

Opening the Third Eye: How Imaging Solved a Mystery

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Our patient is a 75-year-old man who visited the cardiovascular outpatient department complaining of intermittent chest tightness and calf pain during the past week. He had a history of type 2 diabetes, hypertension, and hyperlipidemia under oral medication control, as well as chronic kidney disease stage IIIb. He underwent his first percutaneous intervention (PCI) 20 years ago at another hospital and had a stent placed in the left circumflex artery (LCx), followed by another one in the left anterior descending (LAD) and right coronary (RCA) arteries 4 years later. He came to our hospital 9 years ago and was treated for RCA in-stent restenosis (ISR) with a drug-eluted balloon (DEB). Two years ago, he returned with angina again. PCI for RCA chronic total occlusion (CTO) failed, and a 3.5 by 18 mm DES was placed for de novo proximal left circumflex artery (LCx) 90% stenosis.

This time, his coronary angiogram (CAG) found RCA CTO with collaterals from LAD septal branches and LCx obtuse marginal branches (OM). Both RCA and LAD were in a similar condition two years ago when CTO PCI failed. We determined that neither were the culprit vessel and left them alone. (images 1, 2).

There was, however, a new 70% ISR at middle LCx (image 3). We treated the ISR with balloon angioplasty (POBA) using a 3.0 by 20 mm NC balloon (inflated up to 20 ATM for 15 seconds, image 4), followed by a 3.0 by 30 mm DEB (inflated up to 6 ATM for 40 seconds, image 5).

Just as we were ready to finish, the final look took us by surprise. There was an out-of-stent dissection (images 6-9) at mid-LCx where we performed angioplasty. Instead of an edge dissection, it appeared parallel to the stent. We reviewed our procedure: There was no resistance during delivery of equipment, and our maneuvers were appropriate for ISR. The whole procedure went well, and the patient had no discomfort. What had gone wrong?

We carefully rewired the vessel and ran intravascular ultrasound (IVUS). The answer was then revealed: the preexisting mid-LCx stent with ISR that we had intended to treat was, in fact, placed in the subintimal space (image 10, frames 930-2630, at 12 to 1 o'clock). It had been completely occluded, and our wire had gone through the true lumen, bypassing the stent altogether. So all the while we had been performing angioplasty in the true lumen, not the ISR in the subintima. The dissection that appeared parallel to the stent was indeed parallel to the stent.

We deployed a new 3.0 by 35 mm DES to cover the dissection, and ran IVUS again. This time, we confirmed that the new stent was in the true lumen. The old subintimal stent is visible next to the new stent (image 11, frames 309-695, at 12 to 1 o'clock). The final angiogram showed TIMI-3 flow with no contrast stasis (images 12-15) and the patient was discharged the next day without further complications.

This case demonstrated that an apparently simple lesion may hide unexpected pitfalls. Despite biplane views, we were unable to see that the old stent was in the false lumen and our initial procedure led to an unexpected complication. Like opening the third eye, intravascular imaging helped solve a mystery that baffled us, and ensured that our rescue procedure was correct.