Implantation of a coronary sinus reducer for refractory angina due to coronary microvascular dysfunction

Szymon Włodarczak[1], Piotr Rola[2, 3], Artur Jastrzębski[1], Mateusz Barycki[3], Michalina Kędzierska[4], Andrzej Korda[1], Adrian Włodarczak[1, 2], Maciej Lesiak[5]

[1]Department of Cardiology, The Copper Health Centre (MCZ), Lubin, Poland
[2]Faculty of Health Science and Physical Culture, Witelon Collegium State University, Legnica, Poland
[3]Department of Cardiology, Provincial Specialized Hospital in Legnica, Legnica, Poland
[4]Faculty of Medicine, Wroclaw Medical University, Wrocław, Poland
[5]1st Department of Cardiology, University of Medical Sciences, Poznań, Poland

Correspondence to:
Szymon Włodarczak MD,
Department of Cardiology,
The Copper Health Centre (MCZ),
Skłodowskiej-Curie 66, 59–300
Lubin, Poland,
phone: +48 781 201 753,
e-mail: wlodarczak.szy@gmail.com

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A 65-year-old male patient was referred to our Cardiology Department due to angina pectoris, classified as class III according to the Canadian Cardiovascular Society (CCS) which persisted despite 6 months of optimal anti-anginal medical therapy (isosorbide mononitrate, nebivolol, amlodipine, and trimetazidine).

The patient's medical history included hypertension, hyperlipidemia, and coronary artery disease with subsequent percutaneous coronary revascularization. In 2014, he experienced a non-ST-elevation myocardial infarction and underwent percutaneous coronary intervention (PCI) in the right coronary artery with a drug-eluting stent (DES). In 2015, he had PCI in the left anterior descending artery (LAD) with a DES, in 2019, PCI in the right coronary artery with a DES. In 2021 another non-ST-elevation myocardial infarction led to PCI in the circumflex artery with DES implantation.

Echocardiography revealed normal left ventricular function with ejection fraction of 60%. Due to significant clinical symptoms, the patient underwent coronary angiography, which showed no significant coronary artery stenosis (Figure 1A–C).

In addition, coronary microcirculation was assessed using a pressure wire (PressureWireX, Abbott, US) and adenosine to evaluate coronary microvascular reserve (CFR). Coronary microvascular resistance (IMR) was assessed using the thermodilution method with 0.9% saline. A CFR of 2.2 and an IMR of 46 were obtained, indicating significant coronary microvascular dysfunction (CMD) (Figure 1E).

Due to significant symptoms despite optimal medical therapy and the lack of conventional revascularization options, the patient was eligible for coronary sinus reducer (CSR) implantation (Figure 1 D).

At the 6-month follow-up, coronary microvascular function improved, with a CFR of 4.1 and an IMR of 11 (Figure 1F). The patient's angina symptoms resolved and were reclassified as CCS class I. Furthermore, improvements were observed in the 6-minute walk test (90 to 300 meters), Seattle Angina Question (SAQ-7), EQ-5D, and SF-36.

Despite complete revascularization and optimal pharmacotherapy, up to 10% of patients experience refractory angina pectoris [1]. The pathogenesis of this phenomenon is multifactorial, and CMD may be one of the contributing factors [2].

CSR represents a novel therapeutic approach for patients with refractory angina pectoris without obstructive CAD [3] A growing body of evidence suggests the effectiveness of CSR in alleviating angina symptoms. [4] The presented case suggests the effectiveness of this therapy in CMD.

Article information

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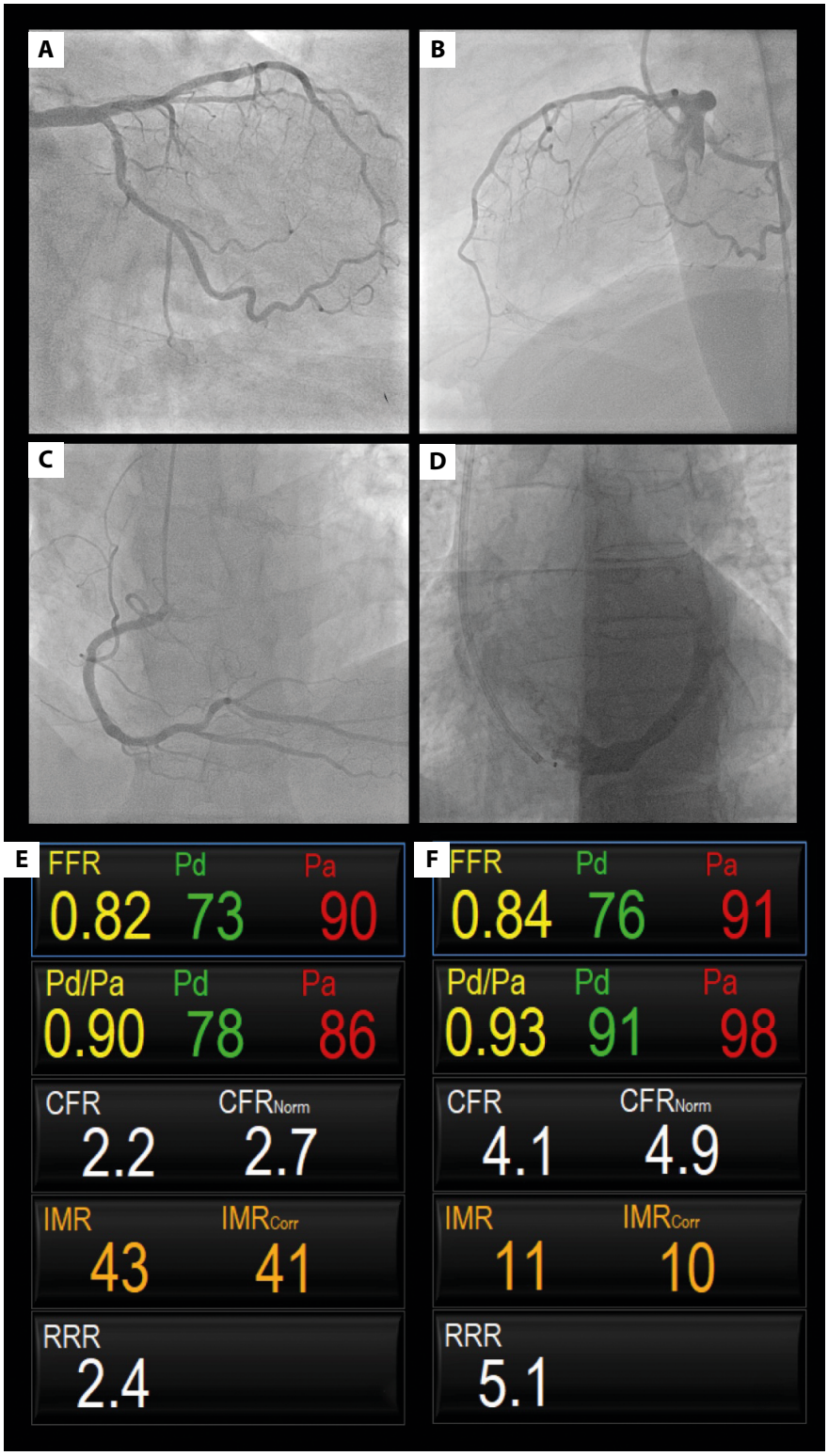

Figure 1. A–B. Coronary angiography of the left coronary artery. **C.** Coronary angiography of the right coronary artery. **D.** Implantation of the coronary sinus reducer. **E.** Baseline physiological indices. **F.** 6-month follow-up — physiological indices

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