

Venous oxygen saturation is reduced and variable in central retinal vein occlusion

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Received: 23 December 2014 / Accepted: 23 December 2014 / Published online: 22 January 2015
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Dear Editor;

We thank Gokce et al. for their comments on our article about reduced and variable venous oxygen saturation in central retinal vein occlusion (CRVO) [1]. They suggest that environmental chronic cold exposure of our subjects, which is not mentioned in the study, might have affected the results by modifying hematologic and cardiovascular risk factors for CRVO.

We would be careful of making any assumptions about the impact of climate on hematological and cardiovascular risk factors in our study population. In Iceland, the average winter temperature is about 0 °C (32 °F), and during the months when the study was performed, the average temperature was 5 °C (ranging from 0 to 12.7 °C). Plenteous geothermal natural resources provide relatively inexpensive space heating, which is abundantly used by the nation, and indoor temperatures are 20–25 °C. The oximetry measurements were made in this temperature range.

To the best of our knowledge, there is no evidence that links cold exposure to the pathogenesis and prevalence of CRVO, and we do not consider our study subjects susceptible to cold temperature eye injury. Intraocular temperature has been related to the core temperature of the body [2]. Both in vitro and in vivo experiments at an ambient air temperature of −40 °C

indicate the role of corneal tissue in limiting heat conductivity between the corneal surface and intraocular environment, thus providing a stable temperature of about +37 °C in the anterior chamber compared with +24.3 °C on the corneal surface [2].

In our study, we used comparable images of the fellow unaffected eye of the same patient, which is exposed to the same temperature and risk factors, to measure oxygen saturation in retinal arterioles and venules for comparative statistical analysis. We think the most likely reason for the marked reduction in venular oxygen saturation in CRVO eyes ($p < 0.0001$, paired t-test) is stagnation of blood due to the venous occlusion. We also suggest that the apparent variability in retinal venous oxygen saturation in CRVO eyes (both within each eye and between eyes) reflects individual differences in the severity of the venous obstruction [3], which may partly be explained by the various compensatory mechanisms against the venous occlusion.

Conflict of interest Einar Stefánsson and Sveinn Hakon Hardarson have financial interest in the retinal oximeter used in the study.

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