

Variability in Subfoveal Choroidal Thickness Measurements

The recent report by Rahman et al.¹ describing subfoveal choroidal thickness (SFCT) measurements was interesting to read and raised several questions that further interpretation of their data may answer. The range of thicknesses (OD 172–550 μm ; OS 142–563 μm) seems surprisingly large for the age range of their study participants. Using the formula for age-adjusted SFCT measurements of Margolis and Spaide² ($366 - 1.56 \times \text{age in years}$) one could expect a range on the order of 290 to 320 μm .² In their original paper, Margolis and Spaide do not specify the ethnicity of the patients examined but one hypothesis could be that racial differences account for such variability in the current work. Although not primarily designed to test this effect, did the authors see any trend to support or refute it? Similarly, for the outliers presented in the Bland-Altman plots, was there any suggestion of a racial predilection? Is the sclerochoroidal interface more difficult to detect in some groups compared with others?

As the choroid is a highly vascular structure, blood flow and thickness are known to vary with intraocular pressure, vascular perfusion pressure,³ and circulating endogenous catecholamines (and by inference, presumably, anxiety state).⁴ Were any of these factors controlled for?

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Author Response: Variability in Subfoveal Choroidal Thickness Measurements

The authors thank Khan et al.¹ for their interest in our paper and appreciate the opportunity to respond to their constructive comments. We note that Margolis and Spaide,² who evaluated the association of age and subfoveal choroidal thickness (ChT), showed a negative correlation coefficient of -0.424 , which implies that only 18% of the variance in ChT in a cohort with a mean age of 50 years can be explained by age alone. Therefore, more than 80% of the variation in ChT measurements is not explained

by age. Furthermore, the impact of age on choroidal thinning may only become important in older or myopic subjects³—hence, the difference between the expected and the actual measured range in ChT. Also, both eyes were used for analysis in their paper (54 eyes of 30 patients), inflating the association between age and ChT.

Although, the method of classification of race is not universally agreed upon, we categorized race into Afro-Caribbean ($n = 4$ study participants), white Caucasian ($n = 22$), Asian (Indian or South Asian, $n = 16$), and Oriental (South-east Asian or Chinese, $n = 8$). In these groups, mean subfoveal ChTs of the right eyes were 364 (Afro-Caribbean), 358 (Oriental), 336 (Asian), and 314 (Caucasian) μm . In the left eyes, mean subfoveal ChTs were 364 (Afro-Caribbean), 353 (Oriental), 329 (Caucasian), and 316 (Asian) μm . We pooled the data for Asian and Caucasian ChT (as they are genetically very similar) and for Oriental with Afro-Caribbean ChT (as they are quite different groups from Caucasians). The mean and median ChTs were still not significantly different between the pooled groups; however, the sample size may be too small to detect a small difference. It is possible that the visibility of the choroidal-scleral interface is affected by racial group and fundus (retinal pigment epithelial and choroidal melanocytic) pigmentation, but we did not have a large enough sample size to examine this question.

We agree with Khan et al. that there are many factors that may influence the fluctuation in ChT. Other possible reasons include diurnal pattern,⁴ blood pressure, and the use of certain drugs, such as phosphodiesterase inhibitors (e.g., Viagra; Pfizer, New York, NY)⁵ and, perhaps, cortisol and epinephrine levels. We considered but did not formally control for each of these factors, as this was an initial study to examine the macular area and variation in ChT in normal subjects. Also, certain factors such as circulating catecholamine levels or anxiety state would be very difficult to control for, and the study size to control for the other factors would have to be very large. These factors could not be addressed in our small study, and so further work is needed.

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