Coronary Pleating Mimicking Coronary Ruptures, Dissections, and Thrombi on Optical Coherence Tomography

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Straightening of tortuous coronaries by intracoronary guidewires may generate intimal wrinkles or coronary pleating and lead to the development of different abnormal angiographic findings widely known as pseudostenosis or accordion effect.1 We report the unique findings disclosed by optical coherence tomography (OCT) in 3 patients developing coronary pleating.

Patient 1
An 84-year-old woman with severe aortic stenosis was referred for coronary angiography before transcatheter aortic valve implantation. A severe stenosis in the mid segment of the right coronary artery was treated with a bare metal stent. The guidewire induced a new moderate focal lesion at the most proximal segment of this vessel (Figure 1A). OCT revealed images consistent with a ruptured plaque with a large cavity adjacent to a normal coronary wall and also images suggesting a large lipid plaque (Figure 1B–1E). Once the guidewire was removed, the angiographic pseudostenosis completely disappeared (Figure 1F) confirming the occurrence of an accordion effect.

Patient 2
A 63-year-old man was admitted for non–ST-segment–elevation myocardial infarction. Coronary angiography demonstrated mild irregularities on the left anterior descending coronary artery. A guidewire was advanced distally to interrogate the vessel with OCT. A new focal stenosis was demonstrated in the mid segment of this vessel (Figure 2A). OCT revealed images highly suggestive of a ruptured plaque and images of coronary dissection with a double-lumen and additional areas of wall thickening associated with marked lumen narrowing (Figure 2C–2G). After removal of the guidewire, this pseudostenosis completely vanished (Figure 2B).

Patient 3
A 69-year-old man with stable angina was referred for coronary angiography. A severe lesion was demonstrated at the distal segment of the right coronary artery that was treated with a drug-eluting stent. During the procedure, a new severe stenosis with a complex appearance suggesting a complicated plaque, developed at its proximal segment (Figure 3A). Lesion morphology remained unchanged after intracoronary nitroglycerin administration. OCT revealed images consistent with a complex ruptured plaque and also images suggesting red thrombus (irregular protruding tissue casting major dorsal shadowing; Figure 3C–3G). After pulling back the guidewire, the lesion disappeared thus confirming the phenomenon of pseudostenosis (Figure 3B).

New lesions appearing during coronary interventions represent a challenge for interventional cardiologists.1,2 The accordion or concertina phenomenon is the appearance of pseudo lesions secondary to major mechanical distortion of tortuous coronary segments after the advancement of guidewires.1,2 Any material that stretches the artery will cause pleating or folds of the artery wall along its long axis that often simulate a focal atherosclerotic lesion, dissection, thrombus, or spasm. Recognition of pseudostenosis, however, remains critical to prevent unnecessary interventions.1,2

The value of intravascular ultrasound examination to reliably assess coronary artery wall and lumen and distinguish true lesions from pseudostenosis has been previously reported.2 Images suggestive of atheroma causing an elliptic residual lumen may be clearly recognized.2 Because of its superb resolution (10–15 μm), OCT potentially provides a unique opportunity to further assess this phenomenon and offer novel insights.1 In our patients, OCT revealed areas suggestive of intimal thickening or large fibroatheromas, inducing significant lumen narrowing. More interesting, we also observed images highly consistent with plaque rupture with large cavities, and also images suggestive of dissections, with a clear double-lumen, precisely located at the site showing the pseudostenosis. Finally, at these sites, images mimicking protruding red thrombus obstructing the lumen were also identified. In all patients, the wrinkles were readily displayed on the longitudinal reconstruction as focal intraluminal structures.

Thus, OCT is extremely useful in the diagnosis of coronary pleating. Importantly, however, at these sites OCT images highly suggestive of ruptured plaques, dissections, and thrombus3 may be just a result of the wrinkles caused by the accordion effect.

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References


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