Analysis of Carotid and Ophthalmic Flow Velocity Waveforms

To the Editor:

Michelson et al,1 from study of the ophthalmic artery flow pulse in the frequency domain, have noted features that are associated with aging and hypertension, and have the potential to identify early stages of microvascular disease in the eye. The findings concur with our studies of the carotid flow pulse in the time domain, which, likewise, are associated with aging and hypertension2 and have the potential to explain microvascular disease and “pulse wave encephalopathy” in the brain.3 The common link is early wave reflection from peripheral sites in the lower body, consequent on arterial stiffening; this increases amplitude of the lower harmonics of carotid arterial flow (and pressure) waves and in the time domain is apparent as increase in flow (and pressure) augmentation index.4 The explanation by Michelson et al1 relates to characteristics of the ophthalmic artery’s vascular bed. We believe that this is unlikely, and note the evidence of similar and low-resistance index in all of their study groups. We also point out that the ophthalmic flow waveforms (Figure 3 in Michelson et al1) are virtually identical to pressure waveforms recorded in the radial artery and show the same change with age.4 The important implication is that wave reflection can be reduced by vasodilator therapies,5 and may reduce vascular disease in the brain and eye. We complement Michelson et al1 and take comfort that, coming from a different direction, we have reached the same conclusion—that secrets hidden in the flow (and pressure) waveforms have the potential to identify vascular damage and to monitor effects of therapy.  

Disclosures

M.F.O. is a founding director of AtCor Medical Pty, Ltd, manufacturer of systems for analyzing the arterial pulse. K.H. reports no conflicts.

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