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Variability and repeatability of quantitative, fourier-domain optical coherence tomography doppler blood flow in young and elderly healthy subjects

(Article)

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Abstract

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Purpose. The purpose of this study was to determine the within-session variability and between-session repeatability of spectral Fourier-domain optical coherence tomography (Doppler FD-OCT) Doppler retinal blood flow measurements in young and elderly subjects.

Methods. Doppler FD-OCT blood flow was measured using the RTVue system. One eye of each of 20 healthy young (24.7 ± 2.7 years) and 16 healthy elderly (64.6 ± 5.1 years) subjects was randomly selected, and the pupil was dilated. The double circular scanning pattern of the RTVue was employed. Six Doppler FD-OCT measurements (i.e., each separate measurement comprising an upper and a lower nasal pupil scan) were acquired at each session. Measurements were repeated approximately 2 weeks later. Total retinal blood flow was calculated by summing flow from all detectable venules surrounding the optic nerve head. The coefficient of variation (COV) and coefficient of repeatability (COR) were calculated for each individual.

Results. The individual COVs for retinal blood flow for young subjects ranged from 0.4% to 20.4% (median 7.5%) and for the elderly subjects ranged from 0.6% to 34.6% (median 9.2%). The group mean CORs for retinal blood flow for young participants were 6.4 $\mu\text{L}/\text{min}$ (median 5.91 $\mu\text{L}/\text{min}$, relative to a mean effect 39.8 $\mu\text{L}/\text{min}$) and for elderly subjects were 10.5 $\mu\text{L}/\text{min}$ (median 9.2 $\mu\text{L}/\text{min}$, relative to a mean effect 46.4 $\mu\text{L}/\text{min}$).

Conclusions. Doppler FD-OCT gave consistent and repeatable blood flow measurements within retinal venules in normal subjects. Considering the individual variation in blood flow measurements, confidence limits for retinal hemodynamics need to be determined on an individual basis. © 2014, The Association for Research in Vision and Ophthalmology, Inc.

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[Fourier-domain optical coherence tomography](#)
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[Total retinal blood flow](#)
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