), chronic kidney disease (n-1), and ischemic heart disease (IHD) (n-2).

Table 2: Distribution of HRCT findings as per presence or absence of co-morbidities

Sr. No	HRCT pattern	Patients DM-HTN Co-morbidities	Patients without co-morbidities
1.	Typical	54 (72.97%)	47 (20.88%)
2.	Indeterminate	03 (04.54%)	19 (08.44%)
3.	Atypical	11 (14.86%)	42 (18.66%)
4.	Negative	06 (08.10%)	117 (52.0%)
	Total	74 (100%)	225 (100%)

Table 3: HRCT score severity in patients with and without co morbidity

Sr. No	Severity	Patients DM-HTN Co-morbidities	Patients without co-morbidities
1.	Mild	41 (55.40%)	199 (88.44%)
2.	Moderate	11 (14.86%)	17 (07.55%)
3.	Severe	22 (29.72%)	09 (04.0%)
	Total	74 (100%)	225 (100%)

Discussion

Bhandari S *et al* [10] reported that more males suffered from covid-19 than females (59% male and 41% female). Das S *et al* [4] also reported male (89% males vs 41% females) preponderance in her study. Study was conducted by Rangankar V *et al* [5] reported that out of 220 patients 18.6% (41) and 81.4% (179) were diabetic and non-diabetic respectively. Das S *et al* [4] reported that pre-existing comorbidity was found in 22.5% (n-129) patients which included diabetes mellitus (DM) (n-98), hypertension (HTN) (n-32) etc. In this study, she too reported that diabetes mellitus were the most common preexisting comorbidity followed by hypertension. Bhandari S *et al* [10] reported similar findings. In his study, the most prevalent comorbidities were diabetes mellitus (56%) and hypertension (48.83%). In Bhandari S *et al* [10] study 39 patients (48.75%) were symptomatic, among them fever (79.47%), cough (74.35%), shortness of breath (36%) and sore throat (17.94%) were the most common presenting clinical manifestations. Das S *et al* [4] reported that 89% of patients with co-morbidity were symptomatic, while 48 % of patients without co-morbidity were symptomatic and symptoms were found to be statistically associated with comorbid patients. In Das S *et al* study, the typical CT pattern was seen to be predominately associated with comorbid patients. In Rangankar *et al* [5] study reported that patients with diabetes had more severe HRCT scores than non-diabetic.

Conclusions

The present study concluded that diabetic patients are at high risk of developing the severe form of COVID-19 with a higher CT lung involvement score than hypertensive and non comorbid patients.

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