Closure of an Iatrogenic Coronary Artery Fistula With a PTFE-Coated Stent

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INTRODUCTION

Posttraumatic coronary-cameral fistula is an uncommon finding. We present the first reported case of a postoperative iatrogenic coronary fistula flowing from the anterior descending artery to the right ventricle, treated successfully by percutaneous insertion of an expandable polytetrafluoroethylene (PTFE)-coated stent.

CASE REPORT

A 50-year-old male diagnosed with rheumatic mitral and aortic valve disease presented to the emergency room with a clinical picture that included progressive dyspnea, poor general health, and fever. The clinical examination was consistent with moderate double mitral valve lesions and moderate aortic insufficiency. Notable findings from standard laboratory workup were neutrophilic leukocytosis and an elevated level of liver enzymes. The electrocardiogram revealed atrial fibrillation with rapid ventricular response. Echocardiographic images from the echocardiography suggested vegetations in on the mitral valves and the aortic semilunar valves. Blood cultures were positive for Staphylococcus aureus. Given his rapid clinical deterioration, the patient required emergency aortic (Carbomedics, 23) and mitral (Carbomedics, 27) valve replacement surgery. Inotropic support and 2 more further interventions because of bleeding in the postoperative period were also necessary. One week after discharge, he was readmitted to the hospital because of heart failure. The echocardiogram revealed a dehiscence of the aortic prosthesis with a perivalvular, aneurysmal appearance and severe aortic insufficiency. An intervention...
was performed to suture the dehiscence. In the postoperative period after this second intervention, the patient developed a left pneumothorax requiring insertion of a chest tube. A continuous parasternal murmur was noted on follow-up examination. Doppler color echocardiogram revealed a continuous flow from the anterior descending artery to the right ventricle. The hemodynamic study and coronary angiography confirmed the presence of a fistula (Figure 1) with a left-to-right shunt (pulmonary to systemic flow ratio \( Q_p/Q_s \) of 1.2). Elective closure of the fistula was achieved by inserting a 3.5 mm×16 mm PTFE-coated stent (Jostent Coronary System Graft®, Jomed, Germany). Complete closure of the fistula was achieved (Figure 2).

**DISCUSSION**

Acquired coronary fistula is an uncommon disorder. It has been described after surgical procedures, endomyocardial biopsy, coronary angioplasty, acute myocardial infarction, and thoracic trauma. In our case, the most likely cause was an inadvertent direct puncture of the epicardium during insertion of a chest tube for postsurgical left pneumothorax. This puncture created fistulous flow between the anterior descending coronary artery and the right ventricle. The flow increased progressively to the point where it was detectable on physical examination.

For large fistulas and those with greater hemodynamic consequences, early surgical closure has been recommended to prevent later complications that may lead to left-to-right shunting, pulmonary hypertension, heart failure, or the emergence of myocardial ischemia due to coronary steal. Iatrogenic fistulas are usually benign, thus allowing for conservative management, although serious complications secondary to volume overload and impairment of distal myocardial flow have also been described. Surgical resolution involves external ligation and often requires extracorporeal circulation.

The development of percutaneous closure procedures (coil embolization, umbrella device, etc), which have mainly been used for congenital coronary fistulas, may increase the number of surgical indications because these procedures provide good results with low morbidity and mortality.

The Jostent coronary stent graft consists of a concentric, double metallic mesh enclosing a layer of PTFE. This polymer, which is impermeable and expandable, permits the closure of coronary aneurysms and iatrogenic punctures of the coronary wall. It has proven useful in the treatment of vein graft lesions because it decreases the risk of distal embolization. The use of this type of stent in the closure of an iatrogenic coronary arteriovenous fistula between the right coronary artery and the posterior interventricular vein has also been described.

In our case, closure of the fistula was indicated to prevent the fistula from progressing to a significant shunt or causing myocardial ischemia because of distal flow deterioration. We chose direct insertion of this type of stent for the occlusion of the ostium proximal to the fistula due to its relative accessibility and the adequate caliber of the anterior descending artery in this area.

To date, no case of acquired coronary-cameral fistula occluded with this method has been reported in the medical literature.

The direct implantation of this type of coated intracoronary stent to close the fistula’s proximal os-
tium provides complete occlusion through a simple percutaneous procedure with low morbidity and mortality.

REFERENCES