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Coronary artery aneurysms: case report and treatment overview

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Abstract. – Coronary artery aneurysms (CAAs) are localized dilatations exceeding the diameter of adjacent normal coronary segments. These conditions, even rare, still represent an important risk factor for the patient life.

Key Words:
Coronary artery aneurysms, Management, Cardiac surgery.

Case Report

A 49-year old woman went to the hospital with low threshold angina and dyspnea. She had been in her usual state of health until 4 months before admission when she started to suffer of chest pain. Her past medical history was distinguished by hypertension with dyslipidemia, a positive family history for cardiovascular disease. She didn't suffer any chest trauma and there were no symptoms of Kawasaki disease. On physical examination general conditions were good. She was suspected for ischemic cardiopathy and hospitalized for investigations. Laboratory tests didn't show any abnormal ranges, ECG didn't present pathological changes but a stress test resulted positive for a spread of 2 mm ST-T segment depression on V3-V4. Transthoracic echocardiography showed the left coronary artery ostium dilated but there were no evidence of valve disease or abnormalities in ventricular contractility. A CT scan coronary angiogram revealed two giant aneurysms: one of the left main coronary artery (LMCA) with 11-mm of internal diameter extending into the anterior descendent artery (LAD) with 11-mm of internal diameter and one of the right coronary artery with 10-mm of internal diameter (Figure 1). The diagnosis was confirmed by coronarography (Figure 2). During the angiography, there was no evidence of flow reducing stenosis. The patient was discharged home with an antithrombotic and antiplatelet regimen due to the high risk of thrombosis and after a follow-up visit at three and six months she was fully mobile and asymptomatic.

Discussion

Coronary artery aneurysms (CAAs), first described by Bougon in a Hussar Officer[1], are localized dilatations exceeding the diameter of adjacent normal segments by 50% while the term *giant* refers to aneurysms with a dilatation superior to 2 cm[2]. They have multiple etiologies: they can follow an autoimmune response as in Kawasaki (10-25% of untreated cases[3]) or Behçet diseases, they can be secondary to aortic dissection, trauma or syphilis and they can be associated to a connective tissue disorders (Ehlers-Danlos disease type IV, vascular type) where the gene for type III procollagen (COL3A1)[4] mutated or congenital malformations as well. For Kawasaki disease, also, new studies outline the role of matrix metalloproteinases (MMPs): patients with this disease have high levels of MMPs (specific type is still unknown) and the imbalance between MMps and tissue inhibitors (TIMP) might playan important role weakening the coronary artery wall until the formation of aneurysms[5].

However, atherosclerotic disease is the most common cause: in fact the presence of plaques may lead to arterial wall weakening, above all in those patients presenting with comorbidities (advanced age, hypertension, smoking, hypercholesterolemia, diabetes mellitus, etc.).

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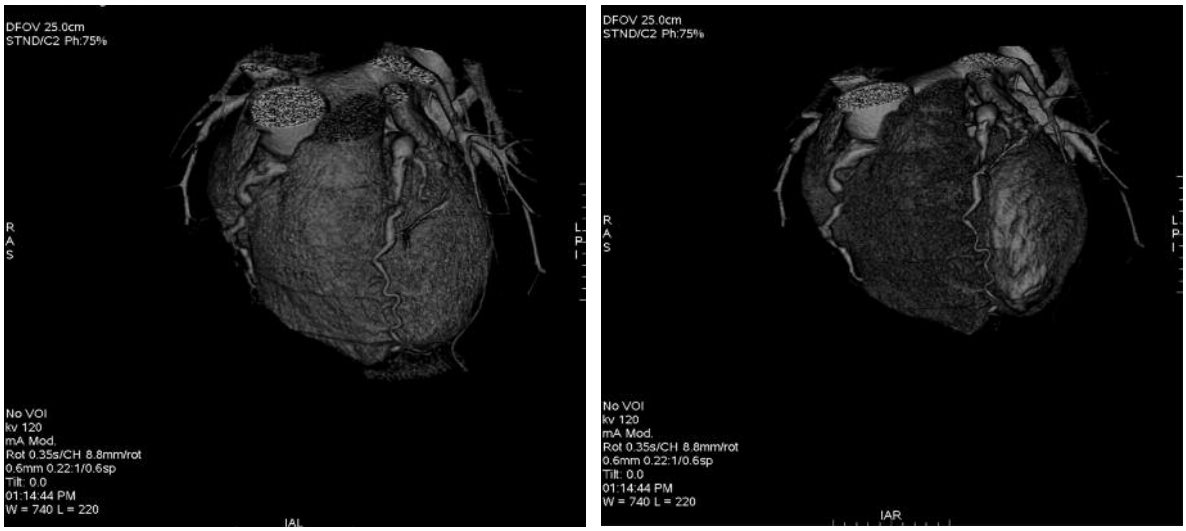

Figure 1. CT angiogram 3D show the presence of one aneurysm on the LMCA, on LAD and on RCA.

There are iatrogenic conditions as well: dilatations can follow percutaneous transluminal coronary angioplasties (PTCA) and can be secondary to a periprocedural trauma (use of balloon, atherectomy, laser angioplasty, etc.) and are thought to be due to an injury of the arterial wall with dissection or perforation of the tunica media: their reported incidence is about 3.9%[6]. Therefore, making an early diagnosis is very important and a noninvasive diagnosis may be useful to evaluate the progression of the disease and selecting treatment strategy.

There is no general consensus about the treatment of CAAs and each case needs an independent assessment. Parameters to be considered are the internal diameter of the coronary arteries and the anatomy of the coronary tree, the patient's age, the suspected etiology of CAAs and the presence of comorbidities.

There are three options of treatment:

- Surgical approach,
- Percutaneous covering stenting,
- Medical management (antiplatelet, anticoagulant therapy).

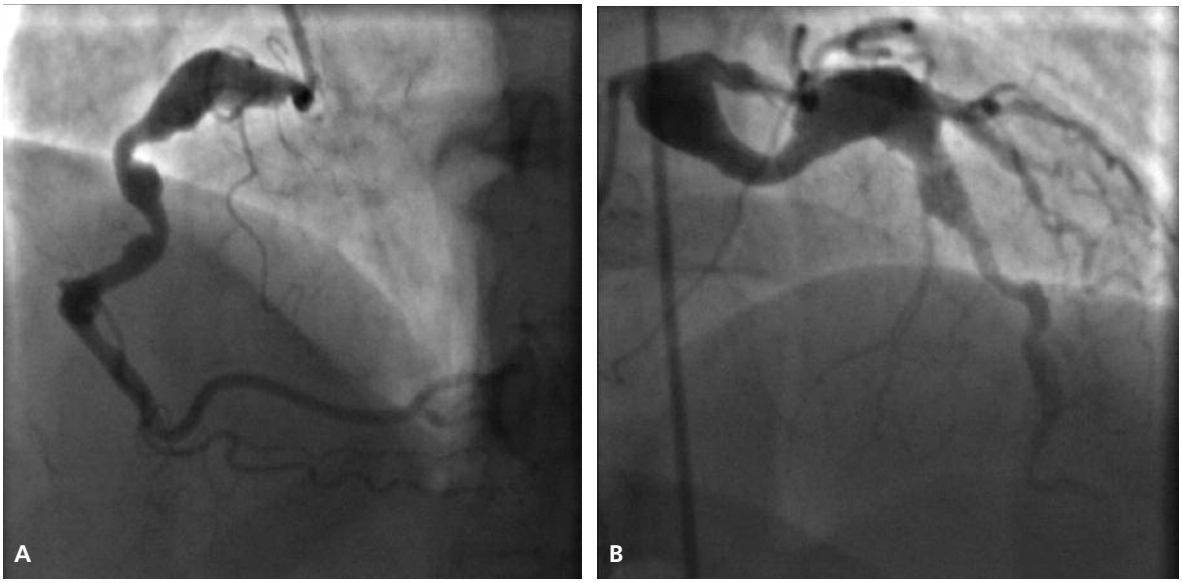

Figure 2. ***A,*** Angiography evidences the aneurysm on RCA. ***B,*** Angiography evidences the aneurysms of LMCA and LAD.

Surgical approach (reconstruction, resection and exclusion with bypass) is advised when the aneurysmal dilatation is over 2.5 cm size in the proximal part as reported by some studies[7], or when there is an intramural thrombus[8]; otherwise situations with compression of cardiac chambers or fistula formation with severe shunt can address the surgical option[9]. But even for these cases there are no consistent guidelines. It is well established that ischemic symptoms, presence of significant shunts and associated aneurysmal dilatations are indications for surgical treatment[10].

Szalat and coworkers made one of the largest retrospective studies comparing outcomes of patients treated with surgery (n = 18) or with PTFE-covered stents (n = 24). Based on this study, PTFE-covered stents (even custom made) appear to be beneficial for patients with aneurysms less than 10 mm in diameter. It seems also that giant CAAs have a worse prognosis and their treatment doubtfull with the currently available covered stents[11].

Medical therapy is indicated for the majority of patients where coronary stenosis is not significant and consists of combined antiplatelet and anticoagulant therapy, almost importantly in cases where the risk of thrombus formation is higher. For CAAs secondary to Kawasaki disease, the medical treatment is sufficient in most of the cases[12].

Conclusions

Coronary artery aneurysms are still considered pretty rare conditions and the absence of specific guidelines make their treatment very challenging. They are an important risk factor for cardiac disease because the thrombus formation and embolism is higher due to the presence of turbulent flow and the wall's weakness can lead to rupture of the aneurysm self. A timely prognostic assessment is required to prevent those important complications and a proper treatment must be patient specific and guidelines specifically addressed.

Conflict of Interest

The Authors declare that they have no conflict of interests.

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