HRCT Features of Covid-19 Pneumonia In Male Patients of Adult Age Group – A Cross Sectional Study

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Abstract :

COVID-19 is a new-age pandemic which has spread ferociously all over the world in a matter of a few months having worldwide humanitarian and economic repercussions. HRCT has become the mainstay of radiological investigations in this pandemic and often showed diagnostic accuracy before the onset of clinical manifestations. Men are more predisposed for fatal outcomes in other SARS virus infections.[1] In a study by Karlberg et al, males had a significantly ($p < 0.0001$) higher case fatality rate than females did, 21.9 percent versus 13.2 percent after adjustment for age. Studies found that the severity of the illness was more and clearance of SARS-CoV-2 virus was less in males as compared to females.[2] Hence it is of utmost importance to study the pattern of lung involvement on HRCT to aid the clinician in starting the treatment at the earliest, even before the symptoms manifest. Thus this study was conducted to look for specific and also unusual patterns of radiological findings of COVID-19 pneumonia.

Keywords: COVID 19, Male, HRCT, SARS-CoV-2

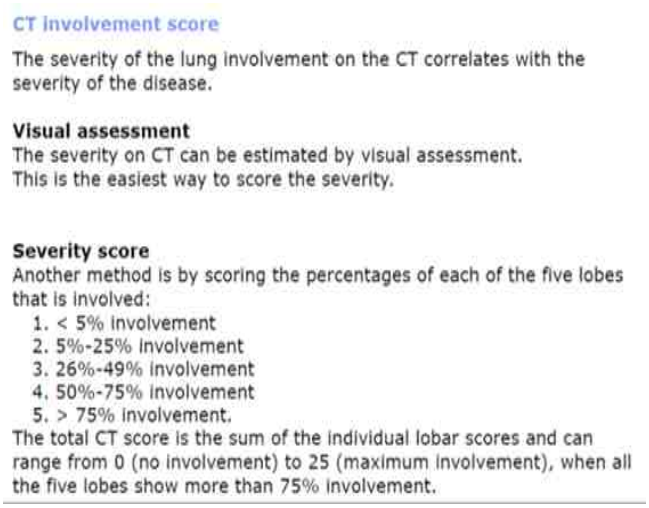
Introduction:

Coronaviruses are important human and animal pathogens. At the end of 2019, a novel Coronavirus was identified as the cause of a cluster of pneumonia cases in Wuhan, a city in China. The World Health Organization, in February 2020, characterized the disease Coronavirus disease 2019 (COVID-19). The virus responsible for this disease is SARS-CoV2 i.e. severe acute respiratory syndrome coronavirus 2.[3]

Nucleic acid based reverse transcriptase testing is proving vital in aiding the prevention of COVID-19 pandemic. However, viral nucleic acid testing needs to have meticulous laboratory specifications and also takes a significant time before the results come out.[4,5]

Chest computed tomography (CT), in particular high-resolution computed tomography (HRCT) thorax has become indispensable for diagnosing patients with COVID-19 infection when patients present with unspecific symptoms. In suspected patients, Chest CT and HRCT are important for disease severity. HRCT is a reasonable tool for confirmation of the diagnosis and to aid in the treatment and assess the prognosis.[6]

Ground Glass Opacities (GGO) in high resolution chest CT with or without consolidation with bilateral involvement is the principal finding of this disease. With subsequent studies, a plethora of HRCT imaging findings were noted, including Crazy paving pattern, Reverse halo sign, Reticular changes, Airway changes, etc. These findings help to assess probable mechanism of lung parenchymal injury in infected patients.[7-9]



CT involvement score

The severity of the lung involvement on the CT correlates with the severity of the disease.

Visual assessment
The severity on CT can be estimated by visual assessment.
This is the easiest way to score the severity.

Severity score
Another method is by scoring the percentages of each of the five lobes that is involved:

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

The total CT score is the sum of the individual lobar scores and can range from 0 (no involvement) to 25 (maximum involvement), when all the five lobes show more than 75% involvement.

CT severity score was assessed for each patient based on the percentage of the lobe involved.[10,11]

This study intends to illustrate the HRCT patterns seen in COVID 19 pneumonia patients.

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Methodology:

Objective:

To study the various HRCT imaging findings of COVID-19 on HRCT thorax in male patients

Sample size: 121 – by pilot study

Study Duration: 5 months

Study Population: All the patients who are RTPC proven COVID 19 infection referred to the Department of Radiology and imaging for HRCT thorax.

CT SCANNER: GE Brio-16 slice

Inclusion criteria

1.Male Patients willing to participate in the study.

2.RTPCR positive COVID-19 patient.

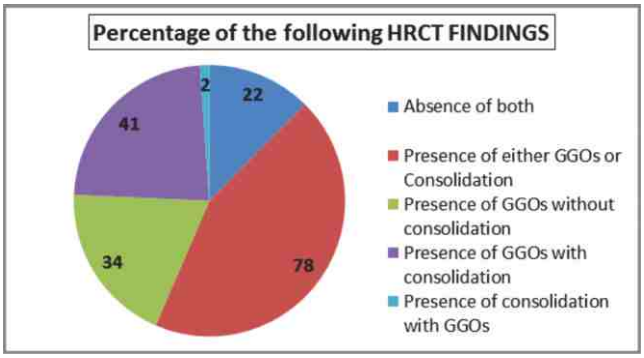
3.Patients of any age

Exclusion criteria

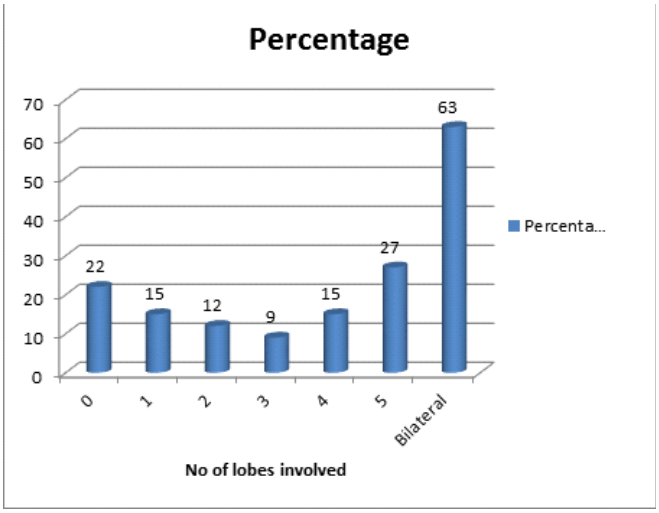
1.Immunocompromised patients

Observation & Results:

PARAMETER	ALL PATIENTS(121)
AGE	
MEAN	45
RANGE	18-80
S.D.	16
SYMPTOMS	
FEVER	74
COUGH	58
SPUTUM PRODUCTION	20



NO. OF LOBES AFFECTED :	No. of Patients (n=121)
0	27(22)
1	18(15)
2	14(12)
3	11(9)
4	18(15)
5	33(27)
BILATERAL LUNG DISEASE :	73(63)



FINDINGS	No. of Patients (n=121)
GGOs AND CONSOLIDATION :	
Absence of both	27 (22)
Presence of either GGOs or Consolidation	94(78)
Presence of GGOs without consolidation	41(34)
Presence of GGOs with consolidation	50(41)
Presence of consolidation with GGOs	2(2)

FREQUENCY OF LOBE INVOLVEMENT	No. of Patients (n=121)
Right upper lobe	53(44)
Right middle lobe	50(41)
Right lower lobe	79(65)
Left upper lobe	58(48)
Left lower lobe	76(63)

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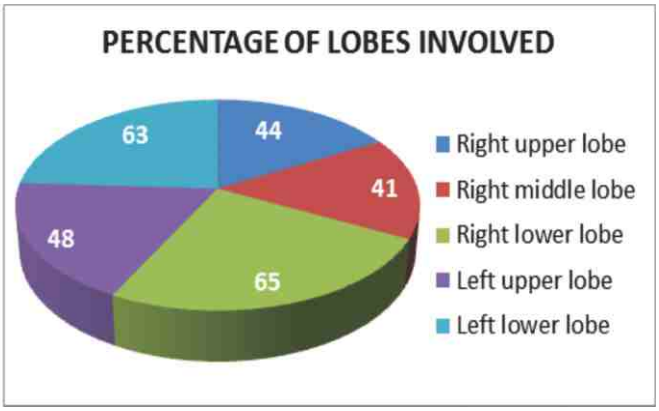
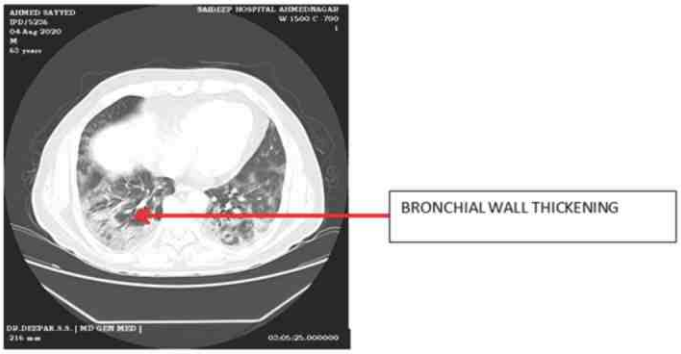
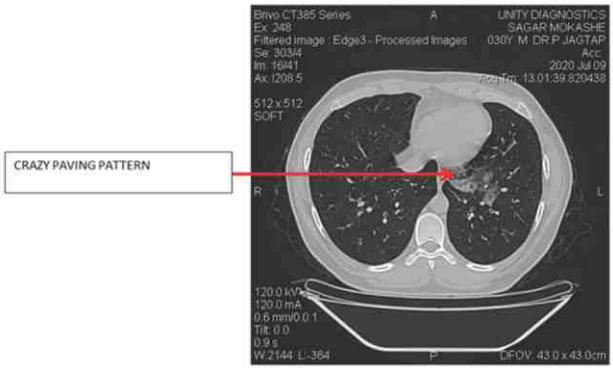


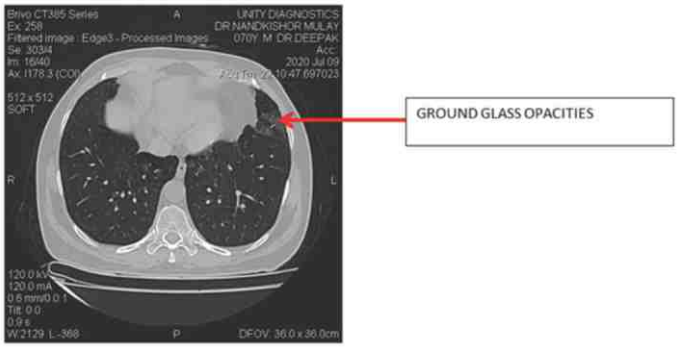
TOTAL LUNG SEVERITY SCORE	No. of Patients (n=121)
Mean	3
Range	0-18
Standard deviation	3





OTHER FINDINGS:

FINDINGS	No. of Patients (n=121)
LUNG CAVITATION	1(0.8)
CARZY PAVING PATTERN	9(7.4)
REVERSE HALO SIGN	3(2.4)
CENTRAL DISTRBUTION	0
PREIPHERAL DISTRIBUTION	83(68)
BRONCHIAL WALL THICKENING	8(6)
BRONCHIETESIS	2(1.6)
PULMONARY NODULES	0
PLUERAL EFFUSION	1(0.8)
LYMPHADENOPATHY	2(1.6)



Discussion

There were 121 men studied with mean age 45.3 years (age range 18 - 80 years with standard deviation 16 years).

Of the 121 patients in the study, 27 (22%) had no GGOs or consolidation on chest CT. Of the 94 patients with ground-glass opacities, consolidation, or both, 41 (34%) had only ground-glass opacities (with no consolidation), and two patients (2%) had consolidation in the absence of ground-glass opacities. Eighteen patients (15%) had opacities in one lobe, 14 patients (12%) had two affected lobes, 11 patients (9%) had three affected lobes, 18 patients (15%) had four affected lobes, and 33 patients (27%) had disease affecting all five lobes.

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The 53 of 121 patients (44%), the right upper & middle lobe was involved in 50 patients (41%), the right lower lobe was involved in 79 patients (65%), the left upper lobe was involved in 58 patients (48%), and the left lower lobe was involved in 76 patients (63%). Twenty (17%) patients had exclusively unilateral lung involvement, including 13 patients that had only right lung involvement and 7 patients that had only left lung involvement. Seventy-three of 121 patients (60%) had bilateral lungs. The mean total lung severity score for the 121 patients was 3 (range 0 - 18 with standard deviation 3). Lung cavitation and changes of bronchiectasis were found in 1 patient (0.8%) with history of old healed tuberculosis. Another old patient with history of chronic smoking had changes of bronchiectasis (1.8%). Thoracic lymphadenopathy was found in 2 patients (1.6%). Pulmonary nodules and central distribution were notably absent in all 121 patients, and only 1 patient (0.8%) had a pleural effusion (minimal left pleural effusion)

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