

Editorial

Highly unlikely transmission of COVID-19 by blood transfusions

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Introduction

Coronavirus disease 2019 (COVID-19) is a newly emerging infectious disease discovered in late December 2019.¹ The COVID-19 is caused by infection with SARS-CoV-2, a novel human coronavirus.¹ The disease is primarily transmitted human-to-human via oral and respiratory routes by ingesting or inhaling aerosols and droplets containing infectious SARS-CoV-2.² Clinical manifestations of COVID-19 range from asymptomatic to mild and severe syndromes of the respiratory system.³ Viral RNA can be detected in samples collected from the upper and lower respiratory tract.⁴ Typically, respiratory viruses do not cause viremia. However, SARS-CoV-2 virions or RNA (called RNAemia) have been detected in the blood samples of patients with COVID-19 which raises concerns about the safety of blood transfusion.^{5,6} A systematic review and meta-analysis by Chiem, et al.⁷ reported the surveys of screening SARS-CoV-2 RNA in donated blood products from asymptomatic donors in which data were collected from January 2019 to May 2020, the first phase of the COVID-19 pandemic. The % RNAemia among those donated blood products was 3.28% (23 from 701). Another dataset analyzed the prevalence of SARS-CoV-2 RNA in a random pool of blood donations collected between January and April 2020, the peak of the pandemic.⁷ SARS-CoV-2 RNA was detected in 6 from 103,661 donated blood products (0.0058% RNAemia). The majority of the analyzed articles reported threshold of the cycle (CT) values of the detected SARS-CoV-2 RNA were more than 30 indicating low viral load. By analyzing post-donation information, all RNAemic donors from both datasets were monitored to report COVID-19-related symptoms to their blood

centers within 15 days after their donation. Totally, 16 of 29 (55.17%) were completely asymptomatic, while 44.83% (13 of 29) developed mild COVID-19-like symptoms.⁷ Moreover, Chiem C, et al. analyzed the transmissibility of COVID-19 using RNAemic blood products. Altogether, 4 articles reported 13 recipients received RNAemic blood products. Surprisingly, none developed COVID-19 or tested positive for RNAemia. These suggest a low risk of COVID-19 transmission by blood transfusion. Saá et al.⁸ reported the prevalence of SARS-CoV-2 RNA in plasma samples collected from 2,250 blood donors by the American Red Cross Society from March 2020 to July 2021. The % RNAemia was 9% to 15% peaking in late 2020 to early 2021 and sharply decreased to 4% which coincided with mass vaccination in the population. Moreover, six RNAemic plasma samples that had the highest viral load were chosen for inoculating the highly susceptible Vero-ACE2-TMRSS2 cells. None of the cultures of the inoculated cells showed cytopathic effects of SARS-CoV-2 and produced infectious virions. It suggested that the RNAemic plasma samples did not contain infectious SARS-CoV-2 or contained the virus below the limit of detection by the Vero-ACE2-TMRSS2 cell assay (0.7 plaque-forming unit/mL).

Conclusion

The prevalence of SARS-CoV-2 RNA detected in donated blood products is low. Infectious SARS-CoV-2 virions and RNA found in the blood of asymptomatic donors, comprising the majority of the donations, are extremely low or even undetected. Hence transmission of COVID-19 by blood transfusion is highly unlikely.

References

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