CORONARY ANEURYSM: CASE REPORT

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ABSTRACT

Introduction: True arterial aneurysms present as focal dilations greater than 1.5 times the normal diameter of the vessel due to elastin and collagen degeneration in the media layer of the arterial wall. The incidence of this condition is low in the general population, ranging from 0.2 to 5%. Objective: To present a case of an elderly female patient diagnosed with coronary aneurysm. Methodology: This is a case report, with retrospective data collection, from the medical record of the selected patient. A patient with a diagnosis of coronary aneurysm was included. Sociodemographic and clinical information, examinations performed, the chosen therapy and the outcome were collected. The search strategy for articles for the bibliographic review was carried out with the help of the Virtual Health Library (VHL), LILACS, PubMed and Scopus. The study followed the ethical guidelines for the development of research with human beings, in particular what is recommended in resolution 466/2012 of the National Health Council. Conclusion: The report of the present case contributed to highlight the clinical presentation of a coronary aneurysm in an elderly female patient, in addition to demonstrating the possible risk factors associated with this condition, as well as the diagnostic method and standard treatment.

KEYWORDS: ANEURYSM. CORONARY. ECTASIA. RISK FACTOR. HOSPITAL TREATMENT.

INTRODUCTION

Arterial aneurysms appear as focal dilations greater than 1.5 times the normal diameter of the vessel, due to degeneration of elastin and collagen in the middle layer of the arterial wall. The incidence of this condition is low in the general population, varying between 0.2 and 5% [18,2,4].

Aneurysms can be classified as saccular or fusiform. Sacular refers to a focal asymmetric bulge of the arterial wall with the remainder of the vessel circumference unaffected. Fusiform aneurysms are completely circumferential enlargements of the vessel wall. Aneurysms involving unusual sites, such as the iliac, femoral, popliteal, superior mesenteric and pulmonary arteries, rarely occur. [21]

In most cases, patients with coronary artery aneurysms have an asymptomatic clinical presentation, and the diagnosis is made based on an incidental finding during imaging tests. In symptomatic cases, this condition may present as acute coronary syndromes or assume other conditions, such as aneurysms of the ascending aorta or pulmonary trunk, pericardial cysts, cardiac tumors and thymomas. [2,23,4]

Coronary artery ectasia (CAE) is a rare phenotype of cardiovascular disease that can promote thrombosis and inflammatory responses leading to myocardial infarction due to abnormal dilation of blood vessels and disturbances of coronary blood flow. [7,12] Acute myocardial infarction is a specific type of coronary artery disease caused by the rupture of coronary atherosclerotic plaques [7].

CAE is a rare manifestation of coronary disease. The most common cause of CAE is atherosclerosis, localized areas of calcification and fibrosis, and the presence of large cholesterol crystals, which reduce the elasticity of the blood vessel wall and reduce its tolerance to intraluminal blood pressure, which leads to vessel expansion. and subsequent formation of aneurysms. [7,12,20]

The pathogenesis of coronary aneurysm is still not well understood, however, it is believed that in addition to genetic susceptibility and the association with atherosclerotic disease, there are other associated etiologies such as Kawasaki, Marfan, post-infectious and Iatrogenic after intracoronary manipulation. There is evidence in the literature that also demonstrates an association of this condition with microvascular dysfunction, causing myocardial ischemia even without significant stenosis. Thus, it is observed that coronary aneurysm may have acute coronary syndrome as its first manifestation, which may also be a differentiated diagnosis of myocardial infarction with non-obstructive coronary arteries. [23,6,29]

Coronary angiography remains the best method for identifying coronary artery aneurysms. This provides information about the location, size and shape of the aneurysm, but only visualizes the vessel lumen, thus contributing to underestimating its real size. Intravascular ultrasound corrects these limitations, providing transmural images and information about wall structure and luminal composition. Computed tomography coronary angiography provides rapid information about the location, shape, size and wall

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composition of coronary artery aneurysms, but this should be used more for patient follow-up. [22,13]

There is still no consensus for the medical treatment of this disease. Based on their mechanistic similarity with Loey's-Deitz syndrome, some studies have suggested beta-blockers and angiotensin receptor blockers for preventing arterial events. [21]

For the treatment of events related to atherosclerosis, smoking cessation, statin therapy, hypertension control and surgical correction are indicated. In the Aneurysm-Osteoarthritis syndrome, arthritic pain control and early elective surgical repair of the aneurysm are indicated. [21]

For the treatment of Kawasaki disease, aspirin, IV immunoglobulins and surgical repair are indicated. For the treatment of polyarteritis nodosa, steroids, drugs that modify the immune system, such as azathioprine or cyclophosphamide are indicated, and for the treatment of infectious aneurysms, antibiotics and emergency surgical repair are indicated. [21]

Given the above, this study will present a case of an elderly female patient diagnosed with coronary aneurysm.

METHODOLOGY

This is a case report, with retrospective data collection, from the medical record of the selected patient. A patient with a diagnosis of coronary aneurysm was included. Sociodemographic and clinical information, examinations performed, the chosen therapy and the outcome were collected. The search strategy for articles for the bibliographic review was carried out with the help of the Virtual Health Library, PubMed and Scopus. [21]

The study followed the ethical guidelines for the development of research with human beings, in particular what is recommended in resolution 466/2012 of the National Health Council.

CASE REPORT

Female patient, 66 years old, was admitted to the cardiology department at the Hospital do Hospital Evangélico Goiano, in May 2022, with typical severe chest pain, lasting more than 12 hours (late delta T), radiating to the cervical region and left upper limb.

The patient reports that the pain in question was triggered by exertion, also being related to associated nausea and vomiting. The past history identified arterial hypertension, hypothyroidism, former smoking and coronary artery disease (Acute Myocardial Infarction in 2012). She was still using atenolol, simvastatin, amiodarone 100mg, losartan and acetylsalicylic acid.

On physical examination, the patient had chest pain, tachypnea (RR 28 bpm), hypotensive (BP: 80/60 mmHg), crackling rales in the lower thirds of both hemithoraxes, regular heart rhythm, without the presence of S3, hypophonetic sounds and abdomen normotensive with bowel sounds present.

A chest pain protocol of the hospital unit in question was carried out, in which the electrocardiogram showed elevation of the ST segment, in the territory of the inferior wall. She underwent cardiac catheterization, which showed: dominant right coronary artery, with diffuse ectasia (with an aneurysm as the diagnostic hypothesis), followed by occlusion in the middle third with a high thrombus load. The distal bed is filled with heterocollaterals (diffusely compromised distal bed) (Figure 1). Left coronary trunk, large caliber and without obstruction. Anterior Descending Artery with ectasia in the proximal third followed by aneurysmal dilatation in the middle 1/3 (Figure 1). Diagonal artery without obstruction. The circumflex artery did not show obstructive lesions.

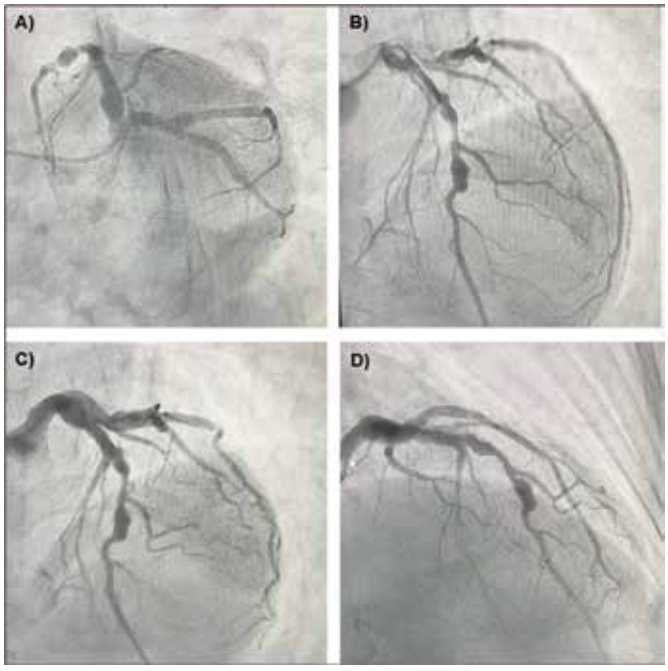

Figure 1: Cardiac catheterization

Regarding the left ventricular evaluation, normal volume, inferobasal and inferior akinesia, without left ventricular gradient, were demonstrated. The mitral valve does not allow reflux into the left atrium. No angioplasty performed. Optimized treatments for Acute Coronary Syndrome were prescribed, with consequent rheumatological/autoimmune screening for the alterations evidenced in the catheterization in question.

The patient evolved in the institution's Coronary Intensive Care Unit (CCU), in regular general condition, lucid and oriented, hemodynamically stable, without the need for vasoactive drugs/amines, eupneic on room air. Febrile, without the need for antibiotic therapy.

DISCUSSION

Aneurysms typically occur in the aorta and are rarely found in systemic arteries. For the aorta in men or in women, femoral and popliteal arteries, the diameters that require surgical intervention are 5.5, 5.0, 2.5 and 2.0 cm, respectively. [21,9,17]

Coronary artery ectasia (CAE) is a relatively rare condition, especially when it involves the left main coronary artery. Furthermore, it is even more unusual that this pathological process involves multiple coronary arteries. [3,12,7,25]

The right coronary artery is the most commonly affected in up to 85% of aneurysm cases, followed by the left circumflex and left anterior descending coronary artery (with up to 32% of aneurysm occurrences). Involvement of the left main coronary artery is extremely rare (0.1% of the population). The incidence of CAE can range from 0.3% to 5.3% (mean 1.65%). Men are more affected than women (2.2% vs. 0.5%). Coronary artery ectasia can be classified as type I (diffuse ectasia of two or more vessels); type II (diffuse ectasia in one vessel and localized disease in another vessel); type II (diffuse ectasia in only one vessel); and type IV (Localized or segmental involvement). [22,13,12]

In the classification of coronary artery dilation based on gross shape or structure, the saccular has the transverse diameter greater than the longitudinal dimension and the fusiform the longitudinal dimension is greater than the transverse diameter. [22,13,12]

In the classification of coronary artery dilation based on the composition of the vessel wall, in true aneurysm the vessel wall is composed of three layers: adventitia, media and intima, while in pseudoaneurysm the vessel wall is composed of one or two layers. Based on size, giant aneurysms (adults) are between > 20-150 mm in diameter and giant aneurysms (children) are greater than 8 mm in diameter. [22,13,12]

The etiology of coronary artery aneurysm varies depending on age, comorbidities and even geographic area. The etiology usually determines the presentation and treatment. [3,13,21]

CAE is often seen in association with atherosclerotic disease secondary to smoking, hyperlipidemia, and uncontrolled hypertension, which comprises nearly half of reported cases. The remaining cases of CAE are secondary to connective tissue sequelae or vasculitic coronary disorders (Ehlers-Danlos syndrome, scleroderma, neutrophil cytoplasmic antibody-related vasculitis, syphilitic aortitis, and Kawasaki disease). In addition, patients with CAE may have worse outcomes than the general population when they have signs and symptoms consistent with acute coronary syndromes. [13,7,12,21,9]

Atherosclerosis accounts for half of CAEs in the Western world, followed by congenital (17%) and infectious (10%) aneurysms. Kawasaki disease is the dominant cause of CAE in Japan. Inflammatory disorders and connective tissue diseases are usually associated with ectasias and are more frequent in younger patients. [13,7,12,21,9]

Iatrogenic causes include trauma resulting from balloon inflation pressure, intervention in acute myocardial infarction, use of non-steroidal anti-inflammatory drugs, steroids and anti-inflammatory colchicine, which can cause inadequate healing. Cocaine can cause severe hypertension and vasoconstriction, damaging the endothelium and promoting the formation of CAE. [22,13]

Thus, it is observed that the main risk factors for the development of thoracic aortic aneurysms are hypertension, smoking and chronic obstructive pulmonary disease (COPD). Nevertheless, aortic complications are influenced by these risk factors, as in the case of hypertension it has a strong association with acute aortic dissection, in addition, advanced age, history of smoking, hypertension and severe atherosclerosis contribute to dilations of the ascending aorta, age being the most important predictor of dilation. [19,5,15,14]

In the past history of the patient who had the case reported, it was identified that she had arterial hypertension, hypothyroidism, coronary artery disease (Acute Myocardial Infarction in 2012) and was a former smoker. In the literature, it is observed that coronary artery ectasia is often associated with atherosclerotic disease secondary to smoking, hyperlipidemia and uncontrolled hypertension, which comprises almost 50% of reported cases. [14,12,21,17]

CAE can be diagnosed by non-invasive and invasive techniques such as echocardiography, computed tomography (CT), magnetic resonance imaging (MRI) and coronary angiography. Coronary angiography is the gold standard for providing information about size, shape and location and is also useful for planning the surgical resection strategy. The natural history and prognosis remain unclear. However, this is invasive with associated risks, in addition to being expensive and the actual size of coronary aneurysms can be underestimated if they contain a substantial amount of thrombus.

Among the non-invasive modalities, coronary CT is an alternative to invasive coronary angiography that can be suggested as the technique of choice for the follow-up of patients with CAE due to improvements in terms of radiation dose with current protocols. However, this modality may have limitations in demonstrating clots or thrombi within the vessel, in delineating the distal part of the coronary arteries, and in simulating a large coronary aneurysm as a non-homogeneous mass because of the turbulence of the blood within it. [19,22]

Coronary magnetic resonance angiography is another non-invasive technique, it also avoids the large dose of radiation associated with coronary CT. However, this modality has its limitations; is not available in all medical centers, has inferior spatial resolution compared to coronary CT angiography, and does not show the characteristic linear

peripheral calcifications of CAE, which are essential for correct diagnosis. [19,22]

Intravascular ultrasound has become the new "gold standard" technique for producing transluminal images of the coronary arteries, including information on lumen composition and arterial wall structure. This method is very useful to differentiate true from false aneurysms caused by plaque rupture. [19,22]

No distinctive clinical characteristic of CAE has yet been shown in the literature. However, chest pain, suggestive of stable angina, is the most frequent presentation in patients with this condition (as was also observed in the patient who had the case reported here). In addition, patients with this condition may experience ST-segment elevation myocardial infarction, non-ST-segment elevation myocardial infarction, sudden cardiac death, or complications such as thrombus formation, embolization, fistula formation, rupture, hemopericardium, tamponade, compression of surrounding structures or congestive heart failure. [22]

Overall, the management of CAE still represents a significant challenge due to the paucity of evidence supporting a specific treatment strategy. The treatment of CAE remains a difficult clinical issue and the decision on therapy must be individualized, taking into account the anatomical and clinical risk factors of each patient. [12]

Nevertheless, any symptomatic or complicated aneurysm should be treated surgically, regardless of size. Medical therapy for all arterial aneurysms strongly depends on accurate diagnosis and etiological classification. [21]

Surgical management is mandatory in symptomatic patients with obstructive coronary artery disease or evidence of embolization leading to myocardial ischemia and in patients with coronary aneurysm at risk of rupture. Several surgical strategies have already been described in the literature, including resection, aneurysm ligation, marsupialization with interposition graft, and coronary artery bypass graft surgery. [19,22,13,12,21]

In symptomatic patients unsuitable for percutaneous coronary intervention, surgical excision or CAE ligation combined with bypass grafting of the affected coronary arteries is the option of choice. Nevertheless, the surgical approach is considered safer and more reliable for repairing an CAE/pseudoaneurysm. Percutaneous therapy includes stent placement and/or coiling. [19,22,13,12,21]

Indications for surgical treatment of CAE in general are:

- Severe coronary artery disease;
- CAE near bifurcation of large branches;
- Evidence of embolism from the aneurysm to the distal coronary bed resulting in myocardial ischemia;
- Progressive increase of an CAE documented by serial angiographic measurements;
- Complications such as fistula formation;
- Compression of the heart chambers;
- Giant CAE (dilation exceeding the diameter of the reference vessel by > four times).

CAE can complicate about 4% of coronary interventions. The suggested pathogenesis of stent-related aneurysm formation is multifactorial. In the literature, it was observed in a six-year follow-up study that the post-treatment mortality rate can reach up to 4.3% of cases. [25]

CONSIDERAÇÕES FINAIS

Dominant right coronary artery with diffuse ectasia is an uncommon condition, but its risk factors associated with the development of thoracic aortic aneurysms include hypertension, smoking and chronic obstructive pulmonary disease. Furthermore, aortic complications are influenced by these risk factors. Hypertension and advanced age are the risk factors that contribute to a greater number of complications in this condition.

In our institution, the patient was diagnosed through cardiac catheterization, following the institutional protocol; however, the literature has recommended intravascular ultrasound as a diagnostic method because it produces information about the composition of the lumen and the structure of the arterial wall, in addition to being invasive.

In asymptomatic patients with aneurysms and those approaching the threshold for surgical intervention, imaging should be performed every six months until the surgical threshold is reached or the dimensions remain stable. However, regardless of the aortic dimensions, symptomatic patients should be referred for surgery.

Appropriate surgical management is still not well defined in the literature, in the patient who had the case reported, optimized treatments for Acute Coronary Syndrome were instituted, with consequent rheumatological/autoimmune screening for the alterations evidenced in the catheterization in question. However, in the literature, several surgical strategies have been indicated, including resection, aneurysm ligation, marsupialization with interposition graft and coronary artery bypass graft surgery, however, medical therapy for all arterial aneurysms strongly depends on the accurate diagnosis and etiological classification, in addition, of course, to the protocols recommended by each institution.

And finally, the patient had a good evolution, remaining hospitalized in the Coronary Intensive Unit, without the need to use vasoactive drugs/amines. What is observed in the literature is that there is a low rate of complications from coronary artery ectasia and there is also a low post-treatment mortality rate, which can reach up to 4.3% of cases, which is why regular follow-up after treatment is important after hospital discharge.

Thus, the report of the present case contributed to highlight the clinical presentation of a coronary aneurysm in an elderly female patient, in addition to demonstrating the possible risk factors associated with this condition, as well as the proposed diagnostic method and treatment.

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