

A Case in Which COA View Facilitated Wiring of the Second Diagonal Branch in a Left Anterior Descending Artery Bifurcation Lesion

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Successful PCI for coronary bifurcation lesions requires selection of an angiographic projection that clearly separates the side branch from the main vessel. Calculation of the Optimal Angiographic View Using IVUS by the Tip Detection Method (COA View) is a technique that identifies the optimal fluoroscopic projection based on intravascular ultrasound (IVUS) findings.

A 79-year-old woman with ischemic heart failure underwent coronary angiography after optimal medical therapy. The angiogram demonstrated chronic total occlusion of the right coronary artery, severe stenoses involving the mid left anterior descending artery (LAD) and the second diagonal branch (D2), and significant stenosis of the left circumflex artery. PCI was performed for the mid LAD and the large perfusion territory supplied by D2.

After successful wiring of the LAD, wiring of D2 was attempted using a dual-lumen microcatheter under the conventional RAO caudal projection but was unsuccessful because the D2 ostium could not be clearly identified angiographically. IVUS revealed that D2 originated from the LAD at an unusual takeoff angle, explaining the difficulty in guidewire manipulation. Therefore, we decided to use COA View to determine the optimal angiographic projection.

A second guidewire was advanced into the LAD, and the tip detection method was used to fuse the guidewire tip orientation on IVUS (3 o'clock position) with the fluoroscopic image obtained in the RAO 30°/CRA 30° projection. Because the D2 ostium was located at the 7 o'clock position on the IVUS image, the optimal viewing angle was calculated to be orthogonal to this direction (4 o'clock position), corresponding to a 35° clockwise rotation from the current fluoroscopic projection. Accordingly, the C-arm was repositioned to RAO 30°/CAU 6°. In this projection, the D2 originated almost directly downward from the LAD, providing excellent separation between the two branches. Directing the guidewire tip inferiorly enabled successful wiring of D2.

After balloon angioplasty, D2 was treated with a drug-coated balloon. A drug-eluting stent was subsequently implanted in the mid LAD using the modified jailed balloon technique to protect the side branch. Because delayed flow was observed in D2 after stent implantation, the side branch was successfully rewired using the same COA View projection, followed by kissing balloon inflation, resulting in restoration of TIMI 3 flow.

This case demonstrates that COA View can accurately identify the optimal angiographic projection and facilitate guidewire crossing of challenging side branches with atypical bifurcation anatomy, thereby contributing to successful PCI for complex coronary bifurcation lesions.