



CLINICAL SIGNIFICANCE OF EOSINOPENIA AS AN EARLY SUPPORTIVE DIAGNOSTIC TOOL IN COVID-19 INFECTION IN A TERTIARY HOSPITAL, RIMS, RANCHI, JHARKHAND

Medicine

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ABSTRACT

Background: COVID-19 pandemic is still unfortunately persisting, there are limited data with regard to the clinical characteristics of the patients as well as 3 to their prognostic factors. Less frequent presentations include generalized body ache, sore throat, headache, conjunctivitis, diarrhea, loss of taste and smell. The diagnosis is confirmed by testing for the presence of nasopharyngeal viral RNA with a polymerase chain reaction assay, which has limited availability. So the present study was conducted to study the most simple test, CBC, and in it the eosinophil count in a tertiary care center of Jharkhand, India to see how such a very simple and easily accessible test aid in early suspicion, detection and segregation of patients with sign and symptoms or history of contact with COVID-19 infected patients.

Materials And Methods: The present study was conducted in a tertiary care institute situated in Jharkhand state of India over a period of 2 months. Our study included 50 patients and the age group of the patients range from 18 to 60 years. Of these 18 were females and 32 were males. The mean age of the patients is 32.12 years. Considering eosinophil count involving 50 patients with sign and symptoms or history of contact with COVID-19 infected patients the study was done at Rajendra Institute of Medical Sciences, Ranchi and latter many came out to be RT-PCR COVID-19 positive during December, 2020 and January, 2021

Result: Analysis of the information observed in our study has shown that out of 50 patients with sign and symptoms or history of contact with COVID-19 infected patients 39 patients had eosinopenia (<2%). Among eosinopenics 29 came out to be COVID-19 positive confirmed by nasopharyngeal and oropharyngeal swab for COVID-19 RT-PCR and 10 were COVID-19 negative.

Conclusion: The absence or decreased of an eosinophil count in a CBC can aid in early diagnosis of COVID-19. It may be a useful tool in deciding whether to promptly isolate a patient and initiate specific therapies while waiting for confirmatory test results.

KEYWORDS

eosinopenia, RT-PCR COVID-19, nasopharyngeal and oropharyngeal swab for COVID-19 RT-PCR

INTRODUCTION

COVID-19 is a coronavirus outbreak that initially appeared in Wuhan, Hubei Province, China, in December 2019, but it has already evolved^{1, 2} into a pandemic spreading rapidly worldwide. However, as the pandemic is still unfortunately persisting, there are limited data with regard to the clinical characteristics of the patients as well as³ to their prognostic factors. Less frequent presentations include generalized body ache, sore throat, headache, conjunctivitis, diarrhea, loss of taste and smell. COVID-19 primarily spreads through respiratory droplets. Common clinical presentations of COVID-19 include fever, cough, dyspnea, myalgia, rhinorrhea, chest pain, and diarrhea.⁷ However, in severe cases, the disease can progress to multiorgan dysfunction syndrome, including acute respiratory distress syndrome, acute renal failure, septic shock, coagulopathy, and death.^{7,14} The clinical diagnosis of COVID-19 is confirmed by laboratory testing with a reverse-transcription polymerase chain reaction (RT-PCR) assay, which remains a challenge due to limited test availability. Eosinophils are circulating and tissue-resident leukocytes that have potent proinflammatory effects in a number of diseases. Eosinophils originate from CD34+stem cells in the bone marrow as terminally differentiated cells; in fact, they no longer proliferate once formed.^{4,5} Under physiological conditions, the eosinophil count only covers a small percentage of circulating leukocytes, about 1–3%, but their levels may vary in different conditions.⁶

Recently, eosinophils have been shown to have various other functions, including immunoregulation and antiviral activity. It has been known that eosinopenia, a reduction in blood eosinophil count, typically accompanies the response to acute infection or acute stress⁸ although the related mechanism remains inadequately understood. This study puts in an effort to assess eosinophil cytopenia are more common in COVID-19 patients than those in non-COVID-19 patients.

Eosinopenia has already been reported in patients with acute respiratory deterioration during infection with severe acute respiratory syndrome (SARS) coronavirus (CoV) 2 (SARS-CoV-2), the causative agent of COVID-19.⁹ Du et al¹⁰ reviewed the medical records of 85

fatal cases of COVID-19 and noted that 81% of the patients had absolute eosinophil counts below the normal range (absolute eosinophil counts <0.02 × 10⁹ cells/L) at the time of admission. Lymphopenia has also been a common finding in patients with COVID-19,^{11,12,13} and blood eosinophil counts correlated positively with lymphocyte counts in both severe and nonsevere cases.

AIMS AND OBJECTIVES

A study on eosinophil count among COVID-19 suspected patients with sign and symptoms or history of contact with COVID-19 infected patients.

Inclusion Criteria

1. All patients with sign and symptoms or history of contact with COVID-19 infected patients admitted in Rajendra Institute of Medical Sciences, Ranchi.
2. Same patients were followed with oropharyngeal and nasopharyngeal swab for RT-PCR COVID-19.

Exclusion Criteria

1. RT-PCR COVID-19 confirmed positive patient
2. Age less than 18, were excluded from the study.

Limitations Of The Study

Our study is limited by its relatively small sample size and relies on early observational data from a single center. Because many patients were not admitted, repeated eosinophil data were limited and, therefore, the ability to compare eosinophil count trends in those patients was limited.

MATERIALS AND METHODS

The present study was conducted in a tertiary care institute situated in Jharkhand, state of India over a period of 2 months during December, 2020 and January, 2021.

Our study included 50 patients and the age group of the patients range from 18 to 60 years. Of these 18 were females and 32 were males. The

mean age of the patients is 32.12 years.

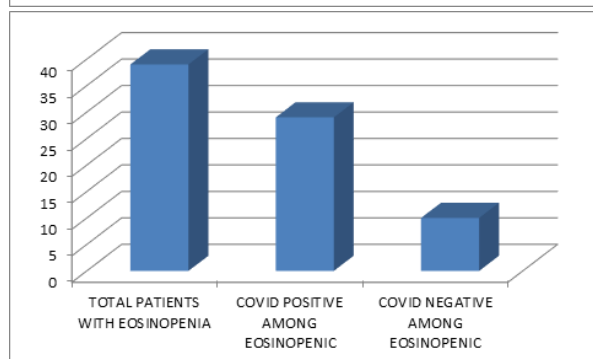
Considering eosinophil count involving 50 patients with sign and symptoms or history of contact with COVID-19 infected patients the study was done at Rajendra Institute of Medical Sciences, Ranchi and latter many came out to be RT-PCR COVID-19 positive during December, 2020 and January, 2021.

Eosinophil count less than 2% was considered to be eosinopenia. Blood counts were done by Beckman Coulter LH-750 or Sysmex XN-1000 automated counters. The low counts were cross-checked by peripheral blood smear examination.

RESULTS

Among 50 patients admitted at Rajendra Institute of Medical Sciences, Ranchi who had sign and symptoms or history of contact with COVID-19 infected patients 32 were men (64%) and 18 were women (36%). The mean age of the patients is 32.12 years.

Analysis of the information observed in our study has shown that out of 50 patients with sign and symptoms or history of contact with COVID-19 infected patients 39 patients had eosinopenia (2%). Among eosinopenics 29 came out to be COVID-19 positive confirmed by nasopharyngeal and oropharyngeal swab for COVID-19 RT-PCR and 10 were COVID-19 negative.



TOTAL PATIENTS WITH EOSINOPENIA= 39	
COVID-19 POSITIVE AMONG EOSINOPENICS	COVID-19 NEGATIVE AMONG EOSINOPENICS
29	10

DISCUSSION

COVID-19 pandemic is still unfortunately persisting, there are limited data with regard to the clinical characteristics of the patients as well as³ to their prognostic factors. Less frequent presentations include generalized body ache, sore throat headache, conjunctivitis, diarrhea, loss of taste and smell. COVID-19 primarily spreads through respiratory droplets. Common clinical presentations of COVID-19 include fever, cough, dyspnea, myalgia, rhinorrhea, chest pain, and diarrhea.⁷ However, in severe cases, the disease can progress to multiorgan dysfunction syndrome, including acute respiratory distress syndrome, acute renal failure, septic shock, coagulopathy, and death.^{7,14} The clinical diagnosis of COVID-19 is confirmed by laboratory testing with a reverse-transcription polymerase chain reaction (RT-PCR) assay, which remains a challenge due to limited test availability.

The clinical diagnosis of COVID-19 is confirmed by laboratory testing with a reverse-transcription polymerase chain reaction (RT-PCR)

assay, which remains a challenge due to limited test availability, variable turnaround time, and the unreliable availability of rapid RT-PCR kits. In many hospitals, test results may take days to return.

The absence of an eosinophil count in a CBC can aid in early diagnosis of COVID-19. It may be a useful tool in deciding whether to promptly isolate a patient and initiate specific therapies while waiting for confirmatory test results.

Future studies could determine whether strategies to rapidly identify patients with COVID-19 with the goal of early institution of treatments results in improvements in prognosis.

CONCLUSION

The absence or a very low count of an eosinophil count in a CBC can aid in early diagnosis of COVID-19.

It may be a useful tool in deciding whether to promptly isolate a patient and initiate specific therapies while waiting for confirmatory test results.

Early diagnosis of coronavirus disease 2019 (COVID-19) and patient isolation are important for both individual patient care and disease containment.

The diagnosis is confirmed by testing for the presence of nasopharyngeal viral RNA with a polymerase chain reaction assay, which has limited availability and a variable turnaround time.

Here we report that a rapid laboratory test, the eosinophil count, readily obtained from a routine complete blood cell count (CBC), may provide actionable clinical information to aid in the early recognition of COVID-19 in patients.

The absence of an eosinophil count in a CBC can aid in early diagnosis of COVID-19. It may be a useful tool in deciding whether to promptly isolate a patient and initiate specific therapies while waiting for confirmatory test results.

In our early care of patients with COVID-19, we observed that many manifested low or absent eosinophil counts at the time of admission.

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