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Case Report

Optical Coherence Tomography-Guided Bifurcation Stenting of a Coronary Artery Dissection

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ABSTRACT

Periprocedural guide wire-induced coronary artery dissection is a rare but potentially serious complication of percutaneous coronary intervention. Immediate stenting of the entry point is one of the therapeutic options but engaging the guide wire in the true lumen might be challenging. We report a case of a 55-year-old woman with a guide wire-induced coronary dissection that occurred during treatment of a bifurcation lesion. Optical coherence tomography was instrumental in distinguishing true from false lumen and thereby guide correct positioning of the guide wire to successfully treat the lesion using a dedicated bifurcation stent.

RÉSUMÉ

La dissection de l'artère coronaire induite par le fil-guide en phase périopératoire est une complication rare, mais potentiellement sérieuse de l'intervention coronarienne percutanée. L'implantation immédiate d'une endoprothèse au point d'entrée est l'une des options thérapeutiques, mais l'insertion du fil-guide dans la vraie lumière serait difficile. Nous rapportons le cas d'une femme de 55 ans ayant subi une dissection de l'artère coronaire induite par un fil-guide qui est apparue durant le traitement d'une lésion de bifurcation. La tomographie par cohérence optique a contribué à faire la distinction entre la vraie et la fausse lumière, et à orienter adéquatement le positionnement du fil-guide pour traiter avec succès la lésion au moyen d'une endoprothèse de bifurcation spécialisée.

A 55-year-old woman was referred for percutaneous coronary intervention with stable angina (Canadian Cardiovascular Society class III). Coronary angiography demonstrated a stenosis at the bifurcation of the left anterior descending artery (LAD) with the second diagonal branch (D2) (Fig. 1A). After wiring the LAD and D2 (both Hi-Torque Pilot 50; Abbott Vascular), the angiogram suggested a dissection at D2 (Fig. 1B) and guide wire positioning in the false lumen. Multiple attempts to position the guide wire in the true lumen were unsuccessful.

As an alternative to repeated angiograms using multiple projections, and to understand the spatial relationship between the actual guide wire position, the true lumen, and the dissection flap, a single optical coherence tomography (OCT) (C7XR, St Jude Medical) scan of the D2 was performed (automated pullback 20 mm/s). OCT confirmed the dissection, demonstrating that the entry point was situated very proximally to the side-branch ostium, the guide wire position in the false lumen, and clearly identified the true lumen (Fig. 1C; Video 1, view video online). 3-D rendering helped in understanding the spatial relationship between guide wire position and true and false lumen (Intage Realia and QAngioOCT; Medis Specials) (Fig. 1, D and E; Video 2, view video online). Using a parallel guide wire technique, one wire was left in the false and a second wire (Hi-Torque BMW; Abbott Vascular) was placed in the true lumen of the D2 (Fig. 2A; Video 3, view video online). OCT confirmed correct positioning of the second wire and clearly visualized the entry point of the dissection at the side-branch ostium (Fig. 2, B and C; Video 4, view video online). The entry point of the dissection was successfully treated with a 3.0/2.5 × 18.0 mm Nile Pax bifurcation stent (Minvasys) (Fig. 2E). The final angiogram demonstrated good clinical result with thrombolysis in myocardial infarction (TIMI) 3 flow (Fig. 2D; Video 5, view video online). Six months after the index procedure, routine follow-up angiography demonstrated resolution of the coronary dissection with TIMI 3 flow (Video 6, view video online).

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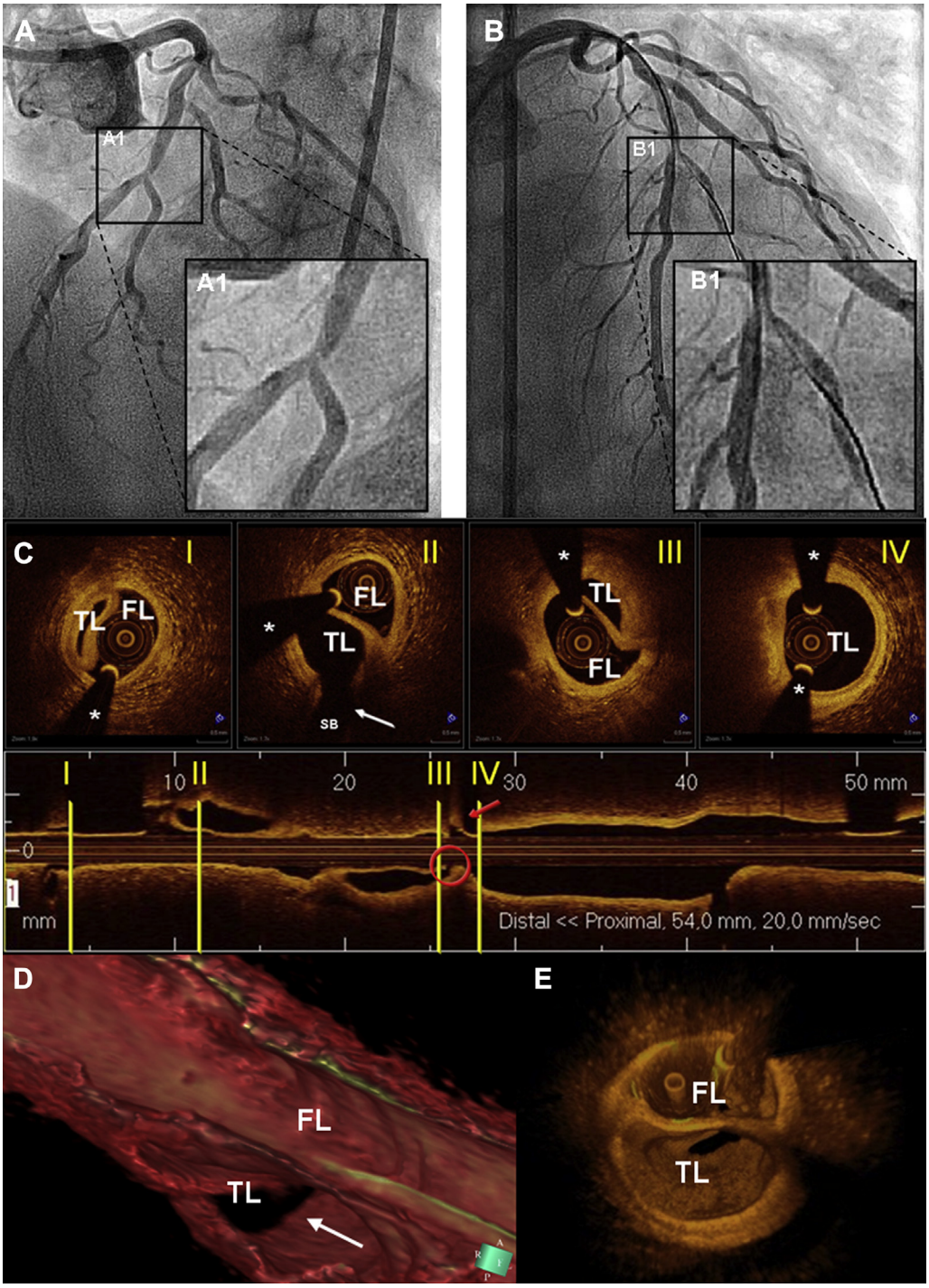

Figure 1. Preintervention imaging. (**A**) Coronary angiography demonstrates a stenosis at the bifurcation of the LAD with D2. (**B**) After wiring, the angiogram suggested a dissection at D2. (**C**) OCT of the D2 confirmed the dissection at the bifurcation with the LAD and demonstrated positioning of the guide wire in the false lumen. The **red circle** in the l-mode indicates the entry point of the dissection, the **red arrow** indicates the LAD. (**D**, **E**) 3-D reconstructions clearly visualize the true and false lumen, with a side branch in the true lumen (**arrow**). D2, second diagonal branch; FL, false lumen; LAD, left anterior descending artery; OCT, optical coherence tomography; TL, true lumen.

Coronary dissections are rare but serious complications of the treatment of bifurcation lesions.[1] Immediate stenting of the entry point is one of the therapeutic options but engaging the guide wire in the true lumen might be challenging because the relative low resolution of angiography only allows the reflection of luminal dimensions. OCT provides an unmatched high-resolution visualization of the coronary artery and could be helpful in these complex situations.[2] In our case, OCT: (1) demonstrated guide wire position in the false lumen and allowed correction of the guide wire