Minimum contrast PCI using a guide extension catheter and IVUS with Philips SyncVision co-registration

Jan Roczniak[1], Marcin Bober[1], Michał Chyrchel[1, 2], Stanisław Bartuś[1, 2], Łukasz Rzeszutko[1, 2]

[1]Department of Cardiology and Cardiovascular Interventions, University Hospital, Kraków, Poland
[2]2nd Department of Cardiology, Jagiellonian University Medical College, Kraków, Poland

Correspondence to:
Łukasz Rzeszutko, MD, PhD, Department of Cardiology and Cardiovascular Interventions, University Hospital, Jakubowskiego 2, 30–688 Kraków, Poland, phone: +48 12 400 22 50
e-mail: lrzeszutko@cathlab.krakow.pl

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Contrast-induced neuropathy remains a common and significant problem limiting interventional treatment possibilities and their outcomes, which occurs in over 10% of patients treated for acute coronary syndromes [1]. This problem is especially pronounced amongst patients with chronic renal failure and a decreased glomerular filtration rate.

A 64-year-old male was admitted for invasive coronary diagnostics due to recent heart failure exacerbation with decompensation (left ventricular ejection fraction of 30%). The patient suffered from complicated type 2 diabetes, atrial fibrillation, and renal cysts, and had a history of left kidney resection and stroke. Coronary angiography revealed significant narrowings in the left anterior descending (LAD), confirmed by fractional flow reserve assessment reaching 0.44. The percutaneous coronary intervention (PCI) was postponed for 6 days due to high contrast administration — 150 ml.

The procedure was carried out *via* right radial access. Tortuosity in the right radial artery was overcome by using a Balanced middle-weight guidewire (BMW) (Abbott Cardiovascular, Plymouth, US). The left aortic sinus was reached with the guide catheter under X-ray guidance with the previous coronary angiogram as a reference. The distal LAD was reached with the BMW wire in a similar fashion. Intravascular ultrasound (IVUS) was able to reach the medial part of the vessel, which was followed by a pullback co-registered with the guidewire using Philips SyncVision. This was followed by several inflations of a 2.5 × 20 mm noncompliant balloon, which allowed for IVUS delivery to the distal part of the vessel, again co-registered with the guidewire.

Subsequently, a Guidion guide extension catheter (Biotronik, Berlin, Germany) was introduced to the LAD for selective intubation of the artery, which allowed its visualization with a smaller volume of contrast. A drug-eluting stent (DES) was positioned based on the co-registered image with a diagonal branch serving as a landmark. Proper DES positioning was confirmed by administration of only 2 ml of contrast thanks to the guide extension. A 2.5 × 38 mm DES was implanted in the distal LAD, followed by several inflations of a 3.0 × 20 mm balloon to achieve proper expansion. Afterward, an overlapping 3.0 × 28 mm DES was implanted proximally guided by stent enhancement and postdilated with a 3.5 × 15 mm noncompliant balloon. Due to emerging ST-segment depressions, acute occlusion of a large diagonal branch was suspected and a prolonged contrast administration (8 ml) was performed. This final angiography excluded the occlusion and confirmed the optimal result of this intervention with TIMI 3 flow.

The total contrast administration during the procedure was 20 ml — 8 ml for initial angiography, 2 ml directly to the LAD during the first DES positioning, 2 ml for post-stenting angiography, and 8 ml for final angiography.

Intravascular imaging is used mostly to ensure optimal stent implantation and good long-term results of the intervention [2]. However, as shown in this case, it can be also applied to minimize contrast administration in a non-complex procedure. IVUS-guided PCI was previously confirmed to be safe and effective [3]. However, orientating the IVUS image to the angiography may pose a difficulty. Philips SyncVision allows IVUS co-registration with a guidewire, reducing the number of

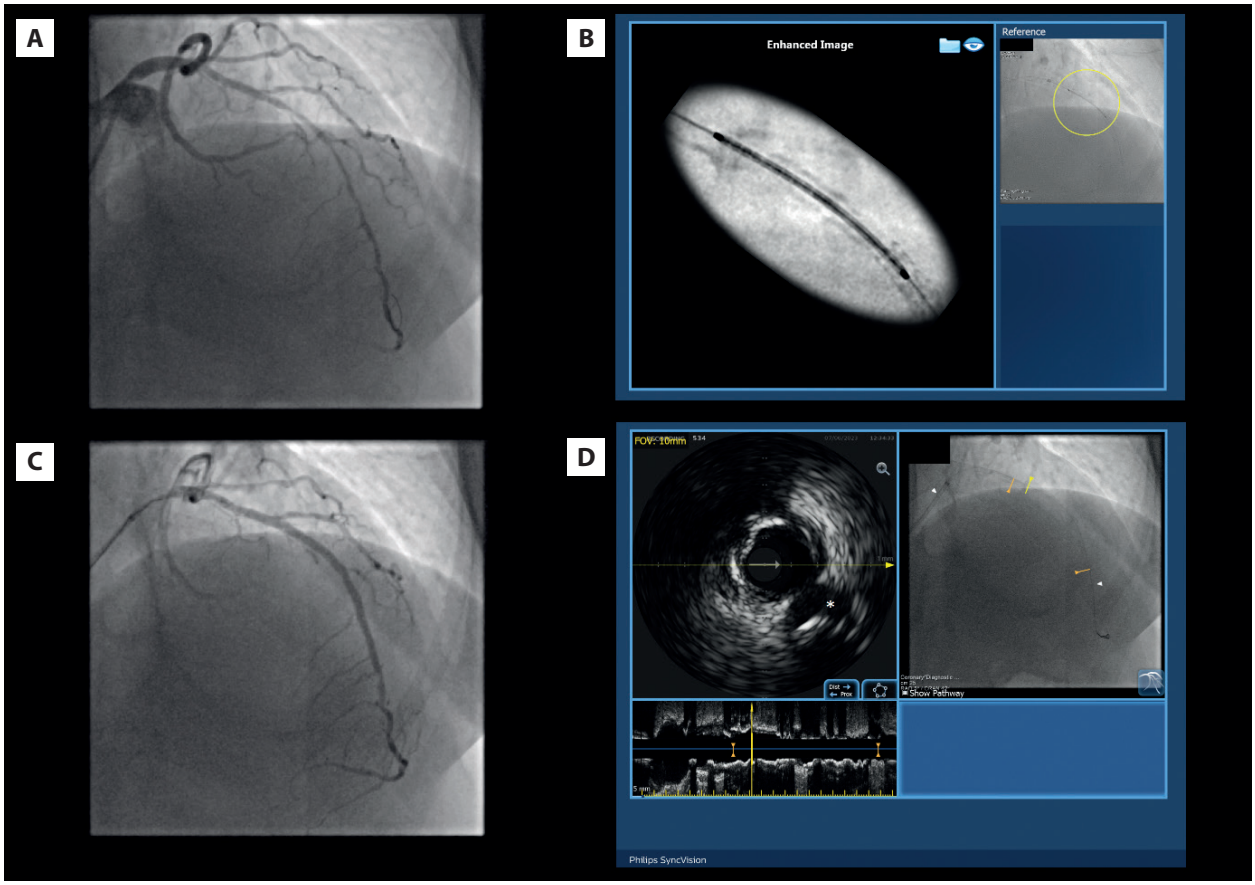

Figure 1. A. Initial angiography. **B.** Final angiography. **C.** Stent enhancement that allowed us to position the second DES without contrast administration. **D.** Philips SyncVision final IVUS image co-registered with the guidewire. DES landing zones are marked with arrows, and the diagonal branch serving as a landmark is marked with an asterisk.

necessary contrast administrations. This could allow for performing a zero-contrast PCI using a landmark.

Guide extension catheter can greatly reduce the amount of contrast necessary to visualize the vessel [4] — up to 2 ml. Described approaches can be considered alone or combined to decrease the risk of kidney injury.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/polish_heart_journal.

Article information

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