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CARDIOVASCULAR FLASHLIGHT
Cardiac imaging

A case of black hole phenomenon: intraplaque haemorrhage associated with coronary vasospasm

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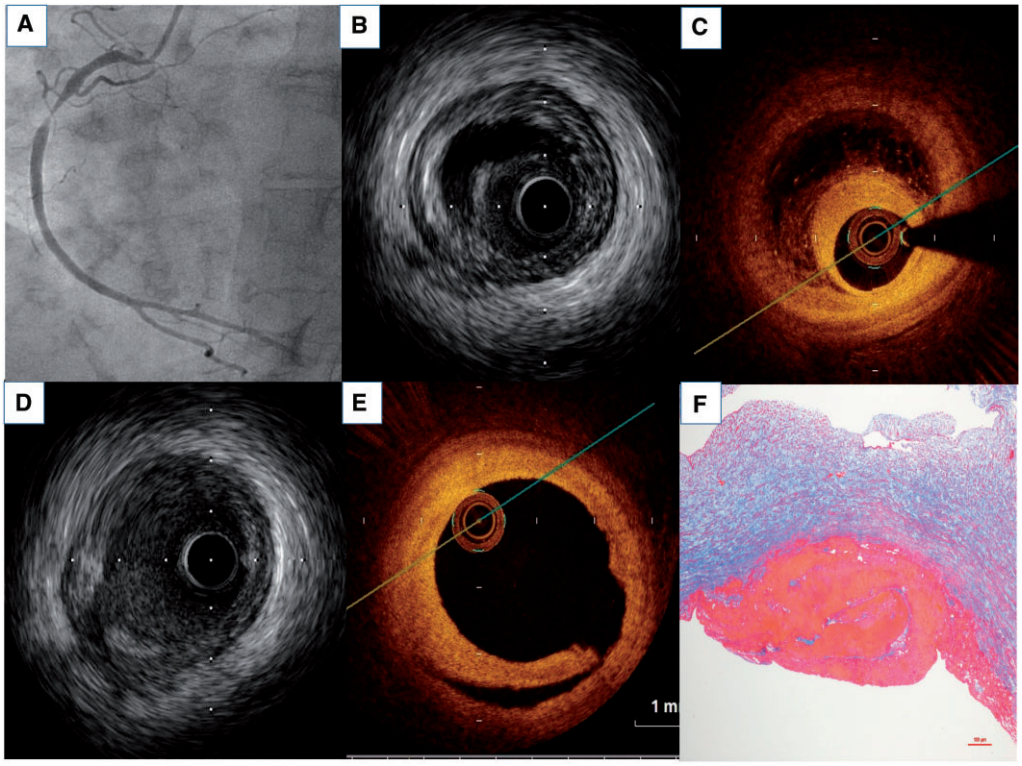
A 60-year-old woman, who had a history of two events of acute coronary syndrome (ACS) with proximal right coronary artery (RCA) occlusion treated through balloon angioplasty, was readmitted to our hospital due to sustained chest pain with transient ST elevation. She had multiple coronary risk factors such as hypertension, hyperlipidaemia, diabetes mellitus, and a history of tobacco smoking. Coronary angiography



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(CAG) revealed a subtotal lesion in the proximal RCA (*Panel A*) at the same location at that during the second ACS 12 years ago. Intravascular ultrasound of the lesion revealed an echolucent area like a 'black hole', and frequency-domain optical coherence tomography (FD-OCT) also demonstrated a crescent-shaped low-signal area with a clear border (*Panels B* and *C*). We performed predilatation using a just-sized balloon prior to stent implantation. While neither intimal disruption nor intraluminal thrombus was observed, distal embolism occurred after balloon angioplasty, and a white jelly-like mass (0.5×1.0 mm) was aspirated. The 'black hole' completely disappeared leaving an intimal flap (*Panels D* and *E*). Plaque reduction and adequate lumen gain with minimum intimal injury were achieved unintentionally; therefore, we decided to complete the procedure without stent implantation for preventing recoil and intimal hyperplasia. The extruded tissue consisted of a fibrous plaque with a thick layer of fibrin accumulation (*Panel F*; Azan stain); hence, 'black hole' was speculated as intraplaque haemorrhage (IPH).

Follow-up CAG and FD-OCT after 4 months of the diagnosis confirmed patency without the 'black hole', and coronary spasm was induced at the same site by acetylcholine provocation. No cardiovascular events have occurred over 7 years under coronary vasospasm treatments.

Recent insights into this field have revealed that atherosclerotic neovascularization facilitates IPH, which is strongly correlated with plaque progression, instability and rupture. Our case indicates that coronary vasospasm can possibly trigger IPH.

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