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IMAGE FOCUS

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Imaging of coronary artery plaques using contrast-enhanced optical coherence tomography

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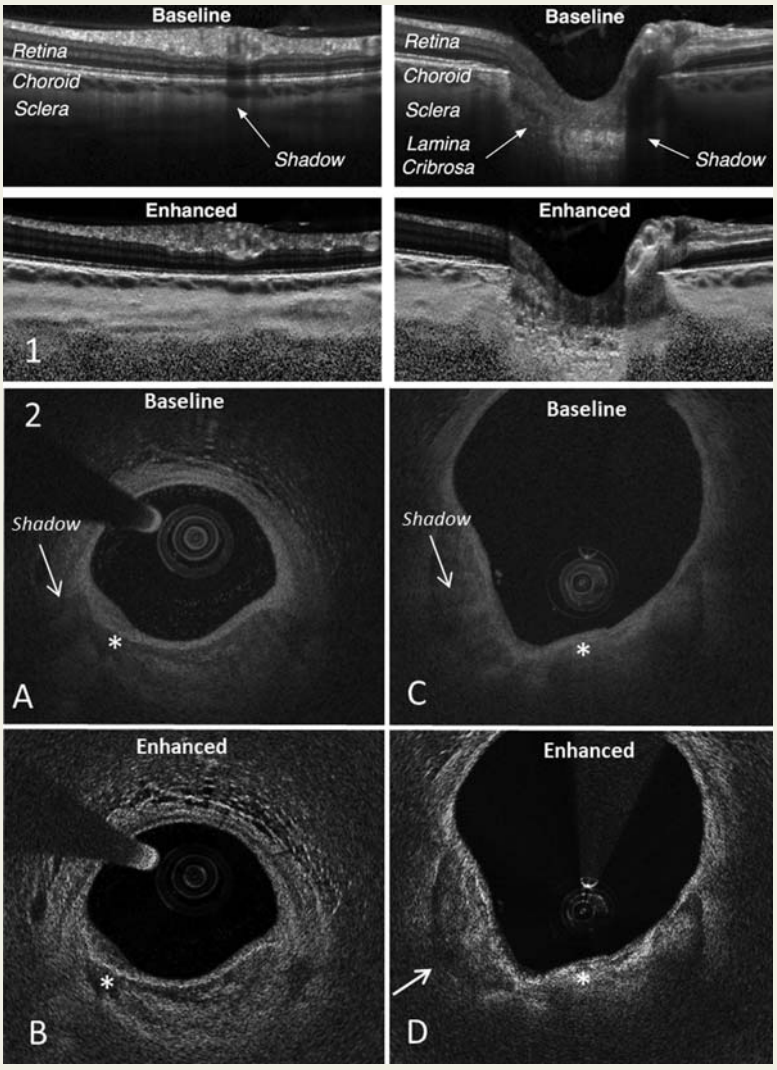
Optical coherence tomography (OCT) has recently emerged as a promising technology for intravascular guidance of interventions. With a resolution on the order of 10 μm, intravascular OCT surpasses intravascular ultrasounds, and allows for precise measurement of cap thickness and identification of lipid-rich thin-cap fibroatheroma. The diagnostic accuracy and assessment of atherosclerotic plaque morphology with OCT remain, however, limited by the rapid attenuation of OCT signal in tissue, limiting contrast on deep plaque structure and accurate assessment of plaque burden.

A contrast enhancement algorithm, previously developed to compensate for light attenuation in spectral-domain OCT images of the human optic nerve head (*Panel 1*, adapted with permission from the Association for Research in Vision and Ophthalmology), was applied to raw spectral-domain intracoronary OCT data acquired on a C7 system (St Jude Medical, St Paul, MN, USA). Examples of the application of the compensation algorithm on intracoronary OCT obtain from two different patients pullback are shown (*Panel 2*). Compared with the original OCT (*Panel 2A* and *C*), the compensated images (*Panel 2B* and *D*) can significantly improve the interpretation of the OCT images by: (i) enhancing contrast; (ii) removing shadows from dense structure; and (iii) improving the visibility of the deep tissue layers (by correcting for the OCT signal attenuation), revealing details within the superficial (*) and outer contour of the atherosclerotic plaque (arrow) that may be critical for interpretation of plaque composition.



Such a compensation algorithm, previously validated for ophthalmic OCT enhancement, may improve our interpretation of atherosclerotic plaque morphology imaged by intravascular OCT.

Conflict of interest: none declared.