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Authors: Tomasz Lemek, Jakub Garbacz, Stanisław Bartuś, Michał Chyrchel

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A cascade of complications: management of a spiral dissection and simultaneous life-threatening remote coronary vasospasm

Tomasz Lemek[1], Jakub Garbacz[1], Stanisław Bartuś[2,3], Michał Chyrchel[2,3]

1 Jagiellonian University Medical College, Kraków, Poland

2 Department of Cardiology and Cardiovascular Interventions, University Hospital, Kraków, Poland

3 Second Department of Cardiology, Faculty of Medicine, Institute of Cardiology, Jagiellonian University Medical College, Kraków, Poland

Correspondence to: Michał Chyrchel, MD, PhD, Second Department of Cardiology, Institute of Cardiology, Jagiellonian University Medical College, ul. Jakubowskiego 2, 30-688 Kraków, Poland, phone: +48 12 400 22 50, email: mchyrchel@gmail.com

A 60-year-old male was admitted for coronary angiography due to chest pain and dyspnea persisting for one month. His medical history included hypertension, type 2 diabetes mellitus, diastolic heart failure, peripheral artery disease, obesity, active smoking, and four prior percutaneous coronary intervention (PCI) procedures involving the right coronary and left anterior descending (LAD) arteries over the preceding three years.

The physical exam and electrocardiogram were unremarkable. Laboratory tests were within normal limits, except for elevated glycated hemoglobin (7.84%; reference range, 4–6%). Echocardiography revealed segmental hypokinesis in the posterior, inferior, and lateral walls of the left ventricle, with an ejection fraction of ~50%.

On the first day of hospitalization, coronary angiography via the right radial artery was performed. No significant stenoses were observed in the right coronary artery. Multifocal coronary atherosclerosis with preserved TIMI 3 flow was visible in both the circumflex (Cx) and LAD arteries, with the most severe narrowing present in the marginal branch of the Cx (Figure 1A).

PCI of the marginal branch was initiated with NC balloon catheter (2.5x15 mm, 16 atm) predilation. An attempt at stent delivery with a GuideLiner system was interrupted by a spiral dissection, which spanned from the ostium to the distal segments of the Cx and completely obstructed marginal branch flow, as shown on Figure 1B. Simultaneously, an unexpected massive coronary spasm with a TIMI 1 flow occurred in the middle segment of the LAD, proximal to a previously implanted stent. The spasm persisted despite intracoronary injection of nitroglycerin, and the patient became hypotensive and disoriented. A temporary noradrenaline infusion was initiated to stabilize the patient. A Xience stent (3.5x18 mm, 18 atm) overlapping with the previously implanted stent was placed in the middle segment of the LAD.

Within minutes, another coronary spasm occurred near the ostial LAD (Figure 1C). As the patient became severely hypotensive again (systolic blood pressure of 50 mmHg), a second Xience stent (3.5x38 mm, 16 atm) was implanted in the left main and proximal LAD (Figure 1D). TIMI 3 flow through the LAD was restored, and the patient became hemodynamically stable, without additional coronary spasms (Figures 1E and 1F). Five hours after the procedure, troponin I levels were found to be markedly elevated (10 783 pg/ml; reference range, <19.80 pg/ml), however, the patient remained stable without any acute changes in the ST segment. The postoperative period was uneventful, and the patient was discharged 5 days later without further complications.

At the three-month follow-up with angiographic re-assessment, the patient reported no significant improvement in the anginal symptoms. The most probable culprit - the marginal branch of the Cx - remained narrowed. Angiography showed patent LAD stents without evidence of occlusion or stent-related complications. Given the prior procedural complications, an initial conservative strategy with pharmacological therapy was adopted, including treatment with a calcium channel blocker (verapamil) as first-line therapy, together with a long-acting nitrate (isosorbide mononitrate) as adjunctive antianginal therapy. A further attempt at revascularization of the remaining Cx lesion was to be considered in case of symptom deterioration or no improvement.

The patient's documented risk factors strongly predispose to endothelial dysfunction and coronary hyperreactivity [1, 2]. The occurrence of severe LAD spasm remote from the dissected vessel suggests a generalized vasomotor response rather than a purely local mechanical phenomenon. Although IVUS was only performed after stent implantation, the LAD changes in angiography were non-contiguous with the circumflex dissection and dynamically fluctuating, strongly suggesting vasospasm rather than dissection propagation or intramural hematoma. Similar multivessel or remote-vessel vasospasm during PCI has been described and may be related to intense sympathetic activation triggered by acute coronary injury, or procedural stress [3, 4]. Although stenting is not routinely recommended for isolated spasm, it has been shown to be a bailout option in refractory, focal cases associated with ischemia or cardiogenic shock [5].

This case calls for heightened vigilance regarding atypical vasospastic complications in high-risk patients. In selected, life-threatening situations, bailout stenting may be an effective rescue strategy when pharmacological measures fail.

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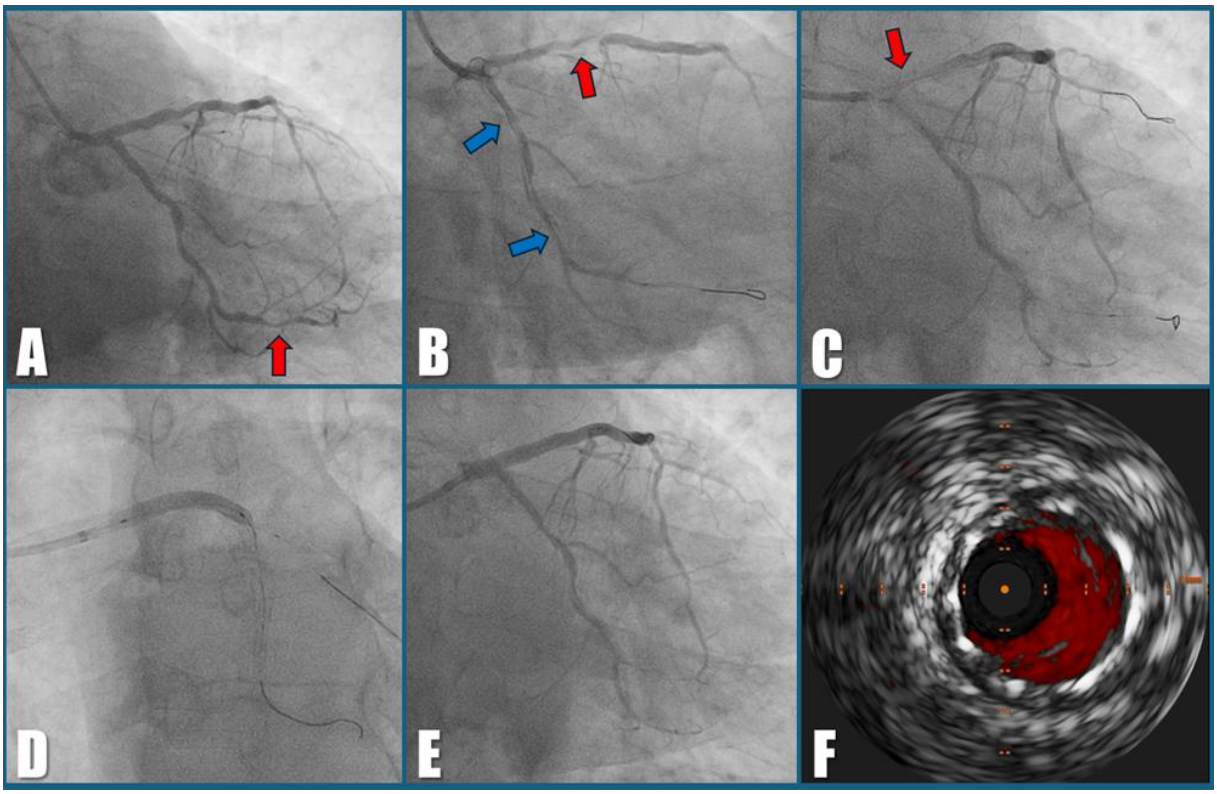

Figure 1 A – Left coronary artery, caudal 30° view. Multifocal coronary stenosis is observed in both the circumflex and LAD arteries, with the most severe narrowing present in the distal segment of the circumflex artery (red arrow); **B** – a spiral dissection from the ostial to distal parts of the circumflex artery (blue arrows). The spastic segment of the LAD positioned proximal to the stent implanted in a past procedure (red arrow); **C** – the red arrow marks the second coronary spasm, which appeared near the ostial LAD after the first stent was implanted; **D** – expansion of the second stent in the left main coronary artery; **E** – angiographic result after implanting two stents, showing restored flow in the LAD and no additional visible coronary spasms; **F** – assessment of adequate stent expansion in the left main via IVUS imaging during the initial procedure

Short title: Spiral dissection complicated by remote coronary vasospasm