POLISH HEART JOURNAL

Kardiologia Polska
The Official Peer-reviewed Journal of the Polish Cardiac Society since 1957

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ISSN 0022–9032 e-ISSN 1897–4279

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Authors: Jan Roczniak, Marcin Bober, Michał Chyrchel, Stanisław Bartuś, Łukasz Rzeszutko

Article type: Clinical vignette

Received: November 24, 2023

Accepted: April 8, 2024

Early publication date: April 22, 2024

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

Short title: Minimum contrast PCI with IVUS and guide extension

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:
Jan Roczniak, MD,
Department of Cardiology and Cardiovascular Interventions,
University Hospital,
Jakubowskiego 2, 30–688 Kraków, Poland,
phone: +48 12 400 22 50
e-mail: roczniakjan@gmail.com

Contrast induced neuropathy remains a common and significant problem limiting the interventional treatment possibilities and their outcome, 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 decreased glomerular filtration rate.

A 64-year-old male was admitted to undergo 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 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 switching a Balanced Middle Weight guidewire (BMW) (Abbott Cardiovascular, Plymouth, US). Left aortic sinus was reached with the guide catheter under X-ray scopy guided with previous coronary angiogram as a reference. 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 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, Guidion guide extension catheter (Biotronik, Berlin, Germany) was introduced to the LAD for selective intubation of the artery which allows its visualization with a smaller volume of contrast. A drug eluting stent (DES) was positioned based on the coregistered image with 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 3.0 × 20 mm balloon to achieve proper expansion. Afterwards, 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 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 optimal intervention result with TIMI 3 flow.

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

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

Supplementary material

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

Article information

Conflict of interest: None declared.

Funding: None.

REFERENCES

1. Rakowski T, Dziewierz A, Węgiel M, et al. Risk factors of contrast-induced nephropathy in patients with acute coronary syndrome. Kardiol Pol. 2022; 80(7-8): 760–764, doi: 10.33963/KP.a2022.0123, indexed in Pubmed: 35521717.
2. Kumar P, Jino B, Roy S, et al. Absolute zero-contrast percutaneous coronary intervention under intravascular ultrasound guidance in chronic kidney disease patients - From despair to hope? Int J Cardiol Heart Vasc. 2022; 40: 101052, doi: 10.1016/j.ijcha.2022.101052, indexed in Pubmed: 35601526.
3. Basavarajaiah S, Kalkat H. Intravascular imaging and coronary intervention: is the bond getting stronger? Kardiol Pol. 2023; 81(10): 942–943, doi: 10.33963/v.kp.97649, indexed in Pubmed: 37768023.
4. Tunuguntla A, Daneault B, Kirtane AJ. Novel use of the GuideLiner catheter to minimize contrast use during PCI in a patient with chronic kidney disease. Catheter Cardiovasc Interv. 2012; 80(3): 453–455, doi: 10.1002/ccd.23331, indexed in Pubmed: 22110014.

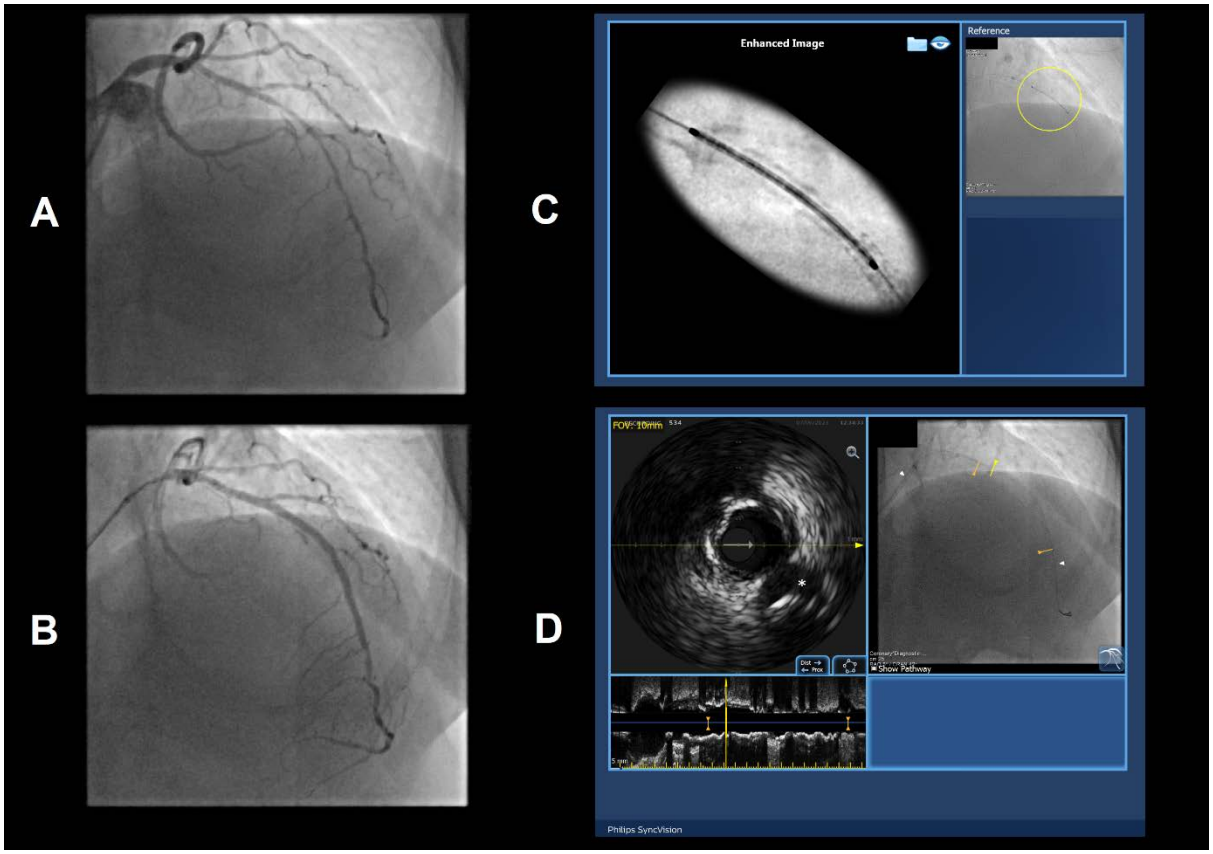

Figure 1. A. Initial angiography. **B.** Final angiography. **C.** Stent enhancement image which allowed to position the second DES without contrast administration. **D.** Philips SyncVision final IVUS image coregistered with the guidewire. DES landing zones were marked with arrows, diagonal branch serving as a landmark was marked with an asterisk