

Dynamic changes of the neutralizing antibodies levels in COVID-19 patients as a potential tool in differential diagnosis

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Abstract

Background: Neutralizing antibody (NAb) is an important immunological marker in Coronavirus disease 2019 (COVID-19). This study aims to explore the different changes of NAbs level in COVID-19 patients and screen specific laboratory findings to predict disease severity. Methods: Eighty-eight COVID-19 patients, forty-eight healthy controls and sixty-two healthy vaccinated people were included. Epidemiological, clinical and laboratory data were obtained from the electronic medical record information system. The NAbs levels were determined by the double antibody sandwich method. The first set of laboratory results of the COVID-19 patients was selected after onset to construct the receiver operating characteristic curve (ROC). Correlation curves were also constructed to explore the relationship between laboratory findings and NAbs. Results: In mild cases of COVID-19, NAbs levels reached the peak at 25-30 days after onset. NAbs levels during convalescence were lower than those after onset and were found to gradually decrease during 0-15 days. In severe cases, NAbs levels peaked at 20-25 days after onset. The ROC analysis demonstrated that the area under the curve of C-reactive protein (CRP) was 0.94 at 20.42 mg/L cut-off with sensitivity and specificity of 100% and 82% respectively. The levels of NAbs, CRP, glucose (Glu), neutrophils (NE) and urea nitrogen (Urea) in mild cases were lower than those in severe cases ($p < 0.05$). Correlation analysis showed that CRP was positively associated with NAbs. Conclusion: The levels of NAbs dynamically changes at different stages in COVID-19 patients with various severities. CRP and other laboratory findings provide the basis for clinical differential diagnosis.

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