Tissue type in the coronary artery wall is an important parameter with significant clinical implications in interventional cardiology. Lipid-rich necrotic lesions may cause periprocedural complications, stent failure, and acute coronary events. Analysis of the optical properties of a lesion imaged by optical coherence tomography (OCT) can serve as a tool to discriminate different tissue components. Necrotic core has a higher attenuation coefficient than do calcified and fibrous tissues (1). In this paper, we compare in vivo OCT-derived attenuation with independent lipid-core plaque detection by a combined near-infrared reflection spectroscopy, intravascular ultrasound (IVUS) device (2).

A 59-year-old man was referred to our center for cardiac catheterization because of non–ST-segment elevation acute coronary syndrome with positive cardiac enzymes (troponin T) and dynamic electrocardiographic changes in the anterior leads. Invasive imaging with OCT (St. Jude Medical C7XR, C7 Dragonfly catheter, St. Paul, Minnesota) and near-infrared reflection spectroscopy/intravascular ultrasound (Infraredx TVC system and catheter, Burlington, Massachusetts), prior to intervention revealed high plaque burden in the proximal left anterior descending artery with marked lumen narrowing (Fig. 1). We matched 3 locations in both pullbacks, based on anatomical landmarks. OCT data of plaques in the images was analyzed to quantify the local attenuation coefficient (1).

The sites selected for analysis are displayed in Figure 2. The sectors identified as containing lipid-core plaque by near-infrared reflection spectroscopy (yellow) have OCT features that are highly attenuating, confirming our in vitro findings that necrotic core has a high attenuation coefficient. In addition, calcium is analyzed as having low attenuation, suggesting a possible method to discriminate between these tissue types, which are sometimes difficult to classify in the OCT image (3,4).

This observation is the first confirmation in a clinical setting, with independent invasive imaging...
control, that quantitative analysis of the OCT signal may assist in tissue-type identification. As our insight into the interaction between intervention and vessel wall biology grows, intravascular imaging of plaque composition can acquire a role in procedure planning and treatment decisions.

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