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IMAGES IN CARDIOVASCULAR INTERVENTION

A percutaneous treatment of giant right coronary fistula causing heart failure: a safe and effective procedure

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A coronary arterial fistula (CAF) is a communication between a coronary artery and a cardiac chamber or a great vessel. It is a rare, usually congenital, anomaly with a wide range of clinical presentations [1, 2]. CAF can be managed conservatively or invasively. Invasive treatment is usually indicated in adults for large or symptomatic fistulas.

A 49-year-old man was admitted to our Emergency Department for worsening dyspnea; he had new-onset heart failure with severe left-ventricular dysfunction (EF 23%) and biventricular dilatation. Family history was negative. He was afebrile; no recent infective diseases were referred; at laboratory analysis, troponin was negative in two measurements. Cardiac magnetic resonance (CMR) confirmed the echocardiographic findings and no edema or late gadolinium enhancement was detected. Coronary angiography only revealed a large fistula (maximum diameter 9 mm), arising from the proximal right coronary artery and draining into the right atrium; the vessel's course was confirmed by multidetector computed tomography (MDCT).

After a multidisciplinary assessment, invasive treatment was planned, considering the symptoms and the caliber of the fistula. A percutaneous occlusion seemed to be preferable, because feasible and less invasive, compared to surgery.

A venous and an arterious femoral access were performed. From right coronary artery, three guidewires were sequentially advanced into the fistula to make its course less tortuous; the last one, a ChoICE extra support guidewire, was retrieved in the right atrium with a Goose Neck snare. It was decided to start occluding the fistula from the atrial side to reduce the risk of coronary retrograde thrombosis. Thus, through a microcatheter, three MicroPlex coils (5 mm × 12 cm) were delivered from the atrial termination and two others (4 mm × 10 cm) from the coronary side, with a minimal residual flow (Fig. 1).

An MDCT, performed 1 month later, showed an excellent result of the embolization; at 1 year follow-up, symptoms were significantly reduced; echocardiography showed biventricular remodeling and recovery in ejection fraction (EF 57%), with a mild residual regurgitation from the fistula to the right atrium.

CAF are rare anomalies (0.2–1.3% of patients undergoing coronary angiography) [1]. Clinical impact ranges from an asymptomatic alteration discovered incidentally to an important cause of morbidity [2]. This variability depends on fistula anatomic characteristics (size, length, and tortuosity) and on the sites of origin and drainage. Large CAF are more often associated with complications and symptoms that are considered main indicators for percutaneous or surgical closure [3].

In our case, fistula exclusion resulted in a progressive improvement of clinical and imaging findings. This suggests that presenting symptoms were probably due to hemodynamic consequences of left-to-right shunt, volume overload on right chambers and a steal phenomenon through the fistula.

There is no univocal consensus on the choice between surgical or transcatheter closure, so the decision should be individualized on patient characteristics and tailored on anatomical fistula features. In selected patients and in anatomically suitable vessels, percutaneous approach can be considered as first-line choice for large coronary fistulas closure, because it is safe and effective, as demonstrated in this case.

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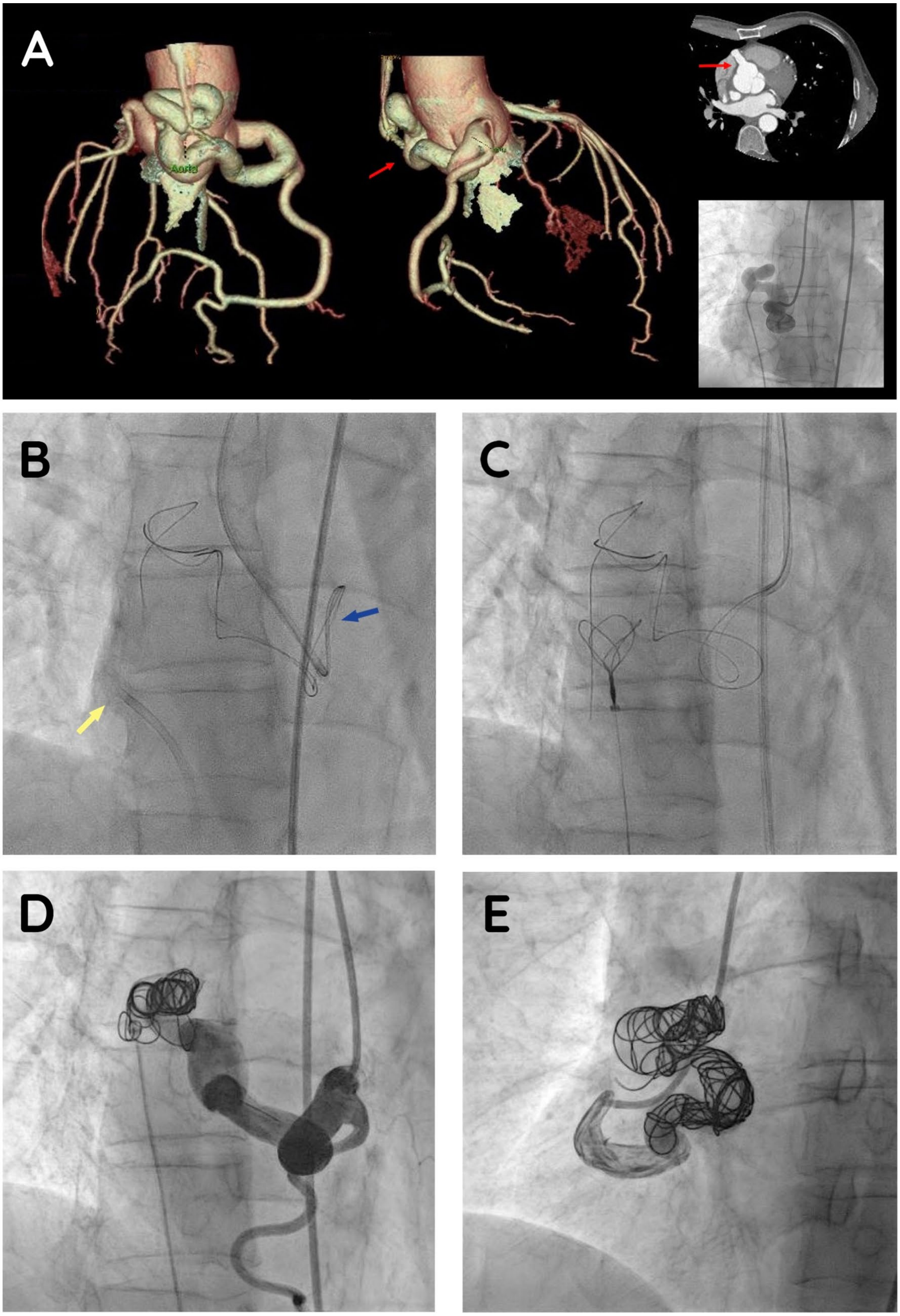

Fig. 1 **A** Baseline right coronary angiography and MDCT images showing the large caliber and the tortuous course of the fistula; **B** three guidewires into the fistula, advanced from RCA (blue) to right atrium (yellow); **C** the last guidewire retrieved with a Goose Neck snare; **D** fistula embolization, starting from atrial side; **E** final angiographic result

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Declarations

Conflict of interest The authors have nothing to disclose.

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