

Coronary aneurysm: incidental finding

Aneurisma coronario: hallazgo incidental

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ABSTRACT

Coronary artery aneurysm is a rare entity in the general population. We present the case of a 51-year-old male patient with unstable angina, in whom an aneurysm of the anterior descending coronary artery was identified during percutaneous coronary intervention. The surgical treatment consisted of ligation, resection, and coronary revascularization, achieving a satisfactory recovery. The patient was discharged on the 5th postoperative day. Aneurysmal surgery is crucial in the management of true aneurysms, particularly in symptomatic patients, as a preventive and optimal measure.

Keywords: aneurysmal surgery, coronary artery aneurysm, coronary artery ectasia, coronary revascularization, percutaneous coronary intervention, unstable angina.

Abbreviations:

AF = atrial fibrillation
AV = atrioventricular
CT = computed tomography
ECG = electrocardiogram
ICU = Intensive Care Unit
LVEF = left ventricular ejection fraction
PCI = percutaneous coronary intervention
TEE = transesophageal echocardiogram

Coronary aneurysms are characterized by focal arterial dilatations that preserve the integrity of the vessel wall, comprising its three distinct layers (intima,

RESUMEN

El aneurisma de la arteria coronaria es una entidad rara en la población general. Presentamos el caso de un paciente masculino de 51 años con angina inestable, en quien se identificó un aneurisma de la arteria coronaria descendente anterior durante la intervención coronaria percutánea. El tratamiento quirúrgico consistió en ligadura, resección y revascularización coronaria, logrando una recuperación satisfactoria y siendo dado de alta cinco días después. La cirugía aneurismática es fundamental en el tratamiento de aneurismas verdaderos, especialmente en pacientes sintomáticos, como medida preventiva y óptima.

Palabras clave: cirugía de aneurisma, aneurisma de las arterias coronarias, ectasia de las arterias coronarias, revascularización coronaria, intervención percutánea coronaria, angina inestable.

media, and adventitia), within a specific arterial segment.¹ The reported incidence of coronary aneurysms varies considerably, with studies citing a prevalence of up to 5%, and a notable predilection for male patients.¹ A widely accepted criterion for defining an aneurysm is a diameter exceeding 1.5 times the normal size of the adjacent segment of the same coronary artery.² Various risk factors have been identified, including advanced age, atherosclerosis, vasculitis, autoimmune disease, Kawasaki disease, Takayasu arteritis, and a history of cardiac catheterization with stent placement.^{2,3}

Coronary aneurysms can occur at various locations, but they are particularly prevalent in the left anterior

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descending coronary artery, especially in proximal segments. This predilection is attributed to increased stress during systole and a higher density of arterial branches in these regions.³ Aneurysms can be further classified based on their morphology, specifically the largest diameter of the aneurysmal sac. Saccular aneurysms are characterized by a transverse diameter exceeding the longitudinal diameter, whereas fusiform aneurysms exhibit a longitudinal diameter that surpasses the transverse diameter.¹

Establishing a diagnosis poses a significant challenge, as most patients are asymptomatic and coronary aneurysms are often discovered incidentally. Diagnostic modalities such as coronary angiography and coronary computed tomography (CT) are available, typically detecting these lesions incidentally. CT scans offer the added advantage of assessing aneurysm size, thrombosis, and arterial calcification, providing valuable insights for clinical management.²

Clinically, patients with coronary aneurysms may present with acute coronary syndrome, the severity of which depends on the size and location of the affected coronary segment. Reported symptoms include dyspnea, angina, vertigo, and in severe cases, cardiac tamponade secondary to rupture or arterial embolization, which can lead to cerebral infarction.^{1,2}

Managing asymptomatic patients poses a considerable challenge. According to some authors, surgical intervention is warranted in patients with severe coronary artery stenosis, fistulas, cardiac tamponade or compression, high risk of rupture, or aneurysms that develop after cardiac catheterization.³

Currently, there are no well-established or substantiated criteria for determining the optimal treatment approach, either medical or surgical, for asymptomatic patients.³

Surgical treatment is the cornerstone for patients presenting with clinical signs or complications. However, for asymptomatic patients, consideration should be given to established indications for surgical intervention, including aneurysm size (> 20 mm or > 4 times the diameter), concomitant valvular disease, aneurysms located near major branch bifurcations (e.g., left main trunk), and compression of adjacent vascular or cardiac structures. These criteria can help guide more objective surgical decision-making in asymptomatic patients. Conversely, some authors advocate for percutaneous coronary intervention (PCI) in patients with smaller aneurysms (< 10 mm) without involvement of the left coronary bifurcation. Additional treatment options include antiplatelet therapy, such as aspirin or clopidogrel, and statins to mitigate potential complications. Nevertheless, despite ongoing efforts, the optimal treatment strategy for patients with coronary aneurysms remains to be fully elucidated.^{4,5} Treatment modalities for coronary artery aneurysms encompass ligation, resection, and revascularization. Nevertheless, further research is warranted to develop more

tailored medical-surgical approaches for individual patients, highlighting the need for continued investigation in this area.³⁻⁶

CLINICAL CASE

A 51-year-old male patient with a 21-year history of systemic arterial hypertension, currently under treatment, and a history of smoking, presented with progressive dyspnea with moderate to severe exertion, paroxysmal nocturnal dyspnea, and symptoms of heart failure, including dry cough and lower extremity edema. Six months later, physical examination revealed a grade IV holosystolic murmur in the mitral valve region. Diagnostic testing included an electrocardiogram (ECG) showing mitral valve prolapse, left ventricular hypertrophy, and a chest X-ray indicating grade two cardiomegaly. A subsequent echocardiogram performed one month later showed a left ventricular ejection fraction (LVEF) of 48%, severe mitral regurgitation, eccentric left ventricular dilatation and hypertrophy, extensive akinesia of the inferolateral and basal inferior segments, and posterior mitral valve prolapse. In May 2024, the patient presented to the emergency department with symptoms of decompensated heart failure. An ECG revealed atrial fibrillation (AF) with a QRS complex duration of 100 ms, a QRS axis of 0° , and various voltage criteria for left ventricular hypertrophy, as well as a prolonged QTc interval of 508 ms. The AF was successfully converted to sinus rhythm using the antiarrhythmic drug amiodarone. A transesophageal echocardiogram (TEE) was subsequently performed, which diagnosed severe Carpentier IIIA mitral regurgitation, LVEF of 45%, generalized hypokinesia, and moderate tricuspid regurgitation. Selective coronary angiography was then performed, which revealed a focal type 3 aneurysm in the mid-segment of the left anterior descending coronary artery, measuring 20×9 mm (*Fig. 1*) (*Fig. 2*). The angiographic diagnosis was a focal aneurysm in the left anterior descending artery, dilated cardiomyopathy with mildly reduced LVEF, and moderate to severe mitral regurgitation. Based on these findings, it was decided to proceed with cardiac surgery, including mitral valve replacement with a 33-mm mechanical prosthesis and, concomitantly, coronary artery bypass grafting or left anterior descending artery plasty.

Cardiac surgery was performed. A standard sternotomy and conventional cardiopulmonary bypass were performed through the ascending aorta and bicaval cannulation. Surgical inspection revealed a focal aneurysm of the left anterior descending coronary artery in the middle third of segment 6, measuring 3 cm in length and 1 cm in diameter (*Fig. 3*). Furthermore, the mitral valve was retracted in the P3 segment and prolapsed in the A1-A2 segments. A 300-ml pericardial effusion was observed. The aneurysm was dissected and a 3-cm arteriotomy was performed, followed by resection and



Figure 1: Left anterior descending coronary artery in the middle segment with focal aneurysm.



Figure 2: Catheterization of left anterior descending artery with giant aneurysm.

plication (*Fig. 4*). The anterior leaflet of the mitral valve was resected, and a 33-mm mechanical mitral valve was implanted using the conventional technique, verifying its correct opening and closing. After aortic unclamping, atrioventricular (AV) block was observed, prompting the insertion of an epicardial pacing lead. Two chest tubes were also placed. Finally, sternal closure was performed with multiple guidewires.

The patient was admitted to the Intensive Care Unit (ICU) with invasive mechanical ventilation, receiving dual vasopressor and inotropic agents, with an epicardial sentinel pacemaker, and an ECG in sinus rhythm, complete left bundle branch block, and bilateral mediastinal tubes. During his ICU course, he presented hemodynamic instability and a paroxysm of atrial fibrillation, so he was started

on antiarrhythmic therapy with amiodarone, lidocaine, and magnesium sulfate, with an adequate response. He subsequently remained hemodynamically stable without the use of vasopressors or inotropes, and extubation was successful. Elective left anterior descending coronary angiography revealed a type 3 irregular tubular and concentric mid-segment lesion, with a maximum residual stenosis of 50% at the bifurcation of the first diagonal branch and TIMI 3 distal flow. The decision was made to discharge him from the ICU. The following day, the patient presented with oppressive chest pain at rest lasting 40 minutes with ST-segment depression in V2-V4. A cardiac biomarker waveform was performed, resulting in a troponin I level of 2.13 ng/ml. He did not show any characteristic signs of myocardial injury, although he did present alternating AF with a heart rate of 35-37 bpm. A 24-hour Holter monitor was performed, which did not show any AF paroxysms. The patient was ultimately discharged and received cardiac rehabilitation follow-up.

COMMENT

Optimal treatment for patients with coronary artery aneurysms undoubtedly poses a significant challenge. In symptomatic patients, ligation, resection, and revascularization are generally preferred to prevent complications and mortality.^{1,2} However, asymptomatic patients with coronary aneurysms present a dilemma regarding the best treatment approach and timing of surgical intervention. According to some authors, surgical treatment is preferred to avoid medium-

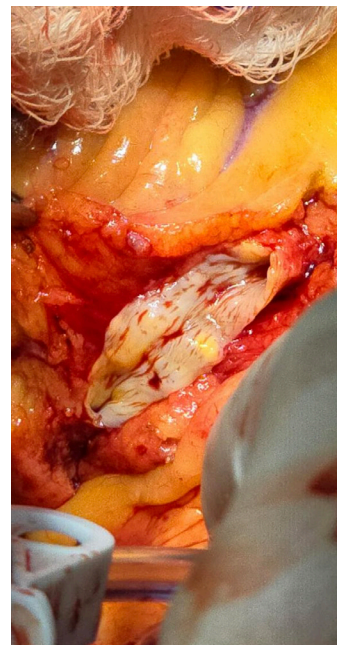
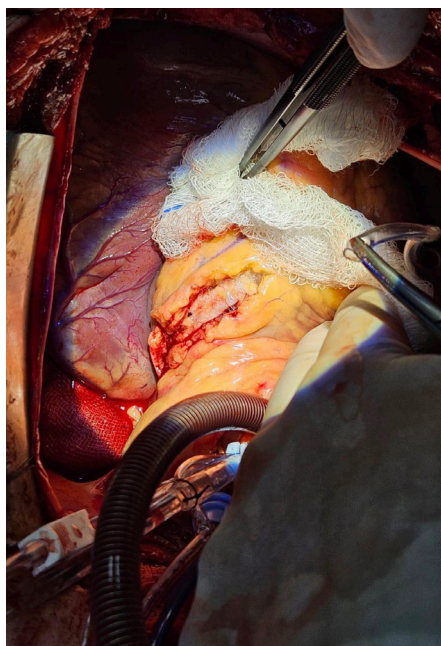


Figure 3:

Focal aneurysm of the left anterior descending coronary artery, 3 cm in length, in the middle third.

**Figure 4:**

Arteriotomy and plasty.

or long-term complications.^{3,6} As previously mentioned, there is a lack of concrete data to guide surgical intervention in asymptomatic patients with coronary aneurysms. Nevertheless, the American College of Cardiology recommends considering aneurysm size, location, and individual risk factors when determining the optimal treatment strategy, advocating surgical resection in patients with giant aneurysms (> 20 mm or > 4 times the vessel diameter) or aneurysms located in the left main coronary artery.⁴ Other authors propose similar criteria for asymptomatic patients with incidental aneurysms, recommending surgical treatment in cases of concomitant valvular disease, aneurysms near bifurcations of major branches, multiple or giant aneurysms, or rapid aneurysm growth.⁵ When considering medical treatment and follow-up for asymptomatic patients, it is still unclear which patients would benefit most from this approach; however, individual risk factors should be carefully assessed to prevent fatal complications. In this case, resection, arteriotomy, and plication were performed without revascularization. The

reasoning for not performing revascularization was that the patient was not present with coronary artery stenosis at the time of surgery. Ultimately, a satisfactory outcome was obtained despite the lack of a literature describing a gold standard procedure or technique.

CONCLUSIONS

In this patient, a surgical approach involving ligation, dissection, and arteriotomy was employed due to the symptomatic presentation and large size of the aneurysm, which was complicated by valvular involvement, thereby increasing the risk of complications. A multidisciplinary approach is essential in managing this type of pathology, ensuring timely and optimal treatment to achieve the best possible outcome. Further research and development of standardized algorithms are necessary to inform evidence-based treatment planning and guide clinical decision-making.

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