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Internal Medicine

EOSINOPENIA AS A DIAGNOSTIC AND PROGNOSTIC MARKER IN COVID-19 INFECTION

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ABSTRACT The COVID-19 infection has spread rapidly worldwide since its outbreak in December 2019. COVID-19 may present with varying degrees of disease severity, from asymptomatic or mild upper respiratory tract illness to multiple organ dysfunction. Though definitive diagnosis of COVID-19 requires a high degree of clinical suspicion and knowledge of its clinical characteristics along with typical radiological abnormalities seen in CT chest and laboratory confirmation of infection with RT PCR technique, the effective screening of patients with COVID-19 mostly starts from fever clinics. Thus, it is important for the physicians in fever clinic to efficiently triage suspected COVID-19 patients.

Routine blood investigations we generally do for a suspected COVID-19 infection includes CBC, renal and liver function tests, electrolytes, CRP, LDH, ferritin and coagulation profile. Among them, CBC is the most efficient and economic investigation. Various studies showed that patients with COVID-19 infection tended to have higher neutrophil to lymphocyte ratio (NLR) in CBC. Some studies described low lymphocyte counts as a predictor of prognosis in COVID-19. Some studies showed that eosinopenia and elevated CRP levels facilitate triage of COVID-19 patients.

KEYWORDS :

OBJECTIVE:
To investigate the diagnostic and prognostic value of eosinopenia in COVID-19 RT PCR positive patients and to correlate eosinopenia with lymphopenia, CRP levels and CT severity score.

METHODS:
Eosinophils, lymphocytes and neutrophil counts from routine CBC and CRP levels were collected from 51 COVID-19 RT PCR positive Cases admitted in Apollo main hospital, Chennai. CT chest was done in 42 cases and CT severity score was calculated. Furthermore, Eosinophil counts were reviewed at the time of discharge or after 1 week of admission if patient remains in hospital. Percentage of patients with eosinopenia on admission and at the time of discharge and correlation of eosinopenia with lymphopenia, CRP levels and CT severity score were studied.

RESULTS:
Out of 51 patients included in the study, 20 patients were admitted in ICU and rest of the 31 patients were admitted to ward. 38 patients (74.5%) had zero Eosinophils, 8 patients (15.68%) had 1% Eosinophils and remaining 5 patients (9.8%) had more than 1% Eosinophils in CBC done on admission. In 20 patients admitted to ICU, 19 (95%) had zero Eosinophils on admission. In 31 patients admitted to ward, 19 had zero Eosinophils and rest of the 12 patients had normal CBC on admission. Among zero Eosinophil group i.e. 38 patients, 27 patients (71.1%) also had associated lymphopenia. Mean C-Reactive Protein (CRP) value on admission among patients with zero Eosinophils was 69.63 mg/dL whereas it was 24.42 mg/dL in normal Eosinophil patients (p-value of 0.007). Mean CT severity score among eosinopenic group was 13.71 whereas it was 8.38 in normal Eosinophil patients. In CBC done on discharge or after 1 week of admission, 21 patients (41.2%) remained eosinopenic and remaining 30 patients had Eosinophils suggesting 17 patients (44.73%) who were eosinopenic on admission had Eosinophils in CBC after 1 week.

DISCUSSION:
The pathophysiology for eosinopenia in COVID-19 remains unclear but is likely multifactorial, involving inhibition of Eosinophil egress from the bone marrow, blockade of eosinophilopoiesis, reduced expression of chemokine receptors/adhesion factors, and/or direct Eosinophil apoptosis induced by type 1 IFNs released during the acute infection. In one study, among 85 fatal cases of COVID-19, 81% of the patients had absolute Eosinophil counts below the normal range (absolute Eosinophil counts <0.02 × 10^9 cells/L) at the time of admission. Lymphopenia has also been a common finding in patients with COVID-19, and blood eosinophil counts correlated positively with lymphocyte counts in both severe and non-severe cases. Notably, Eosinophil levels improved in all patients before discharge, suggesting that resolution of eosinopenia may be an indicator of improving clinical status.

CONCLUSION:
Eosinopenia is present in nearly 75% of the COVID-19 RT PCR positive patients in the study. As 19 of the 20 ICU admissions had zero Eosinophils and only 1 patient had 1% Eosinophils and patients with eosinopenia are having high CRP values and high CT severity scores compared to the patients with normal Eosinophil counts, we can conclude that eosinopenia is probably associated with higher severity of the disease. About 45% of the patients who were eosinopenic on admission had normal Eosinophil counts at the time of discharge and the remaining 55% patients continued to be eosinopenic which signifies that we may probably use eosinopenia as a prognostic marker in COVID-19 infection.

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