JACC: CASE REPORTS VOL. 2, NO. 15, 2020

MINI-FOCUS ISSUE: INTERVENTIONS

INTERMEDIATE

IMAGING VIGNETTE: CLINICAL VIGNETTE

Recanalized Coronary Thrombus

Role of OCT in Identifying a Slow-Evolving and Underestimated Coronary Lesion

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ABSTRACT

Pathological studies have revealed spontaneous recanalized coronary thrombi as a frequent evolution of coronary occlusions; however, they are poorly recognized on coronary angiography, and the optimal therapeutic strategy for clinical evolution is unknown. We report the role of optical coherence tomography in identifying a recanalized coronary thrombus causing myocardial ischemia after 11 years of follow-up. (**Level of Difficulty: Intermediate.**)
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For 11 years, a 48-year-old man who smoked and had diabetes with a history of anterior myocardial infarction stented on the left anterior descending artery had an unremarkable clinical follow-up, including repeated negative stress tests. New onset of angina occurred; therefore, stress echocardiography was performed, which revealed severe inferior wall motion abnormalities (Video 1). On angiography, the right coronary artery (RCA) angiogram was similar to that during the initial examination (**Figure 1A**, Video 2) with multiple irregular intraluminal contrast-filling defects involving the entire RCA that had been interpreted as a coronary dissection (**Figure 1B**, Video 3).

To clarify this ambiguous angiogram, optical coherence tomography (OCT) was performed, which showed a diffuse heterogeneous plaque burden with fibrotic areas (diffuse high-reflectivity intimal thickening with low attenuation) (**Figures 1C to 1E**), a central lumen divided by thin septa into multiple channels (**Figure 1C to 1F**) with a smooth inner border (**Figure 1F**, white arrowhead) that were communicating with each other (**Figure 1C and 1D**, Video 4) (1).

This "swiss cheese," "lotus root," or "honeycomb" appearance is typical of a long recanalized coronary thrombus (2). OCT revealed the heterogeneous histological composition of this lesion with a strong signal in the septa near the central lumen (**Figure 1F**, white arrow) and darker signal in the deeper portion (**Figure 1F**, white asterisk). OCT also revealed organized thrombi with high-intensity signals (**Figure 1D**, blue arrow), suggesting that this long lesion might have impeded the coronary flow and triggered a thrombogenic process. Based on these findings and the large area of ischemia documented on a stress imaging test, percutaneous

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

Manuscript received June 26, 2020; revised manuscript received August 27, 2020, accepted September 4, 2020.

ISSN 2666-0849 https://doi.org/10.1016/j.jaccas.2020.09.054

ABBREVIATIONS AND ACRONYMS

OCT = optical coherence tomography

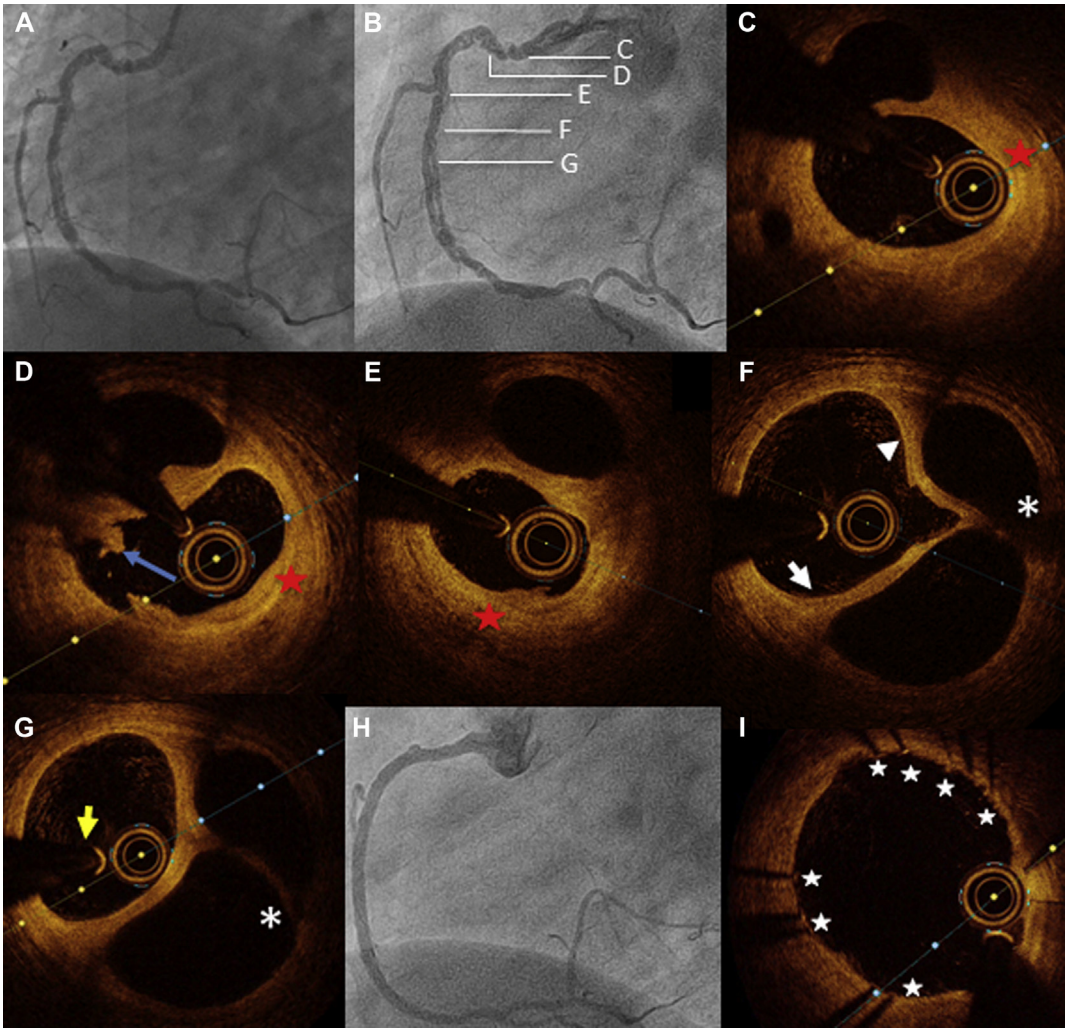
PCI = percutaneous coronary intervention

RCA = right coronary angiogram

coronary intervention (PCI) was performed with balloon angioplasty and implantation of 3 drug-eluting stents, after securing the positioning of the guidewire in the central lumen at the proximal and distal intended landing zones (**Figure 1G**, yellow arrow). Post-PCI angiography (**Figure 1H**, Video 5) and OCT showed enlargement of the central lumen by squeezing of the small surrounding channels (**Figure 1I**, Video 6). The patient was discharged with dual antiplatelet therapy. Three months later, the patient was asymptomatic, and stress echocardiography did not induce myocardial ischemia (Video 7).

Pathological studies have revealed spontaneous recanalized coronary thrombi as a frequent natural evolution of coronary occlusions (3); however, the optimal therapeutic strategy is unknown because of

FIGURE 1 Coronary Angiograms and Optical Coherence Tomography Images of a Recanalized Coronary Thrombus



(A) Initial angiogram (11 years ago) with filling defects and pseudo-dissection aspect involving the entire right coronary artery. **(B)** Angiogram (11 years later) with persistent filling defects and pseudo-dissection aspect involving the entire right coronary artery. **(C to G)** Optical coherence tomography images of the right coronary artery performed using the FD-optical coherence tomography C7XR system (Lightlab Imaging Incorporated, Westford, Massachusetts) and a 6-F guide catheter-compatible Dragonfly Duo catheter (Abbott Vascular, Chicago, Illinois). **(C to E)** Diffuse heterogeneous plaque burden with fibrotic areas (diffuse high-reflectivity intimal thickening with low attenuation, **red star**). **(D)** Organized thrombus with high-intensity signal **(blue arrow)**. **(F)** Central lumen divided by thin signal-rich septa **(white arrow)** into multiple channels with a smooth inner border **(white arrowhead)**. Dark signal of the deeper portion of the septa **(white asterisks)**. **(G)** Guidewire within the central lumen **(yellow arrow)**. Dark signal of the deeper portion of the septa **(white asterisks)**. **(H)** Right coronary artery angiogram after percutaneous coronary intervention. **(I)** Post- percutaneous coronary intervention optical coherence tomography showing optimal strut positions **(white stars)**.

the scarcity of data regarding the long-term evolution of this coronary lesion subset. This report describes a case of very slow evolution causing myocardial ischemia after an 11-year follow-up favoring conservative medical management in the absence of ischemia, but is also supportive of a careful follow-up, as thrombogenic process can still occur after several years. OCT is pivotal to overcoming the limitations of angiography and excluding coronary dissection. As invasive hemodynamic assessment of this lesion has not been validated due to the presence of multiple channels, noninvasive testing seems mandatory in the decision-making process before implementing any intervention. Overall, a large registry is needed with long-term follow-up to improve our knowledge of the natural evolution of this underestimated coronary lesion and to tailor the optimal therapeutic strategy for patients.

ACKNOWLEDGMENTS The authors thank the nursing staff of the catheterization laboratory at Nîmes University Hospital, France.

AUTHOR DISCLOSURES

Dr. Vincent has received research grants from the Fédération Française de Cardiologie and Lille University Hospital. Dr. Cayla has received research grants, consultant fees, and lectures fees from Amgen, AstraZeneca, Abbott, Bayer, Biotronik, Bristol Myers Squibb, Pfizer, and Sanofi. Dr. Lattuca has received research grants from Biotronik, Boston Scientific, Daiichi-Sankyo, Fédération Française de Cardiologie, and Institute of CardioMetabolism and Nutrition; has received consultant fees from Daiichi-Sankyo and Eli Lilly; and has received lecture fees from AstraZeneca, Medtronic, and Novartis. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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KEY WORDS angiographic haziness, coronary artery disease, endocoronary imaging, lotus root, optical coherence tomography, percutaneous coronary intervention, recanalized thrombus, stress echocardiography, swiss cheese

APPENDIX For supplemental videos, please see the online version of this paper.