Letters

COMMENT & RESPONSE

In Reply We thank Li and colleagues for their interest in our study.1 We elected to focus our attention on the most well-established risk factors for retinal vascular occlusion when including covariates. Li and colleagues identified other possible risk factors for retinal vascular occlusion; however, the nature of these associations is less certain. Given the known causative role of hypertension, hyperlipidemia, and diabetes with heart disease and peripheral vascular disease, the inclusion of these latter 2 variables would be anticipated to have a more limited impact on our results and may risk distorting our results by unblocking new confounding pathways. The desire to be complete in the inclusion of covariates must be weighed against the risks of overfitting, multicollinearity, and inflating the standard errors for regression coefficients.2,3 As such, models with collinear covariates may bias against finding an independent association between COVID-19 diagnosis and retinal vascular occlusion. The goal of this study was to provide a focused evaluation of retinal vascular occlusions relative to COVID-19 diagnosis. Additional studies are needed to improve our understanding of the risk factors for retinal vascular disease outside of COVID-19; however, this is outside the scope of our current study.

As noted previously, the time between COVID-19 and retinal vascular occlusion diagnoses likely represents an overestimate given the expected delay between symptom onset and diagnosis. Nonetheless, other studies have found that post-COVID-19 vascular and thrombotic changes can persist for months after acute infection,4,5 making it possible that a similar phenomenon could occur with retinal vascular disease.

Given the relative rarity of retinal vascular occlusions, it is not unexpected that some associations may fail to reach statistical significance and it is more important to analyze the general trends to ensure they make intuitive and clinical sense. Compared with those patients who did not have a retinal vascular occlusion (group 1), patients with occlusions before COVID-19 diagnosis (group 2), and those with occlusions after COVID-19 diagnosis (group 3) were more likely to have elevated BMI. Obese individuals were more likely to have a retinal vascular occlusion—the mean difference between group 2 and group 1 was 22.7; 95% CI, 10.4-35.0; P < .001. The same degree of difference was not seen between group 3 and group 1 (mean difference, 8.9; 95% CI, −1.3 to 19.0; P = .09). Overweight individuals were more likely to have retinal vascular occlusions when comparing group 3 vs group 1 (mean difference, 14.0; 95% CI, 5.2-22.8; P = .002); however, this degree of difference was not seen between group 2 and group 1 (mean difference, 4.9; 95% CI, −5.8 to 15.6; P = .37). It is important to view these results in the larger context that generally higher BMI was associated with an increased risk of retinal vascular occlusion.

We appreciate Li and colleagues’ thoughtful commentary. The purpose of our study was to quantify the risk of post–COVID-19 retinal vascular occlusions and perform an exploratory analysis to investigate the nature of such an association. We agree that further studies are necessary to more fully understand the association between COVID-19 and vascular disease.

Bobeck S. Modjtahedi, MD
Duy Do, PhD
Jeremy Shaw, MD

Author Affiliations: Department of Research and Evaluation, Southern California Permanente Medical Group, Pasadena (Modjtahedi, Do); Department of Clinical Science, Kaiser Permanente Bernard J. Tyson School of Medicine, Pasadena, California (Modjtahedi); Eye Monitoring Center, Kaiser Permanente Southern California, Baldwin Park (Modjtahedi, Shaw); South Bay Medical Center, Department of Ophthalmology, Southern California Permanente Medical Group, Harbor City (Shaw).

Corresponding Author: Bobeck S. Modjtahedi, MD, Department of Research and Evaluation, Southern California Permanente Medical Group, 100 S Los Robles Ave, Pasadena, CA 91101 (bobmodj@gmail.com).

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