CORRESPONDENCE

Role of ABO Blood Group and Hematological Parameters in COVID-19 Prediction

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As mentioned before, there are hundreds of different blood group antigens and alleles as well as 34 recognized human blood type systems. Variations in antigen expression between blood types can increase or decrease a host's vulnerability to a range of diseases.[1] ABO antibodies may contribute to disease etiology and individual susceptibility. They are a part of the innate immune system's protection against enveloped viruses and certain bacterial infections.[2] COVID-19 may be one of these illnesses.

Mostly found on the surface of erythrocytes, the glycoproteins referred to as ABO blood type antigens are encoded by two co-dominant alleles on chromosome 9.[3] A number of illnesses and cancers, including the Norwalk, Dengue, Hepatitis B, and the most recent corona viral severe acute respiratory syndrome epidemic in 2003, have been linked to racial variations in blood group expression.[4]

Anti-A antibodies prevent the SARS-COV 2 from interacting with the angiotensin converting enzyme (ACE) receptor on host target cells. Given that the virus's primary target is ACE receptors, a correlation between the ABO blood type and COVID-19 disease seems plausible.[5] A small number of pathogens, including parvovirus B19 and malarial parasites infect red blood cells (RBCs) and their progenitors.[6]

Due to its pleomorphism, the ABO gene exhibits significant regional and ancestry variation. Two dominant and two recessive alleles on chromosome 9 encode the A and B antigens seen on the surface of RBCs.[7] These antigens are expressed by neurons, platelets, vascular endothelial cells, and epithelial cells).[8] The A and B antigens may serve as receptors for a variety of immunological and inflammatory responses such as antibodies against enveloped viruses.[9,10]

There was an apparent link between COVID-19 transmission and ABO type in a Hong Kong outbreak. Based on an epidemiological research of 34/45 hospital personnel who had severe acute respiratory syndrome after being exposed to a single-index patient (groups A, B, and AB), the majority of afflicted individuals (23/34) were non-group O individuals. With an OR of 0.18, members of group O exhibited a reasonable level of immunity against infection.[11]

Coronavirus, like HIV, is an encapsulated virus that uses a viral adhesion glycoprotein to target host cells. Group B accounted for 14% of the 389 HIV donors identified during screening, a percentage that was somewhat higher than the 9% rate for the overall population (OR, 1.5).[2]

Zhao and colleagues found that persons with blood group type A had a higher chance of contracting COVID-19 than those with other blood types, whereas people with blood group type O have a reduced risk of infection.[7]

Most regular hematological measures were significantly different in dead COVID-19 patients compared with recovered COVID-19 patients, with lymphocytes being the most obvious difference.[12] Researchers discovered that a decrease in lymphocytes was more common in the severe groups, but they also showed that in contrast to what other research had previously shown, lymphopenia can only accurately predict a patient's prognosis between days 9 and 12 after admission. While eosinophil counts looked to be low in all COVID-19 patients but recovered slowly, leukocyte and neutrophil counts were considerably higher in the severe COVID-ICU group.[13] Among the regular hematological measurements examined, the lymphocyte count showed the most significant alterations, indicating that but only for a limited period of time, we may use this parameter to identify the onset of the illness and forecast prognosis in COVID-19 patients.[14]

Total leukocyte count (TLC), neutrophil, lymphocyte, and absolute eosinophil counts, and neutrophil-to-lymphocyte ratio (NLR) are hematological indicators that have been shown to predict the severity of new coronavirus disease 2019 patients.[15]

It is crucial to find many circulating biomarkers that can predict the severity of COVID-19 due to the virus's contagious nature and disastrous effects.[16] Total leukocyte count and NLR, two components of CBC that are indicators of the systemic inflammatory response, are being researched as potential predictors of the severity of COVID-19 pneumonia. It has also been possible to

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estimate the severity of COVID-19 in patients using inflammatory indicators such lymphocyte and eosinophil counts.[17]

These routine indications are particularly important because of the massive COVID-19 patient load that is straining the healthcare system. Consequently, a basic CBC with TLC, neutrophil, lymphocyte, and eosinophil counts, as well as NLR, may be very beneficial in predicting the severity and triaging of these patients, particularly in poor countries with limited resources.[18]

Lymphocytes, T-cell subsets, and eosinophil numbers all dropped dramatically in seriously and critically sick individuals.[19] Neutrophil counts, interleukin-6, procalcitonin, serum amyloid A protein, and C-reactive protein levels in non-survivors remained high or showed a rising trend, whereas levels in survivors were steady or showed a decreasing trend. The relationship between aberrant immunological measures, such as white blood cell, lymphocyte, and eosinophil counts, infection-related factors, serum inflammatory-cytokine levels, and disease severity or mortality.[20]

Indeed, detecting early and sensitive indications of innate and adaptive immune responses to COVID-19 might aid in the prediction of illness development and catastrophic consequences.[21]

In conclusion, both ABO blood group and hematological parameters play essential role in predicting COVID-19 progression and development.

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