Platelet Recruitment in COVID-19

Am J Clin Pathol XXXX 2021;XX:1–0 HTTPS://DOI.ORG/10.1093/AJCP/AQAB102

TO THE EDITOR

McMullen et al[1] discuss the increasingly recognized role of platelet deposition in the lung vasculature of patients with coronavirus disease 2019 (COVID-19). The group used the immunostain CD61, found predominantly on thrombocytes, to assess the degree of platelet deposition in COVID vs control tissues.

In their discussion of this well-written article, the group comments that one limitation of their study is the inability to exclude the source of the platelet deposition: is it from local pulmonary megakaryocytes or circulating platelets and thromboemboli? Similar work at our university suggests that this platelet deposition is extrapulmonary and corroborates the finding of the Chicago group that there is indeed increased platelet deposition in COVID-19.

We studied several postmortem venous thromboemboli of patients with COVID-19 vs noninfectious pulmonary embolism and found increased platelet deposition in the COVID-19 cohort. Using a modified Carstair stain,[2] we were able to visually differentiate platelets from fibrin FIGURE 1 analogous to the original article's use of CD61.

Combined with the findings of McMullen et al,[1] there is accumulating evidence that platelet aggregation is a major component of the coagulopathy present in COVID-19. In the original study, the deposition was limited to mostly interalveolar capillaries and smaller vessels. Our preliminary findings extend this platelet aggregation evidence to larger thromboemboli as well. In addition, we found an increase in sloughed endothelial cells in our COVID-19 cohort, one of the proposed mechanisms of thrombosis in these patients.[3]

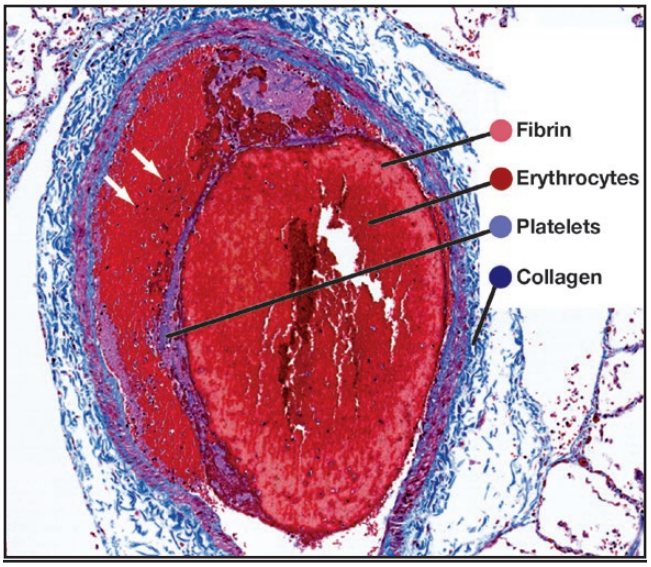

FIGURE 1 A modified Carstair stain differentiating between the major components of a venous thromboembolism in coronavirus disease 2019. Fibrin (light pink) is more easily differentiated from platelets (gray-blue) than on traditional H&E, and both components are architecturally major components of this representative clot. In addition, sloughed endothelial cells (arrows) can be seen in the erythrocyte portion of the clot.

Anthony Cardillo, MD
Majed Refaai, MD
University of Rochester Medical Center, Rochester, NY, USA

REFERENCES

1. McMullen PD, Cho JH, Miller JL, et al. A descriptive and quantitative immunohistochemical study demonstrating a spectrum of platelet recruitment patterns across pulmonary infections including COVID-19. *Am J Clin Pathol.* 2021;155:354-363.
2. Carstairs KC. The identification of platelets and platelet antigens in histological sections. *J Pathol Bacteriol.* 1965;90:225-231.
3. Ackermann M, Verleden SE, Kuehnel M, et al. Pulmonary vascular endothelialitis, thrombosis, and angiogenesis in Covid-19. *N Engl J Med.* 2020;383:120-128.