Images in Cardiology

Optical Coherence Tomography and PCI in a Patient With Methamphetamine-Associated Spontaneous Coronary Artery Dissection

Joshua Durbin, MD, MSc, Joseph Abunassar, MD, MSc, Gerry Adams, MD, Paul Malik, MD, Amar Thakrar, MD, and Wael Abuzeid, MD, MSc

Division of Cardiology, Kingston Health Sciences Center, Queen's University, Kingston, Ontario, Canada

A 44-year-old man with a history of significant methamphetamine abuse presented following witnessed out-of-hospital cardiac arrest. Immediate bystander cardiopulmonary resuscitation was initiated, with return of spontaneous circulation. The patient was intubated and noted to have increasing requirements for hemodynamic support. An electrocardiogram demonstrated anterior Q-waves with minor (<1 mm) ST-segment elevation in leads V1–V3, with corresponding ST-segment depression in leads II and III, and arteriovenous fistula, and echocardiography demonstrated severely reduced left ventricular systolic function.

Coronary angiography demonstrated a diffuse linear hazy lesion in the mid left anterior descending (LAD) artery, suspicious for spontaneous coronary artery dissection (SCAD) (Fig. 1A). Given the thrombolysis in myocardial infarction (TIMI) 3 flow, this was initially managed conservatively. The patient was extubated but continued to have angina 1 week later. The patient also described having used methamphetamine earlier in the same day of his cardiac arrest. Computed tomography angiography of the brain and renal arteries did not show evidence of fibromuscular dysplasia. Re-look coronary angiography and optical coherence tomography (OCT) revealed multiple false lumens, intimal tears, and significant stenosis of the mid LAD artery, compressed by intraluminal hematoma (Fig. 2A; Fig. 1B; Video 1 , view video online). Given the symptomatic state and angiographic worsening of the lesion post OCT, percutaneous coronary

Novel Teaching Point

- Careful use of optical coherence tomography can help clarify etiology and guide management decisions in patients with suspected spontaneous coronary artery dissection.

intervention was performed to the mid LAD artery, under OCT guidance (Fig. 2B).

Fibromuscular dysplasia is well described in many patients with SCAD. However, amphetamine-associated SCAD is rare, with a limited number of cases reported.^{1,2} There are no reported OCT images in the literature of amphetamine-associated SCAD, and our case is the first OCT demonstration of this rare etiology of SCAD. However, the differential diagnosis also includes either a re-canalized vessel post prior infarction, a woven coronary artery anomaly, or plaque rupture with emptied cavity. These cannot be excluded with certainty, especially in the context of the presence of anterior Q-waves and underlying severe left ventricular systolic dysfunction. Our case highlights the role of OCT imaging in helping identify the etiology of SCAD, ensuring proper wire positioning in the true lumen, and identifying entrance and exit intimal tears to guide the percutaneous coronary intervention strategy.

Received for publication July 16, 2020. Accepted August 12, 2020.

Ethics Statement: The Research reported has adhered to the relevant ethical guidelines.

Corresponding author: Dr Wael Abuzeid, Division of Cardiology, Queen's University, KIDD 3, CV lab, Kingston Health Sciences Center, Kingston, Ontario, K7L 2V7, Canada. Tel.: +1-613-548-1383; fax: +1-613-548-2400.

E-mail: wael.abuzeid@queensu.ca

See page 745 for disclosure information.

Funding Sources

The authors have no funding sources to declare.

Disclosures

The authors have no conflicts of interest to disclose.

Figure 1. (A) A linear hazy lesion (**yellow arrow**) in the mid left anterior descending artery. **Red lines** represent normal vessel segment, per optical coherence tomography (OCT). (B) OCT demonstrating false lumens (FL) and stenosed true lumen (TL) with compressive hematoma (**blue arrow**). **Orange arrow** indicates OCT catheter and wire artifact; **green arrow** indicates intimal layer; **red arrow** indicates medial layer; **white arrow** indicates adventitial layer.

Figure 2. (A) Linear haziness in mid left anterior descending artery (**white arrow**) suspicious for spontaneous coronary artery dissection. (B) Post—percutaneous coronary intervention mid left anterior descending artery.

References

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stressors and cardiovascular outcomes. *Circ Cardiovasc Interv* 2014;7:645-55.

Supplementary Material

To access the supplementary material accompanying this article, visit *CJC Open* at <https://www.cjopen.ca/> and at <https://doi.org/10.1016/j.cjco.2020.08.004>.