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Authors: Weronika Rokosz, Bernadeta Chyrchel, Leszek Bryniarski, Andrzej Surdacki,
Marek Rajzer, Wadim Wojciechowski, Tadeusz Popiela, Wiktoria Wojciechowska

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Large coronary artery fistulas: An unexpected finding during diagnosis of coronary artery disease

Short title: Large coronary artery fistulas

Weronika Rokosz¹, Bernadeta Chyrchel², Leszek Bryniarski², Andrzej Surdacki², Marek Rajzer³, Wadim Wojciechowski⁴, Tadeusz Popiela⁴, Wiktoria Wojciechowska³

¹Student Scientific Group at the Department of Radiology, Jagiellonian University Medical College, Kraków, Poland

² Department of Cardiology and Cardiovascular Interventions, Institute of Cardiology, Jagiellonian University Medical College, Kraków, Poland

³1st Department of Cardiology, Interventional Electrophysiology and Arterial Hypertension, Institute of Cardiology, Jagiellonian University Medical College, Kraków, Poland

⁴Department of Radiology, Jagiellonian University Medical College, Kraków, Poland

Correspondence to:

Wiktoria Wojciechowska, MD, PhD,

1st Department of Cardiology, Interventional Electrophysiology and Arterial Hypertension, Institute of Cardiology,

Jagiellonian University Medical College,

Jakubowskiego 2, 30–688 Kraków, Poland,

phone: +48 12 400 21 50,

e-mail: wiktoria.wojciechowska@uj.edu.pl

A 73-year-old man treated for hypertension and hypercholesterolaemia was admitted to the hospital for invasive coronary angiography because of newly diagnosed angina and an abnormal treadmill exercise test result. He had a normal 12-lead electrocardiogram (ECG) and preserved ejection fraction on transthoracic echocardiography. Coronary angiography showed total occlusion of the middle segment of the left anterior descending artery and approximately 60% stenosis of the right coronary artery (RCA) (**Figure 1A–C**; Supplementary material, *Videos S1* and *S2*). Both arteries had a very strong fistula — most likely to the pulmonary artery. The patient underwent a successful percutaneous coronary angioplasty (PCI) with drug-

cluding stent implantation (Figure 1C; Supplementary material, Video S3). Patient was discharged from the hospital in good general condition with optimal medical treatment including dual antiplatelet therapy. Computed tomography angiography (CTA) was scheduled to determine the anatomy of the fistulas. CTA scans were performed with ECG gating at a heart rate of 60 beats per minute. The study confirmed the good effects of the PCI. It also showed that proximal to the implanted stent there was a coronary artery fistula (CAF) with a tortuous course that entered the pulmonary trunk about 1 cm above the pulmonary artery valve with an orifice of approximately 4 mm (Figure 1D–E; Supplementary material, Figure S1). Another fistula, wider than the distal end of the RCA, originates in the initial segment of the RCA. After numerous bends, it has joined the fistula from the left anterior descending artery, creating an aneurysmatic dilatation of 14 × 10 mm, and then entered the pulmonary artery (Figure 1D–E).

Coronary artery fistulas are rare, occurring in 0.002% of the general population and accounting for 0.4% of all cardiac malformations [1, 2]. This case is distinctive for a variety of reasons. Firstly, the patient exhibited a rare anatomical variant of vascular fistulas (Figure 1F). Single fistulas are most common, ranging from 74% to 90%, multiple fistulas occur in 10.7% to 16% of all CAFs, and both coronary arteries are involved only in 5% [3]. Secondly, multiple imaging techniques were used, as coronary angiography alone did not provide sufficient information on the course of fistulas. The use of CTA with 3D reconstruction is a reliable method for the accurate examination of the anatomy of CAFs. It has become as the preferred diagnostic assessment method due to its higher temporal and spatial resolution when compared to alternative imaging techniques [3]. CTA is also the method of choice for assessing fistula-related complications such as aneurysm or thrombus [4]. Treatment options for CAF include ligation, surgical patch closure, bypass grafting, and transcatheter closure. The 2020 European Society of Cardiology guidelines recommend consideration of patient age, presence of symptoms, complications, and significant shunt in the main indications for percutaneous or surgical closure [5]. In this case report, the patient was diagnosed with a pathological coronary-pulmonary fistula at an advanced age. The angina symptoms reported prior to PCI were completely resolved after angioplasty. No arrhythmia was found on ECG monitoring, so the patient was offered a strategy of conservative management of the CAF.

Supplementary material

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

Article information

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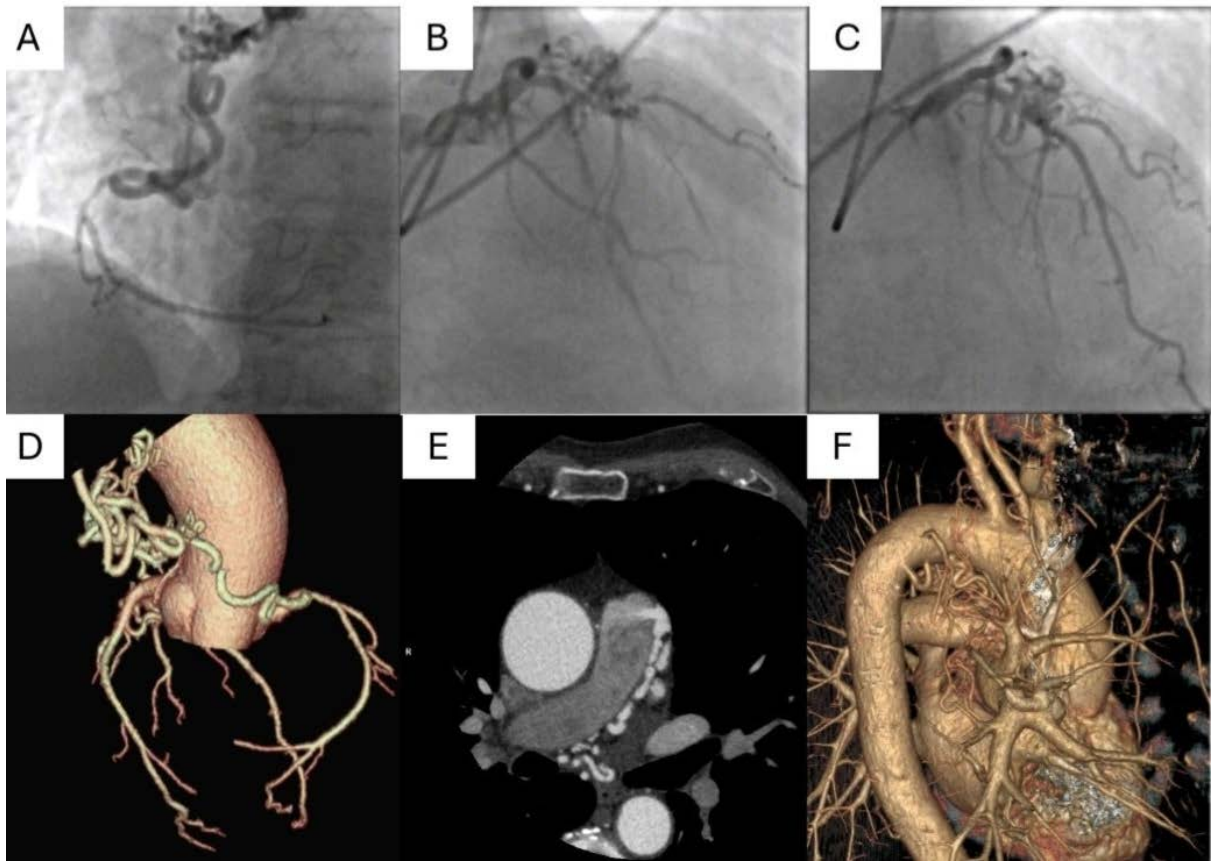


Figure 1. **A.** Angiographic view of the right coronary artery (RCA) showing stenosis of the proximal segment. **B.** Angiographic view of the left coronary artery (LCA) showing an occlusion of the middle segment. **C.** Angiographic view after successful percutaneous coronary angioplasty of the left anterior descending artery. **D.** An fistulas branching off from proximal segment of RCA (3-dimensional reconstruction of computed tomography angiography [CTA]). **E.** CTA presenting connection of the fistulas of the coronary circulation to the pulmonary artery. **F.** 3-dimensional reconstruction of CTA showing a leash of vessels