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RESEARCH ARTICLE

TO STUDY THE CORRELATION BETWEEN SMOKING (PACK YEARS) AND CT SEVERITY SCORE IN COVID 19 RTPCR POSITIVE PATIENTS – SHORT RETROSPECTIVE STUDY AND ALSO STUDY IT'S EFFECT ON COVID 19 BIOMARKERS

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ABSTRACT

Background: Coronavirus Disease 2019 (COVID-19) is a contagious disease caused by SARS (SARS-COV2). It is a large family of virus that are known to cause illnesses ranging from common cold to pneumonia to Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The effect of smoking on COVID 19 is under consideration. This study is aimed to evaluate the relationship between smoking (Pack years) and CT severity score and its effect on COVID 19 linked biomarkers in COVID-19 RTPCR positive patients. **Materials and Methods:** This is a retrospective study conducted between March 2021 to July 2021 on 50 adult COVID-19 RTPCR positive patients admitted in COVID ward and ICU in GMC, Kota. Their CTSS and biomarkers (CRP, D-Dimer, LDH, IL-6 and S. Ferritin) were obtained at the time of admission and smoking history was obtained for the study. **Results:** The CT severity score was found to be high in patients with more pack years. The Pearson Correlation 'r' value was calculated as 0.575475 with a p-value of 0.000012 at 5% level of significance which is highly significant. COVID-19 linked biomarkers and its association with pack years was also evaluated. P-values at 5% level of significance for the biomarkers are CRP=0.03359, D-Dimer=0.219884, LDH=0.000028, IL-6=0.186538 and Serum Ferritin=0.00001. **Conclusion:** CT severity score is high in smokers and shows significant p-Value at 0.05 and is associated with poor prognosis. CRP, LDH and S. Ferritin are found to be significantly raised in smokers suffering from COVID 19 disease, out of which S. Ferritin is more significantly raised as compared to other significant markers.

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INTRODUCTION

Coronavirus Disease 2019 (COVID-19) is a global pandemic caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It has caused devastating morbidity and mortality. With recent rises around the world, Widespread pandemics have stressed and will continue to pressure healthcare resources. Infection with COVID-19 induces disproportionate inflammatory responses and cytokine storms, which frequently lead to multiple organ failure. Because the pandemic is still progressing, there is a scarcity of information about individuals' clinical characteristics and prognostic variables. To date, smoking has been thought to be probably connected with poor illness prognosis, as significant research has shown that smoking harms lung health. Smoking

Because of the disease's rapid progression, effective biomarkers are frequently evaluated to assess the severity of covid 19 and the effect of smoking on these biomarkers. Common biomarkers tested are CRP, D-dimer, S.LDH, S. ferritin, and IL-6. CRP is usually produced by the liver. It is an inflammatory marker that is elevated in inflammatory diseases. It is elevated in covid -19 infection and is a lung deterioration and progression marker. D-dimer levels are used as a biomarker for blood disorders such as disseminated intravascular coagulation and coagulation disorders associated with COVID -19 infection. It is a fibrin degradation product. It denotes a hypercoagulable state. The presence of LDH (lactate dehydrogenase) isoenzyme 3 in the lungs has been linked to severe covid 19 infections, leading to a severe form of atypical pneumonia and ARDS.

A higher amount is connected to a more severe kind of illness. IL-6 (interleukin 6) has both anti- and pro-inflammatory properties.

Its overproduction can cause a severe inflammatory reaction known as CYTOKINE STORM. It's a lung inflammation and damage biomarker. Its rise is linked to severe lung disease, organ failure, and the need for long-term mechanical ventilation. Ferritin is an iron-containing blood protein called. Its increased concentration causes severe inflammatory responses.

A significantly increased amount in a patient with covid 19 is linked to a poor prognosis. By providing a CT severity score based on the lobes of the lung affected, HRCT chest assisted in the diagnosis, follow-up, and prognosis of a patient with covid 19 pneumonia. The goal of this research was to examine the relationship between smoking (pack-years) and CT severity score on HRCT and the effect on covid -19 biomarkers.

MATERIALS AND METHODS

We conducted a retrospective, single-center observational study at the government medical college in Kota, Rajasthan, collecting clinical data on COVID -19 RT-PCR positive patients admitted to covid wards and ICU inpatients between March and July 2021. Patients under the age of 18, pregnant women, patients with comorbid pathologies such as active tumoral disease, pulmonary embolism, myocardial infarction at the time of admission, and patients receiving immunocompromised therapy were all excluded from the study. There were a total of 50 patients.

COLLECTION OF DATA: Clinical data at the time of admission include demographic information such as (Sex, age, comorbidities), laboratory tests such as routine blood tests for CRP, D-dimer, S. ferritin, S.LDH, S. ferritin, and HRCT chest.

STATUS OF SMOKING: The patient's smoking history was obtained from both the patient and a relative. The cigarettes consumed by the patient were calculated by multiplying the number of cigarettes smoked per day by the number of years of smoking (PACK YEARS).

STATISTICAL ANALYSIS: All analyses were carried out using statistical software that was commercially available (SSPV). At the time of the study, the patient's smoking history was obtained in terms of pack-years, and it was compared to the CT severity score and its associated biomarkers. The independent samples T-test (mean SD) was used to analyze the comparison method of the variable distribution. Pearson's correlation coefficient was used to calculate the degree of correlation between variables. The ordinal logistic regression method was used. The p 0.05 value was chosen for statistical significance.

RESULTS

Patients with more pack-years had a higher CT severity score. The Pearson correlation r-value was calculated as 0.575475 with a p-value of 0.000012 at the 5% significance level, indicating that the correlation is highly significant.

	PACK YEARS	CTSS	P value
PACK YEARS	1		
CTSS	0.575475	1	0.000012

The Pearson correlation coefficient r value was calculated, and the p-value at 0.05 significance. CRP has an r-value of 0.30128 and a p-value of 0.033539 at a significance level of 0.05. The D-dimer has an r-value of 0.176659 and a p-value of 0.21988, which is not statistically significant. The r-value for LDH is 0.555301, and the p-value is 0.000028; The r-value for IL-6 is 0.189976, and the p-value is 0.186538; and The r-value for serum ferritin is 0.60023, and the p-value is 0.00001, all of which are highly significant.

	P	CTSS	CRP	D Dimer	LDH	IL-6	S ferritin
P	1						
CTSS	0.575475	1					
CRP	0.30128	0.600391	1				
D Dimer	0.176659	0.392837	0.460571	1			
LDH	0.555301	0.574429	0.468394	0.376559	1		
IL-6	0.189976	0.392455	0.598107	0.64215	0.372616	1	
S Ferritin	0.60023	0.562944	0.440285	0.342161	0.951611	0.334523	1

Among all inflammatory markers, CRP, Serum LDH, and Serum ferritin have significant p values, indicating that these markers are significantly elevated in smokers with more packyears, with serum ferritin being the most significantly elevated in smokers with more packyears and being associated with poorer prognosis.

DISCUSSION

The dangers of smoking and COVID-19 are not well understood. The current study aimed to assess the impact of smoking on the prognosis of covid 19 positive patients. We obtained some critical data demonstrating that smoking has a significant effect on this disease's radiological and inflammatory parameters. Smoking is a risk factor for COVID -19 progression. Smoking is a significant and well-known risk factor for respiratory illnesses and makes the patient more susceptible to other infectious pathogens. Guan et al.'s largest cohort study involving 1099 patients revealed that a higher proportion of current and former smokers were among those with severe COVID 19 infections (16.9 percent and 5.2 percent). Varvadas et al. concluded that smokers were 1.4 times more likely to have severe COVID-19 symptoms and 2.4 times more likely to require intensive care unit treatment, such as mechanical ventilation.

COVID-19 has wreaked havoc worldwide, crippling the entire healthcare system. It has resulted in a high number of deaths. For the sake of the world as a whole, it has become necessary to categorize patients based on risk and stratify high-risk patients to provide effective and urgent health services. The research community was in desperate need of reliable biomarkers for the progression and prognosis of the covid-19 disease. Many studies have shown that inflammatory parameters suchas CRP, d-dimer n, serum LDH, IL-6, and

serum ferritin help in predicting the prognosis. This research has some limitations. We couldn't tell if the biomarkers were elevated in pre-disease smokers because we didn't have the patients' pre-covid 19 parameters.

CONCLUSION

The CT severity score in smokers is high, with a significant p-value of 0.05, and is associated with a poor prognosis. CRP, S.LDH, and S. ferritin levels were found to be significantly higher in smokers suffering from Covid, with S. ferritin levels being substantially higher than other significant biomarkers.

CONFLICT OF INTEREST: The author declares that he has no conflicts of interest.

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