



## A STUDY OF CORRELATION BETWEEN PRESENCE OF COMORBIDITIES AND SEVERITY OF LUNG INVOLVEMENT IN COVID 19 PATIENTS.

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**ABSTRACT** **Background:** The Coronavirus disease is caused by SARS-CoV-2. The Corona virus (CoV) is an enveloped non-segmented RNA from Coronaviridae family. A new virus, CoV 2019, is the seventh recognized CoV that can affect humans. comorbidity of the patients are associated with severe lung involvement **Materials & Methods:** Observational, cross sectional study. The sample size consists of 200 covid 19 confirmed by RT-PCR. All the patients were subjected to a comprehensive proforma which includes demographic data and history of comorbidities. HRCT of chest with CT severity score calculation were done in all patients. **Results:** Older age patients and patients having hypertension, DM, COPD and multiple comorbidities were associated with more severe lung involvement which was statistically significant. while history of asthma and pulmonary tuberculosis were not associated with severe lung involvement **Conclusions:** In This Study We Conclude That Low Spo2 Level And High HRCT Score Is Well Correlated With Comorbidities Like Hypertension, DM, COPD Except Asthma and Pulmonary T.B. Asthma Have Protected Effect On Covid 19 Infection.

**KEYWORDS :** COVID 19, Comorbidities CT severity score

### INTRODUCTION

The Coronavirus disease is caused by SARS-CoV-2. The Corona virus (CoV) is an enveloped non-segmented RNA from Coronaviridae family<sup>1</sup>. It began in Wuhan, China and spread to more than 200 countries and became pandemic. A new virus, CoV 2019, is the seventh recognized CoV that can affect humans remaining are HCoV-229E, HCoV-OC43, HCoV-NL63, HCoV-HKU1, SARS-CoV, and MERS-CoV<sup>2</sup>. Coronavirus and Middle East respiratory syndrome have been responsible for the past two epidemics of corona virus.<sup>3,4</sup> clinical manifestations of covid 19 is similar to SARS-CoV 2003 and both viruses affects ACE 2 receptors.<sup>5</sup> older age, and comorbidity of the patients are associated with severe lung involvement and poor outcome<sup>6,7</sup>.

### Material and methods

Clearance is taken from institutional ethical committee. This study was conducted in department of respiratory medicine, Government Medical College, Kota. RT PCR confirmed cases of COVID 19 patients attending OPD and IPD were included in study after written informed consent

### Study design:

Observational study.

### Sample size:

The sample size consists of 200 covid 19 confirmed by RT-PCR

### Method :

- 1) Informed written consent from all subjects
- 2) All the patients were subjected to a comprehensive proforma which includes demographic data and history of comorbidities
- 3) HRCT of chest with CT severity score calculation were done in all patients

### Data analysis:

Statistical analysis was performed using SPSS package (version 11.5, SPSS Inc, Chicago, IL) For categorical data (patient sex, aortic arch branching patterns), Pearson's  $\chi^2$  test with a Yates correction were used to evaluate statistical independence and p value calculated.

### Results:

**Table 1: Distribution Of Patients According To Sex**

	Ct Score >8	Ct Score <8
Male	82	62
Female	27	29

In Our Study Total 200 Patients Were Evaluated. Out Of 200 Patients 144 Patients Were Male 56 Patients Were Female. 82 Male Patients And 27 Female Patients Have Ct Score More Than 8.

**Table 2: Correlation Of Age Of Patient With Severity Of Lung Involvement**

	Ct Score >8	Ct Score <8
Age >60	63	37
Age <60	46	54

Age >60	63	37
Age <60	46	54

Out Of 200 Patients 109 Patients Have CT SCORE More Than 8 And 63 Patients Have Age More Than 60. Age More Than 60 Is Associated With More Severe Lung Involvement Which Is Statistically Significant.

The Chi Square Statistics Is 5.8272. The P- Value Is .01578. Significant At P<.05

**Table 3: Correlation Of Hypertension With Severity Of Lung Involvement**

	Ct Score >8	Ct Score <8
Hypertensive	36	9
Non Hypertensive	73	82

Total 45 Patients Were Hypertensive Out Of Them 36 Patients Have Moderate To Severe Lung Involvement (CT SCORE >8). Hypertension Is Associated With More Severe Lung Involvement Which Is Statistically Significant. The chi square statistics is 15.2259. the p- value is .000095. significant at p<.05

**Table 4: Correlation Of Diabetes Mellitus With Severity Of Lung Involvement**

	Ct Score >8	Ct Score <8
Diabetic	20	6
Non Diabetic	89	85

Total 26 Patients Were Diabetes Mellitus Out Of Them 20 Patients Have Moderate To Severe Lung Involvement (CT SCORE >8) Diabetes Mellitus Is Associated With More Severe Lung Involvement Which Is Statistically Significant. The chi square statistics is 6.0595. the p- value is .013832. significant at p<.05

**Table 5: Correlation Of Asthma With Severity Of Lung Involvement**

	Ct Score >8	Ct Score <8
Asthmatic	6	4
Non Asthmatic	103	87

In Our Study 10 Patients Have History Of Asthma 6 Patients Had Severe Lung Involvement And 4 Patients Had Mild Lung Involvement. Asthma Is Not Associated With Severity Of Covid 19 Manifestation. The chi square statistics is 0.1284. the p- value is .720088. significant at p<.05

**Table 6: Correlation Of COPD With Severity Of Lung Involvement**

	Ct Score >8	Ct Score <8
COPD Present	11	2
COPD Absent	98	89

In Our Study 13 Patients Have History Of COPD 11 Patients Had Severe Lung Involvement And 2 Patients Had Mild Lung Involvement. COPD Is Associated With Severity Of Covid 19 Manifestation Which Is Statistically Significant

The chisquare statistics is 5.0851 . the p- value is .024132 . significant at p<.05

**Table 7: Correlation Of Pulmonary Tuberculosis With Severity Of Lung Involvement**

Pulmonary tuberculosis	Ct Score >8	Ct Score <8
Present	5	2
Absent	104	89

In Our Study Total 7 Patient Had Pulmonary Tuberculosis. 5 Had Severe Lung Involvement And 2 Had Mild Lung Involvement. Pulmonary Tb Is Not Associated With Severe Lung Involvement

The chisquare statistics is 0.8383 . the p- value is .359881 . significant at p<.05

**Table 8: Correlation Of Multiple Comorbidities(Combination Of Dm, Htn, Cad, Ckd And Liver Disease With Severity Of Lung Involvement**

	Ct Score >8	Ct Score <8
Present	36	14
Absent	73	77

In Our Study 50 Patients Had Multiple Comorbidities (I.E Combinations Of DM,HTN,CAD ,CKD And Liver Disease) And 36 Out Of Them Have Severe Lung Involvement And 14 Had Mild Lung Involvement. Patients With Multiple Comorbidities Have More Severe Lung Involvement Which Is Statistically Significant The chi square statistics is 8.2334 . the p- value is .004113 . significant at p<.05

**Table 9: correlation of comorbidities with severe lung involvement and their p value (significant at <.05)**

Correlation of Hypertension with severe lung involvement	p- value is .000095
Correlation of DM with severe lung involvement	p- value is .013832
Correlation of Asthma with severe lung involvement	p- value 0.720088
Correlation of COPD with severe lung involvement	p- value 0.024132
Correlation of Pulmonary TB with severe lung involvement	p- value 0.359881
Correlation of Multiple comorbidities with severe lung involvement	p- value 0.004113

**DISCUSSION:**

In Our Study Total 200 Patients Were Evaluated. Out Of 200 Patients 144 Patients Were Male 56 Patients Were Female.82 Male Patients And 27 Female Patients Have Ct Score More Than 8.

Out Of 200 Patients 109 Patients Have CT SCORE More Than 8 And 63 Patients Have Age More Than 60. We Found Higher Age Group Patients Have More Severe Lung Involvement Which Was Statistically Significant. Similar Results Were Found By Farghaly Et A<sup>8</sup>.

In Our Study 45 Patients Were Hypertensive Out Of Them 36 Patients Have Moderate To Severe Lung Involvement ( CT SCORE >8). Hypertension Is Associated With More Severe Lung Involvement Which Is Statistically Significant. Exact Pathogenesis Is Not Clearly Understood Till Now. In Hypertensive Patients With COVID-19, Imbalance In The Renin-Angiotensin System (RAS) In Hypertensive Patients Leads To Activation Of, The NADH/NADPH Oxidase System By Excessive Inflammatory Reactions Or A Large Number Of Cytokines Which May Exacerbate Lung Damage In COVID 19 Patients 9 Similar Results Were Found By Songjiang Huang<sup>10</sup> In Our Study 26 Patients Were Diabetes Mellitus Out Of Them 20 Patients Have Moderate To Severe Lung Involvement ( CT SCORE > 8) Diabetes Mellitus Is Associated With More Severe Lung Involvement Which Is Statistically Significant. Macro And Microvascular Changes Associated With Diabetes Mellitus Leads To More Severe Lung Involvement And Increased Requirement Of Oxygen During Admission. Khalili S et al<sup>11</sup> In There Study Found Higher Mortality In The Group With Diabetes (22.8% Vs 15.0%; P=0.109), Although Not Significantly. More Severe Pulmonary Involvement (P=0.015), Extended Hospital Stay (P<0.001) And Greater Need For Invasive Ventilation (P=0.029) Were Reported In This Population.

In Our Study 10 Patients Have History Of Asthma 6 Patients Had Severe Lung Involvement And 4 Patients Had Mild Lung Involvement. Asthma Is Not Associated With Severity Of Covid 19 Manifestation. Use Of Corticosteroids During Treatment Of Asthma May Have Protective Effect. Asthma Is Characterized By Type 2 Inflammation Which Is Characterized By Predominance Of TH2 Cells And Cytokines IL-4,IL-5 And IL-13. IL-13 Down Regulates ACE2 Which Is Receptor For Entry Of SARS-Cov-2. A Systematic Review By Castro-Rodriguez<sup>12</sup> Found Same Results. In Our Study 13 Patients Have History Of COPD 11 Patients Had Severe Lung Involvement And 2 Patients Had Mild Lung Involvement. COPD Is Associated With Severity Of Covid 19 Manifestation Which Is Statistically Significant. COPD Patients Have TH 17 Cell Activations Which Leads To Increased Expression Of ACE 2.<sup>13</sup>

In Our Study Total 7 Patient Pulmonary Tuberculosis. 5 Had Severe Lung Involvement And 2 Had Mild Lung Involvement. Pulmonary Tb Is Not Associated With Severe Lung Involvement. A Metanalysis By Gao Y Et Al<sup>14</sup> Found That People With Tuberculosis Are Not More Likely To Get severe COVID-19, But Pre-Existing Tuberculosis Has A Higher Chance Of Developing Serious Complications From COVID-19.

NK cells have role in the defense against microbes in pulmonary tuberculosis infection. NK cells bind to microorganisms and provide direct cytotoxicity via secreted bactericidal molecules<sup>15</sup>. The expression of surface ligands on NK cells provides the capability of killing pathogens and target cells by inducing apoptosis<sup>16</sup>. These raised NK cell in pulmonary tuberculosis patients prevent severe lung involvement in covid 19 patients by attacking covid 19 virus.

In Our Study 50 Patients Had Multiple Comorbidities (I.E Combinations Of DM,HTN,CAD, CKD And Liver Disease) And 36 Out Of Them Have Severe Lung Involvement And 14 Had Mild Lung Involvement. Patients With Multiple Comorbidities Have More Severe Lung Involvement Which Is Statistically Significant. Sanyaolu A et al<sup>17</sup> In Their Metanalysis Found That Multiple Comorbidities Are Associated With The Severity Of COVID-19 Disease.

**CONCLUSION:**

In This Study We Conclude That Low Spo2 Level And High HRCT Score Is Well Correlated With Comorbidities Like Hypertension, DM, COPD Except Asthma and Pulmonary T. B. Asthma Have Protected Effect On Covid 19 Infection.

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