

Endovascular Imaging of Angiographically Invisible Spontaneous Coronary Artery Dissection

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Spontaneous coronary artery dissection (SCD) is a rare clinical entity (1,2). Clinical diagnosis is challenging and classically relies on the angiographic

demonstration of an intimomedial “flap” leading to a double lumen appearance (1,2). Angiography, however, is unable to visualize the coronary wall.

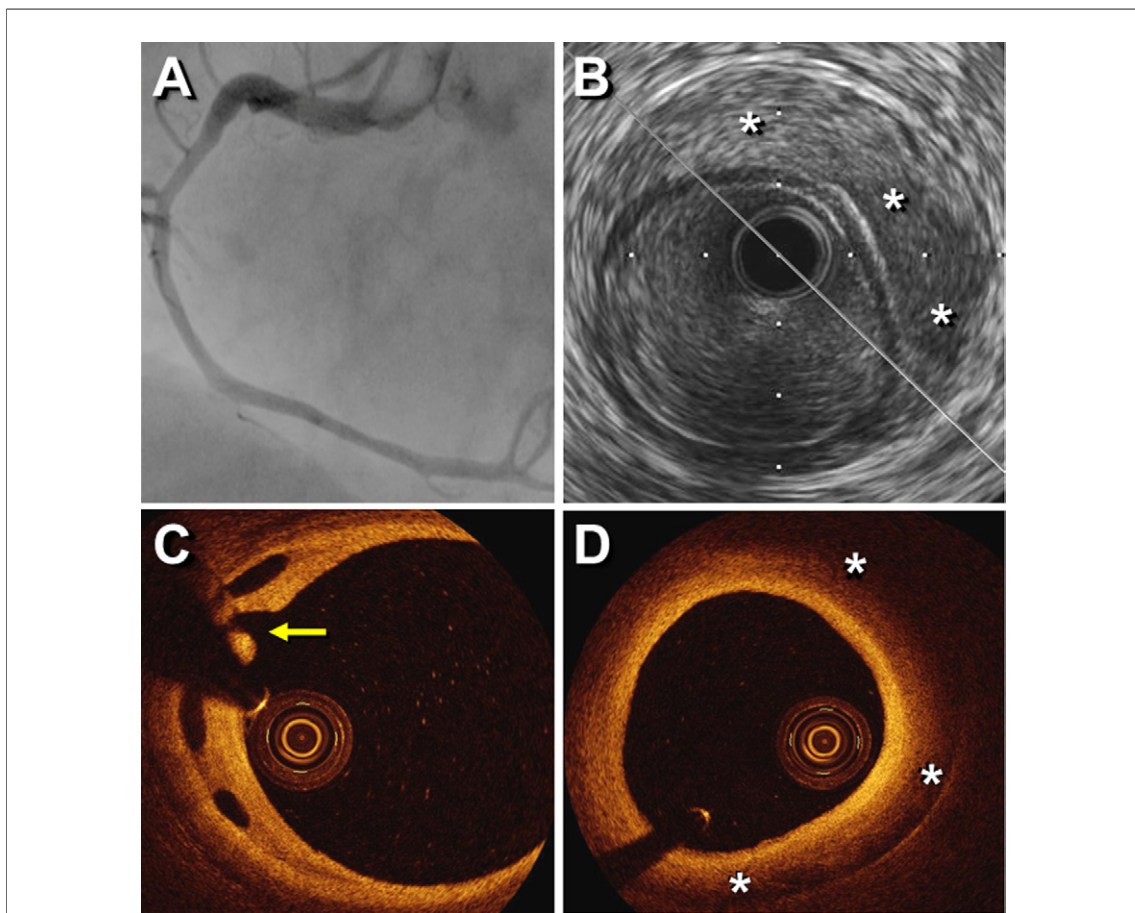


Figure 1. Combined Use of IVUS and OCT in SCD

(A) Coronary angiography showing a right coronary artery without significant coronary stenosis. (B) IVUS imaging disclosing the presence of a large space (asterisks) separating the intimomedial membrane from the external elastic membrane. The coronary lumen was largely preserved (minimal lumen diameter: 3.5 mm). (C) OCT unraveling (arrow) the intimal tear in the proximal right coronary artery with an anfractuous entrance into the coronary vessel wall. (D) An image of intramural hematoma was demonstrated in the mid and distal segments of the vessel. In most segments, the outer boundaries of the vessel were not visualized. IVUS = intravascular ultrasound; OCT = optical coherence tomography; SCD = spontaneous coronary artery dissection.

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New intracoronary diagnostic tools provide comprehensive, tomographic, high-resolution insights on vessel wall pathology, allowing a precise diagnosis of SCD (3,4).

A 58-year-old woman presented with a non-ST-segment elevation inferior myocardial infarction. Angiography (Fig. 1A) revealed a normal right coronary artery with just minor lumen irregularities. Intravascular ultrasound (IVUS) (Fig. 1B) (resolution: 150 μm) disclosed a large intramural hematoma along the entire right coronary artery. The coronary lumen was fully preserved, the coronary wall was readily recognized, and the abluminal hematoma (asterisks) had a heterogeneous pattern suggesting recent bleeding and ongoing thrombus formation. Optical coherence tomography (OCT) (Fig. 1C) (resolution: 15 μm) identified a confined proximal entry tear (arrow) leading to a large distal intramural hematoma (Fig. 1D). The clinical course was uneventful with conservative medical management.

Intravascular diagnostic techniques provide novel insights into the pathophysiology of SCD (3,4). Currently, many patients with negative angiographic findings are readily diagnosed with these tools if the level of clinical suspicion is adequate. The present case clearly illustrates their potential complementary value in selected patients. OCT provides uniquely high-resolution images of the intimomedial “flap” and is able to accurately identify the “entry door.” However,

most of the outer boundary of the vessel is not visualized (especially in large vessels), and the presence of red thrombus (or thrombin-rich intramural hematoma) produces dorsal shadowing, preventing visualization of posterior structures in the coronary wall. Alternatively, IVUS has a lower axial resolution but better depicts the complete vessel wall, even in patients with intraluminal red thrombus and in those with large coronary vessels.

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REFERENCES

1. Pretty H. Dissecting aneurysms of coronary artery in woman aged 42: rupture. *BMJ* 1931;1:667.
2. DeMaio SJ Jr., Kinsella SH, Silverman ME. Clinical course and long-term prognosis of spontaneous coronary artery dissection. *Am J Cardiol* 1989;64:471-4.
3. Maehara A, Mintz GS, Castagna MT, et al. Intravascular ultrasound assessment of spontaneous coronary artery dissection. *Am J Cardiol* 2002;89:466-8.
4. Alfonso F, Canales E, Aleong G. Spontaneous coronary artery dissection: diagnosis by optical coherence tomography. *Eur Heart J* 2009;30:385.