

Eosinopenia as a Diagnostic Marker in Covid-19?

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Commentary

Eosinopenia is defined as a decrease of circulating eosinophils $<0.01 \times 10^9/l$. Eosinopenia is mediated by adrenal glucocorticosteroids and epinephrine in acute stress, whereas in acute inflammatory states, this is not reliant upon the endocrine mechanisms. The use of eosinopenia as a marker is an encouraging observation in COVID-19 infection, besides require further investigation[1].

Eosinopenia was first described in certain infections in 1893, Bass and colleagues stated a series of papers presenting that eosinophil count repeatedly decreases in acute inflammation and eosinophil count increases after recovery of infection. Subsequently, eosinopenia has been linked with a variety of medical situations including bloodstream infections, viral infections, therapy with corticosteroids and catecholamines, physiological stress, psychiatric conditions and some allergic disorders. The response to acute inflammation involves a fast and persistent decrease in the numbers of circulating eosinophils, as a consequence of release of small amounts of the chemotactic factors into the circulation [2,3].

Eosinophils comprises a very small proportion of the peripheral white blood cells, their production is controlled and regulated by cytokines, mainly interleukin-3, interleukin-5 and granulocyte-macrophage colony stimulating factor. Deprivation of these three important cytokines, impedes the survival of eosinophils for less than 48 hours. These three cytokines are though, not significantly activated in patients with sepsis, it is believed to be the main mechanism resulting in eosinopenia in patients with severe sepsis and bloodstream infections. Bass (1980) confirmed that eosinopenia is common in adult patients with bloodstream infections. Even though eosinopenia has a reasonable specificity (79%) as a marker of bloodstream infection in adult patients, its sensitivity is low [4,5].

There has been a recent reappearance of interest in using eosinopenia as a biomarker in COVID-19 infection. Eosinopenia had been found in numerous studies lately to have a strong correlation with COVID-19 mortality, eosinopenia along with lymphopenia may be a useful pointer for diagnosing COVID-19 in those patients with typical symptoms and radiological changes [6].

Eosinopenia appears to be a commonly used as a differential diagnostic inflammatory marker. Because bloodstream infection is a more objective and clearly described form of infection, eosinophilia is becoming a favourite endpoint for assessing the diagnostic efficacy. Laboratory values that shows

strong indications in COVID-19 infection include lymphopenia, prolonged prothrombin time (PT), elevated lactate dehydrogenase (LDH), elevated alanine aminotransferase (ALT), elevated IL-6 and elevated ferritin levels. Elevated elevated D-dimer, elevated neutrophils, eosinopenia, elevated C-reactive protein (CRP), aspartate aminotransferase (AST), and elevated troponin (including high-sensitivity troponin had been implicated in most cases [7,8].

Eosinopenia had appeared as a low-cost warning test for COVID-19 and bloodstream infection. The use of eosinopenia, as a marker is a promising observation in COVID-19 infection and require more exploration. Larger sample population is needed to further investigate the relationship between COVID-19 and eosinopenia. In summary, using a validated automated analyzer that provides precise and accurate numerical data, including a five-part leucocyte differential and the evaluation of a peripheral blood film for morphological changes can guide clinicians with the management [9].

References

1. Bass DA, Gonwa TA, Szejda P, et al. Eosinopenia of acute infection: production of eosinopenia by chemotactic factors of acute inflammation. *J Clin Invest.* 1980;65:1265-1271.
2. Bass DA. Behavior of eosinophil leukocytes in acute inflammation. II. Eosinophil dynamics during acute inflammation. *J Clin Invest.* 1975;56:870-879.
3. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet.* 2020;395:507-513.
4. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet.* 2020;395:497-506.
5. Wang D, Hu B, Hu C, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA.* 2020;323:1061-1069.
6. Gil H, Magy N, Mauny F, et al. Value of eosinopenia in inflammatory disorders: an "old" marker revisited. *Rev Med Interne.* 2003;24:431-435.
7. Mann A, Lehmann H. The eosinophil level in psychiatric conditions. *Can Med Assoc J.* 1952; 66:52-58.
8. Abidi K, Khoudri I, Belayachi J, et al. Eosinopenia is a reliable marker of sepsis on admission to medical intensive care units. *Crit Care.* 2008;12:R59.

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9. Rosenberg H F, Dye K D, Forster P.S. Eosinophils: changing perspective in health and diseases. *Nat Rev Immunol.* 2013;13:9-22

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