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Is ABO Blood Groups Relevant to COVID-19 Infection?

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ABSTRACT

Evaluation of peripheral blood morphology is an important screening tool for many diseases. When abnormalities are detected by the automated hematology analyzer, manual microscopic review of the blood smear is necessary to determine the next course of action. Thus, the International Consensus Group for Hematology Review prepare criteria to review peripheral blood slide after analyzing by hematology analyzers. For better advantage of this criterion laboratories must optimize it with their setting.

Keywords: COVID-19, ABO blood group, Hematology

INTRODUCTION

The association of Covid-19 infection and blood groups remains elusive and must be approach with vigilance. The research designs and methodologies identified in recent literatures are not robust and convincing. A sound research design that identifies dependent and independent variables and adjust for confounding factors could be a way forward. However, Covid-19 infection could be the results of complex interactions of factors that could vary from genetics, behavioural, metabolic, psychological, social status and environmental risk factors.

Conversely, as suggested by Guillon and colleagues [1] that variable susceptibility to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections could be linked to circulating anti-A antibodies, and could interfere or even reduce the virus-cell adhesion process. This could be considering as a working hypothesis.

A genome-wide association study (GWAS) [2,3] found that blood type O carriers have increased IL-6 levels than non-O blood types, suggesting the advantages of blood type O over the other types in maintaining the dominant role of Angiotensin-converting enzyme-2 (ACE2) in the RAS and thus a reduced risk of developing hypertension. The GATC haplotype of the four polymorphisms of the ABO gene (rs8176746, rs8176740, rs495828, rs12683493), which is common among non-O blood type patients, was positively associated with ACE activity [2].

In addition to inflammatory response associated with Covid-19 infection [3], we cannot overlook mechanism purported by earlier studies that suggested ABO blood group profound influence on the haemostasis, as it is a major determinant of plasma levels of Von Willebrand Factor (VWF) [4,5]. Literatures also defined blood group O as a risk factor for increased severe bleeding while blood group non-O is a risk factor for thromboembolic events. The risk of VTE is probably related to the level of VWF and factor VIII in non-group O subjects. A, B, and H blood group antigens are expressed on N-glycans of vWF and influence the half-life of the protein (10 hours for group O and 25 hours for non-O subjects), duchies explain for the greater levels in non-O patients. These observations raise the prospect that a greater tendency for blood clot formation in non-O patients [6].

The association between antigens A and B and arterial thrombosis, such as coronary heart disease (CHD), cerebrovascular disease or peripheral vascular disease, is still unclear. Canadian researchers evaluated the association between blood groups and thrombotic events in a cohort of blood donors from the province of Quebec, Canada. When the analysis was controlled to older women (≥40 years), those with blood group A had a statistically significant 40% higher risk of CHD events, compared to those with group O (HR 1.40 [95% CI: 1.01-1.92]) [7].

Thromboembolic events (blood group O *vs*. others) occured

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in 2.8 (O) *vs.* 3.3 (others) %, P=0.619. The Canadian retrospective study on 1281 multiple injured patients, there found no relevant influence of ABO blood group on haemorrhage, thromboembolic events and mortality.

They found Blood group AB was associated with a higher risk of hospitalisation or death because of thrombotic events such as coronary, cerebrovascular or peripheral diseases.

However, in another review, one justification for the association of ABO blood group and CHD was directed towards elevated levels of Von Willebrand Factor (VWF) and consequently, of factor VIII in the plasma, as a risk factor for CHD and also towards variants at ABO loci associated with increased levels of plasma lipid and inflammatory markers. Some studies have found conflicting results [2,8-10].

Other mechanisms have been proposed to explain the association between blood group and CHD, but a unifying theory remains elusive as discussed by Zhou et al. in their recent review [11].

An international database, encompass with a robust research design could unlock the biology of Covid-19 and its association with blood groups which eventually will improve our understanding of human susceptibility to the new emerging infection [12].

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