CASE REPORT

Radial Access and Closure With the RAIN Sheath™ Introducer and ZEPHYR™ Vascular Compression Device to Treat Focal, Heavily Calcified RCA Lesions

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Disclosures: Speakers and advisory honoraria from Abbott, Cordis.

PATIENT PRESENTATION

A woman in her late 70s was admitted for coronary angiography due to non–ST-segment elevation acute coronary syndrome. She was experiencing typical chest pain both on exertion and at rest for 1 week and was sent to the cardiology center from a peripheral hospital. Her medical history included arterial hypertension, hyperlipidemia, former nicotine abuse with smoking cessation in 2003, and chronic renal insufficiency/stage 3 chronic kidney disease.

The electrocardiogram (ECG) showed negative T-waves in the anterolateral leads and small waves in leads III and aVF with slightly but not significantly elevated ST segments. Echocardiography showed unimpaired left ventricular function with mild distal septal and apical hypokinesis.

TREATMENT OPTIONS

Coronary angiography found two-vessel coronary disease with two focal but tight and heavily calcified stenoses in the mid segment of the right coronary artery (RCA) and a relevant, calcified but not critical stenosis in the proximal left anterior descending (LAD) coronary artery (Figures 1 and 2).

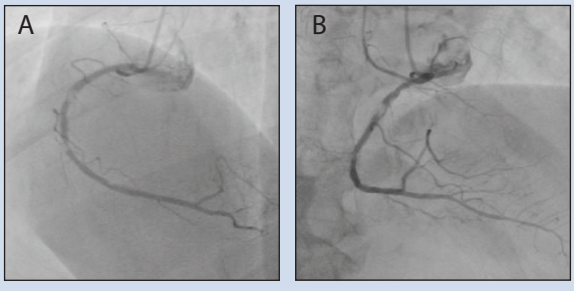

Figure 1. Baseline coronary angiograms of the RCA showing two heavily calcified, focal stenoses.

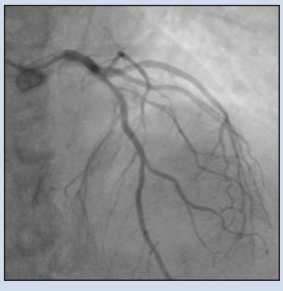

Figure 2. Baseline angiogram showing focal, calcified stenoses of the proximal LAD.

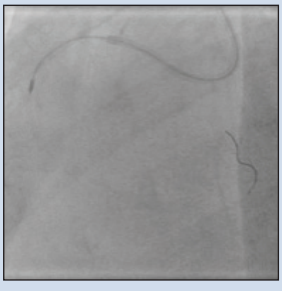

Figure 3. Rotational atherectomy of the mid RCA.

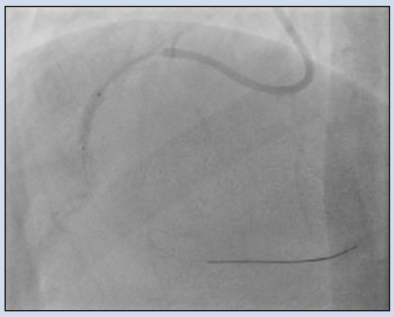

Figure 4. Intravascular lithotripsy of the mid RCA after rotational atherectomy.

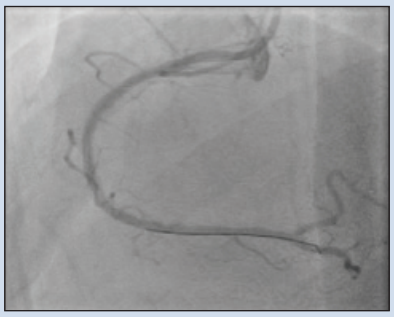

Figure 5. Result after rotational atherectomy, intravascular lithotripsy, and PTCA of the mid RCA.

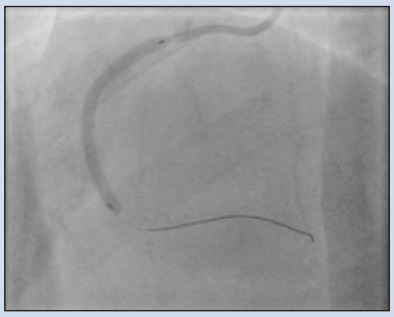

Figure 6. Implantation of a 3.5- X 48-mm Xience Skypoint DES.

Although ECG alterations and wall motion abnormalities were likely originating from the LAD territory, the lesions in the RCA seemed to be clinically more relevant by means of the culprit lesion for an initial percutaneous coronary intervention (PCI).

COURSE OF TREATMENT

Arterial access was achieved via the right radial artery with a RAIN Sheath™ Introducer (Cordis), and a VISTA BRITE TIP™ XB-RCA Guiding Catheter (Cordis) was engaged to the right coronary ostium. An unsuccessful first attempt to cross the heavily calcified mid segment with the workhorse Sion Blue wire (Asahi) led to a change in strategy. The guiding catheter was exchanged for a VISTA BRITE TIP™ AL1 Guiding Catheter (Cordis) due to lack of backup, and the wire was exchanged to a Fielder XT wire (Asahi) with support of a FineCross microcatheter (Terumo Interventional Systems), allowing the wire to cross.

After the initial difficulty crossing with the wire, the 1- X 6-mm IKAZUCHI ZERO™ Semi-Compliant PTCA Balloon (Kaneka Corporation) was unable to cross the stenosis. The 1.25-mm Rotapro (Boston Scientific Corporation) rotational atherectomy system was subsequently used for a total of two runs of rotablation (Figure 3).

After a wire exchange to an extra support BMW wire (Abbott), the complete segment of the RCA was treated with intravascular lithotripsy with the 3.5- X 12-mm Shockwave (Shockwave Medical) for 80 therapy cycles for calcium modification (Figure 4).

Afterward, standard PCI including angioplasty with a 3.5- X 15-mm RAIDEN3™ Non-Compliant Percutaneous Transluminal Coronary Angioplasty (PTCA) Balloon (Kaneka Corporation), stenting with a 3.5- X 48-mm Xience Skypoint drug-eluting stent (DES; Abbott), and postdilatation with a 3.5- X 15-mm RAIDEN3™ Non-Compliant PTCA Balloon at 22 atm rated burst pressure was performed (Figures 5 and 6). Final coronary angiography showed an optimal stent expansion due to prior extensive calcium modification (Figure 7).

At the end of the procedure, the right radial artery was closed with a ZEPHYR™ Vascular Compression Device (VCD; Advanced Vascular Dynamics) according to the standard protocol, which includes inflation of the closure balloon, deflation until bleeding from the puncture site, followed by inflation of additional 4 mL of air.

RESULTS

A culprit lesion of a non–ST-segment myocardial infarction was treated with rotational atherectomy, intravascular lithotripsy, stenting, and high-pressure postdilatation via right radial access through a RAIN Sheath™ Introducer and vascular closure with ZEPHYR™ VCD. An intervention for the stenosis of proximal LAD was planned within the next 3 months. The rationale for this prolonged interval was that the LAD lesion was relevant

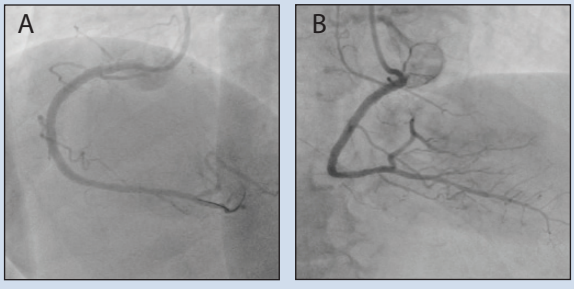

Figure 7. Final result after rotational atherectomy, intravascular lithotripsy, PTCA, stenting, and postdilatation.

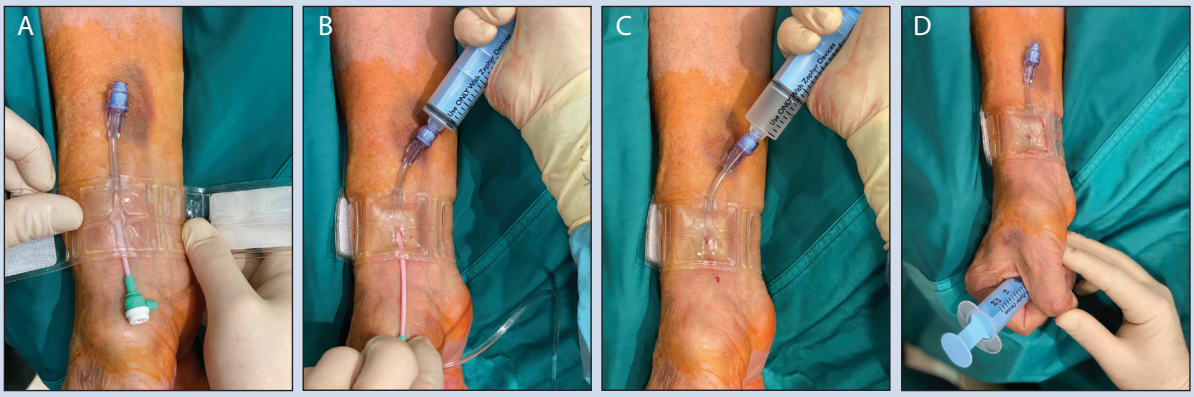

Figure 8. The RAIN Sheath™ Introducer and ZEPHYR™ VCD (A). Images showing the ZEPHYR™ VCD during inflation (B), patent hemostasis (C), and removal (D).

but not urgent, so the result of the RCA with extensive lesion preparation could then be evaluated for early in-stent restenosis.

DISCUSSION

This treatment strategy seems to be rather aggressive upfront, but initial dilatation attempts with small balloons in heavily calcified lesions often prohibit options for rotablation as an "exit strategy." The initial decision for rotational atherectomy should be made while planning an intervention. Especially with a huge amount of calcium, improper modification and lesion preparation before stenting often leads to inadequate stent expansion and consequently increases the risk for in-stent restenosis. For this reason, we decided to perform intravascular lithotripsy after gaining a channel through the calcium with rotablation.

Using the RAIN Sheath™ Introducer for radial access and ZEPHYR™ VCD for radial closure seems to be feasible for even complex daily coronary interventions (Figure 8). The ZEPHYR™ VCD has a soft, flexible elastomeric material that allows for excellent patient comfort and is adjustable to all wrist sizes, even the smallest ones. The included extension strip enables easy enlargement of the compression band, so it is a one size fits all. Finally, the ZEPHYR™ VCD can be used for conventional proximal radial access as well as distal radial and several other access sites, such as the brachial artery. ■