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Case Report

Stable angina revealing a post-traumatic coronary cameral fistula: A case report[☆]

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ABSTRACT

Coronary-cameral fistulas are abnormal connections between coronary arteries and any of the heart chambers, It may be acquired or congenital (whether isolated or along with congenital heart diseases); It is usually asymptomatic in younger patients; but with increasing age, symptoms begin to appear, and the incidence of complication rises. Coronary angiography is the gold standard in diagnosis but echography and cardiac magnetic resonance imaging may be also useful. It can be treated medically with β -blockers or calcium channel blockers, but large fistulas with hemodynamic significant shunts should be closed by transcatheter or surgical means. We present a 57-year-old patient with a history of chest trauma, that present fistulas connecting the 3 coronary arteries to the left ventricle chamber complicated by myocardial ischemia causing stable angina.

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Case description

A 57-year-old patient consulted our center for palpitations and exertional chest pain. There was no history of syncope or dyspnea.

The patient had no family history of sudden cardiac death, known cardiovascular disease or a context of congenital disease. But he had a previous history of chest trauma leading to a pneumothorax five years earlier, caused by a stick blow.

Cardiovascular examination on presentation was unremarkable, resting EKG demonstrated sinus rhythm (heart rate,

73 bpm) and negative T-waves on the anterior territory without any other significant abnormalities.

Transthoracic echocardiography demonstrated mildly increased left ventricular size with a normal systolic function and no left ventricular hypertrophy. Mild mitral regurgitation was present. Continuous turbulent systolic and diastolic flow was noted at the lateral wall of the left ventricle draining into a cavity within the anterolateral papillary muscle.

During an exercise stress electrocardiogram, the patient exercised for 12 minutes and was symptom free with no arrhythmias and no electrical evidence of ischemia.

Diagnostic coronary angiography demonstrated a right dominant system. The left main coronary artery had a nor-

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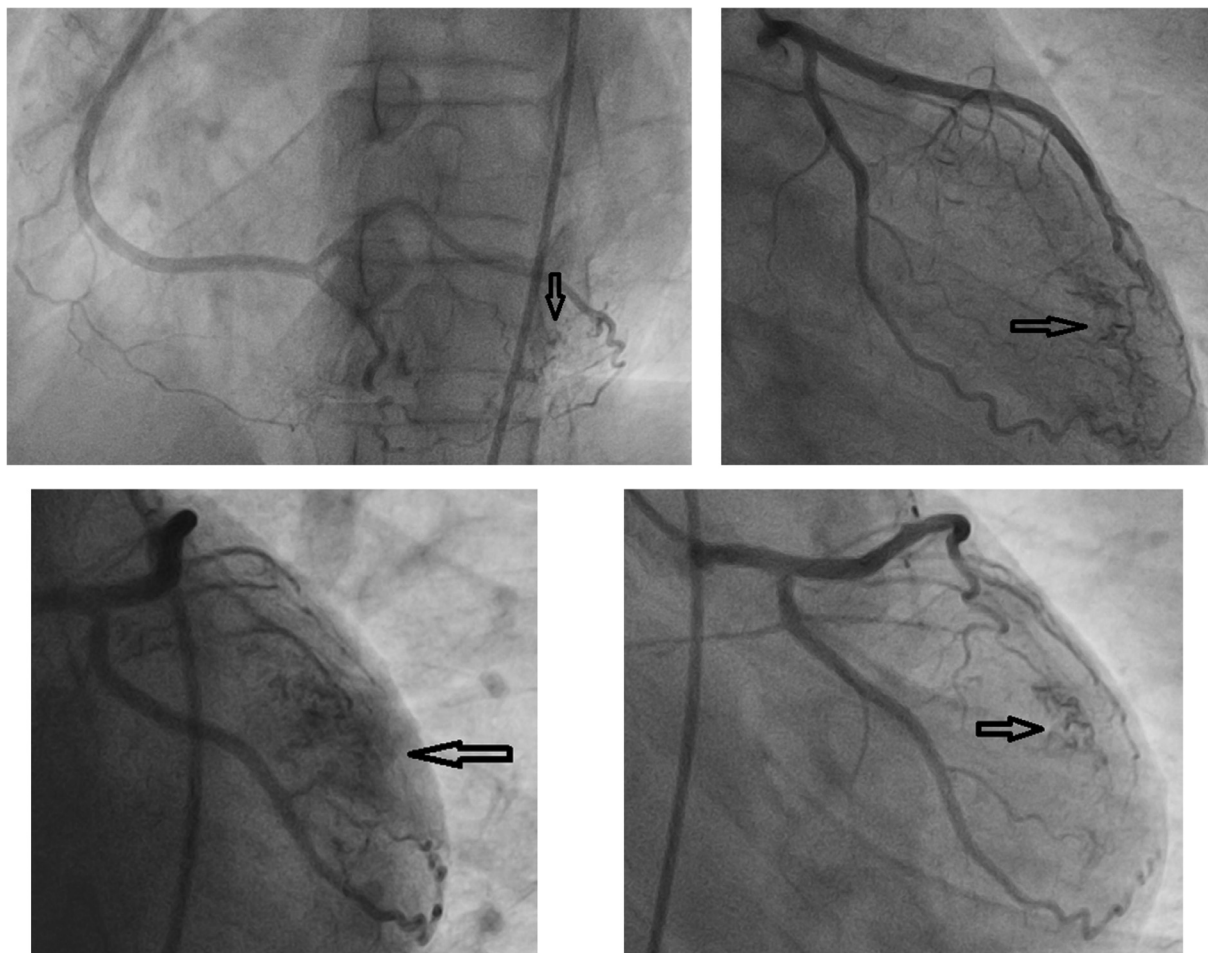


Fig. 1 – Coronary angiography figures showing images of coronarocameral fistulas from different incidences.

mal length and diameter. The left circumflex artery, the left anterior descending artery and the right coronary artery had a normal size, and did not present any significant lesion. We noted an extravasation of contrast into the left ventricular cavity originating from the three coronary trunks (Fig. 1).

The case was reviewed at the heart team meeting. The images were examined and the literature was discussed. It was concluded that serial imaging with annual echocardiography and regular clinical review would be the best approach and that there was no current indication for invasive management.

Discussion

Coronarocameral fistulas (CCF) are abnormal connections between coronary arteries and any of the heart chambers, most commonly affects the right side of the heart. It may be acquired or congenital (whether isolated or along with congenital heart diseases). It is usually asymptomatic in younger patients; but with increasing age, symptoms begin to appear, and the incidence of complication rises.

Although the majority of coronary artery fistulas are diagnosed incidentally on coronary catheterization, there is a portion of patients who can present symptoms of congestive heart failure, myocardial infarction, pulmonary hypertension, and other cardiopulmonary functional abnormalities.

There are 3 major causes of coronary artery fistulas. Most commonly, they arise congenitally because of abnormal embryological development. The most frequent form of acquired fistulas results from severe trauma, such as gunshot wounds or stab injuries. Iatrogenic causes of CCF include interventional and surgical cardiac procedures such as coronary artery bypass grafting, cardiac angiography, valve replacements, device implantations, or biopsies [1].

Regarding the prevalence of coronary artery fistulas in general population, a study has found a prevalence of 0.9%. Furthermore their incidence is 0.1% to 0.2% in all patients undergoing coronary angiography [2].

The pathophysiology in each patient depends principally upon the resistance of the fistulous connection and on the site of fistula termination. The resistance is determined by the size, tortuosity, and length of the fistula. Blood follows the lower-resistance pathway through the fistula rather than traversing the smaller arterioles and capillaries of the myocardium. With larger fistulas, a “diastolic runoff” may occur,

drawing blood away from the normal coronary pathway with a widened pulse pressure and a coronary steal, resulting in angina [3].

The evaluation of coronary artery fistulas begins with the auscultation of a continuous murmur over the lower precordium. Initial diagnostic exams could include chest radiography and electrocardiography (EKG). Although these modalities do not yield a sufficient diagnosis, they are helpful in uncovering any ensuing complications. For example, ST-segment changes on an EKG could be indicative of acute or chronic myocardial ischemia. Chest radiography would be able to assess volume overload.

Studies have shown that transthoracic echocardiograms (TTE) are able to visualize hemodynamically significant coronary artery fistulas, but are not helpful in determining sites of origin and termination. Transesophageal echocardiograms (TEE) are helpful in assessing turbulent blood flow and delineating the origin and insertion points of the fistulas in adults. Cardiac magnetic resonance imaging can also be used to estimate the blood flow within the fistula. Nevertheless, coronary catheterization and subsequent coronary angiography are the gold standards in diagnosing coronary artery fistulas [4].

The complications they predispose patients to, are the ultimate determining factor. In adults, some patients may remain asymptomatic for their entire lives, if the fistula was not hemodynamically significant. In other patients with ensuing complications such as congestive heart failure, atrial/ventricular arrhythmias, and cardiac tamponade, an immediate reversal of the complication followed by treatment of the coronary artery fistula by catheterization closure is necessary to decrease morbidity. Although recurrence of the coronary artery fistula is rare, surgery is known to increase the rate of recurrence as opposed to catheterized closure [5].

Treatment and further management are only indicated in patients with the following [6]:

- Hemodynamically significant left to right shunt.
- Congestive heart failure with either left ventricular volume overload or left ventricular dysfunction
- Myocardial ischemia.

The treatment choice depends on whether the CCF is congenital or acquired. Whereas multiple congenital coronary-ventricular microfistulas can be treated medically with β -blockers or calcium channel blockers, large solitary macrofistulas that lead to severe hemodynamic shunts (Qp:Qs ratio, 1.5) should be closed by transcatheter or surgical means [7].

The current guidelines refer to coronary fistulas in general and do not specify the subject of coronary cameral fistulas. The last ACC/AHA guidelines (2018) and ESC guidelines (2020) recommend the closure of medium or large fistulae in the presence of symptoms, complications, and a significant shunt [8].

Patient consent

I have informed the patient and I am committed to him that the images taken during his medical care are anonymous and that their use has a purely scientific objective. And I have obtained a written consent statement from the patient.

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