

ABO blood type analysis of the donors of convalescent plasma after COVID-19 infection in Chelyabinsk region, Russia

The distribution of ABO blood type in COVID-19 patients was studied in a number of countries among various ethnic groups. Increased percentage of the A and decreased percentage of the O blood type were observed in COVID-19-infected individuals [1]. However, in some cohorts in India, Iran and Lebanon, these correlations were not found [2–5]. We determined the association of COVID-19 infection rate with ABO blood type in the sample of Russian population, which previously was not studied. During the period between 1 August 2020 and 1 February 2021, we analysed 193 donors of COVID-19 convalescent plasma donors (CPD) in Chelyabinsk Region, located in the South Ural Mountains of Russia and inhabited mostly by Russians (83.8%), Tatars (5.4%) and Bashkirs (4.8%).

Diagnosis according to anamnesis data was confirmed by SARS-CoV-2 RNA test through PCR from the nasopharyngeal swabs and the disease severity in patients were analysed retrospectively. Seventy-four people had a mild form of the disease (acute respiratory infections, pharyngitis, bronchitis, asymptomatic forms, contact), and 119 people had moderate form (bilateral pneumonia of moderate severity). All subjects were free of concomitant severe illnesses and had positive SARS-Cov-2-IgG. Two thousand, one hundred and two healthy blood donors from Chelyabinsk Region from the same ethnos served as controls. The ABO blood group was determined by standard serological methods using monoclonal antibodies.

Control group is represented mostly by individuals with blood type O, 35.0%, type A, 29.9%, type B, 23.6% and AB, 11.0%. Similar distribution was found in CPD with mild symptoms. (Table 1). In contrast, the ABO group distribution of the CPD with a history of moderate symptoms was different. In this group, blood type A was more predominant (41.2%) than


type O (25.2%). It should be noted, that fewer individuals with anti-A isoagglutinins (O and B blood type) were observed in the moderate symptoms group compared to the mild symptoms. This observation indicates that the presence of anti-A isoagglutinins may protect from COVID-19 infection, so that people with O and B groups can be better protected from infection and prone to less severe development of the disease. In conclusion, we found that group A population of the Chelyabinsk region in Russia seems to have a higher risk of suffering from severe forms of COVID-19, like it has been reported in other regions of the world.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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TABLE 1 The frequency of ABO antigens in CPD for COVID-19

| ABO | CPD with moderate form | CPD with mild form | Control group | p-value ^a | OR [95%CI] ^a |
|--------|------------------------|--------------------|---------------|----------------------|-------------------------|
| Number | 119 | 74 | 2102 | | |
| O | 30 (25.21%) | 23 (31.08%) | 745 (35.44%) | 0.023 | 0.6 [0.4–0.9] |
| A | 49 (41.18%) | 21 (28.38%) | 628 (29.88%) | 0.009 | 1.6 [1.1–2.4] |
| B | 25 (21.01%) | 22 (29.73%) | 497 (23.64%) | | |
| AB | 15 (12.61%) | 8 (10.81%) | 232 (11.04%) | | |
| anti-A | 55 (46.21%) | 45 (60.81%) | 1242 (59.09%) | 0.006 | 0.6 [0.4–0.9] |
| anti-B | 79 (66.38%) | 44 (59.46%) | 1373 (65.32%) | | |

Note: The chi-square (χ^2) test was used to assess the differences in the size of distribution for blood type within study groups ($p < 0.05$).

Abbreviation: CPD, convalescent plasma donors.

^aCOVID-19 CPD moderate severity versus control group.

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