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Percutaneous closure of a coronary artery fistula using a precision-guided approach

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Abstract

Coronary artery fistulae are rare vascular anomalies with a wide spectrum of clinical presentations. We report the case of a 55-year-old male with a large coronary artery to pulmonary artery fistula, identified following evaluation for exertional breathlessness. The patient underwent successful percutaneous closure using coil embolisation under image-guided precision techniques. Post-procedural imaging confirmed complete occlusion of the fistula, and the patient remained asymptomatic at follow-up. This case highlights the efficacy and safety of a catheter-based approach to fistula management in selected patients, offering a less invasive alternative to surgery.

Keywords: Coronary fistula; Percutaneous closure; Coil embolization; Congenital anomaly; Interventional cardiology; Coronary imaging.

Abbreviations: CAF: Coronary Artery Fistula; CT: Computed Tomography; PA: Pulmonary Artery; LCA: Left Coronary Artery; RCA: Right Coronary Artery.

Introduction

Coronary Artery Fistulae (CAFs) are uncommon congenital or acquired anomalies involving abnormal communication between a coronary artery and a cardiac chamber or major vessel, most frequently the pulmonary artery or right atrium [1]. They represent approximately 0.2-0.4% of all congenital cardiac anomalies [2]. CAFs may remain silent or lead to complications such as myocardial ischaemia, arrhythmias, heart failure, or endocarditis [3]. The treatment strategy depends on anatomical complexity and clinical symptoms, with percutaneous closure emerging as a favourable option in selected cases [4].

Case presentation

A 55-year-old male presented with exertional dyspnoea and was found to have a continuous cardiac murmur on clinical examination. Coronary angiography demonstrated a large coronary artery to pulmonary artery fistula originating from the left mainstem artery and draining into the main pulmonary artery (Figure 1). A multi-disciplinary heart team recommended percutaneous closure due to the symptomatic nature and favourable anatomy. Using femoral access, a 6F guiding catheter was advanced into the LCA. The fistulous tract was engaged with a microcatheter (Figures 2 and 3), and successfully occluded using detachable coils (Figure 4). Post-procedure angiography showed persistent flow through the fistula (Figure 5). At three-

month follow-up, the patient was clinically well. CT coronary angiography confirmed a thrombosed, fully occluded fistula with no residual flow (Figure 6). No complications were reported, and the patient remained asymptomatic.

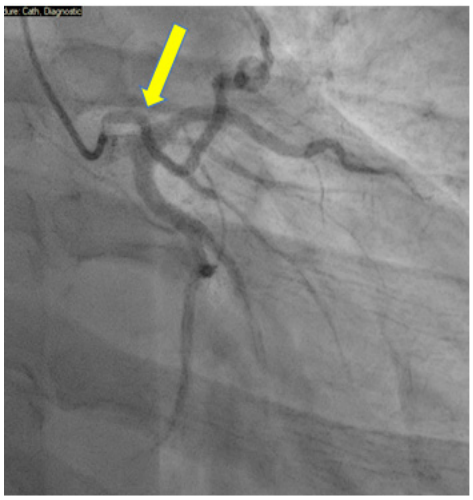

Figure 1: Coronary angiogram showing the fistula (yellow arrow) arising from the left mainstem artery.

Figure 2: Coronary angiogram showing wiring of the fistula with a Sion blue.

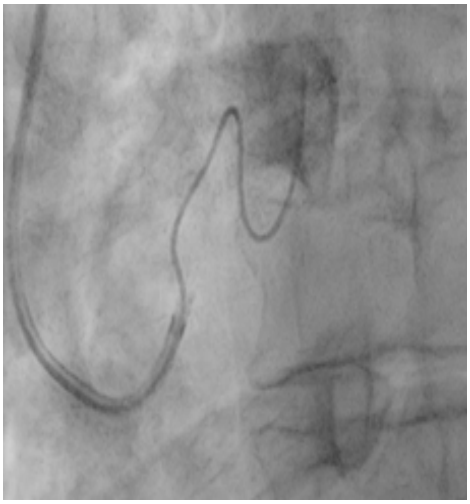

Figure 3: Coronary angiogram showing advancing a microcatheter into the fistula.

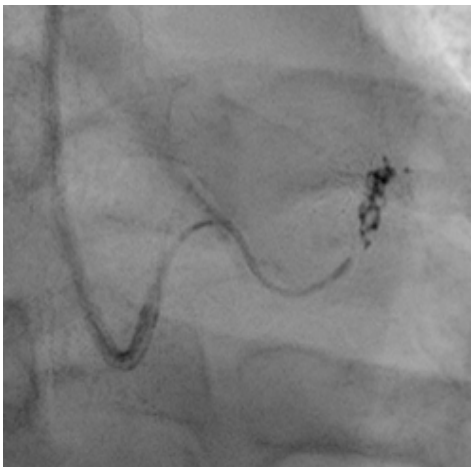

Figure 4: Coronary angiogram showing the deployment of the coil in the fistula.

Figure 5: Coronary angiogram picture post coil deployment.

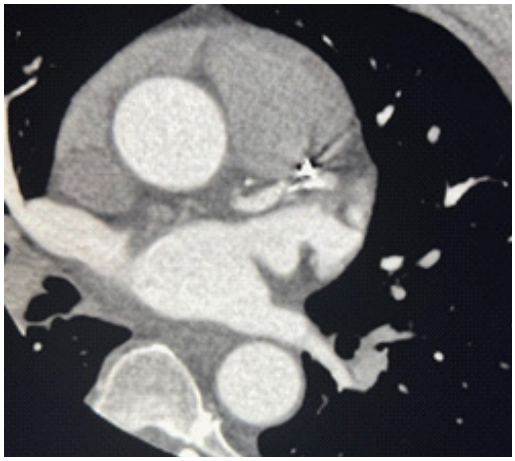

Figure 6: CT coronary angiogram image showing occluded fistula with no contrast filling.

Discussion

CAF is a rare but clinically relevant coronary anomaly. While small fistulae may be managed conservatively, larger or symptomatic ones necessitate closure to prevent complications such as heart failure or myocardial ischaemia [5]. Historically, surgical ligation was the standard of care. However, advances in interventional cardiology have enabled percutaneous closure to become a viable and often preferred strategy [6]. This case

demonstrates that percutaneous closure, when guided by appropriate imaging and patient selection, is not only feasible but effective, offering low morbidity and a rapid recovery. The use of detachable coils provided controlled deployment and excellent occlusion rates, as corroborated by follow-up imaging.

Conclusion

This case reinforces the importance of a tailored approach, integrating anatomical assessment, symptomatology, and operator expertise. A minimally invasive, catheter-based closure strategy should be considered first-line in appropriately selected patients with coronary artery fistulae.

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