

Coronary Artery Aneurysm and Ectasia: A Case Report and Overview of Literature

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Abstract

Coronary artery aneurysm or ectasia is a rare disease that is found incidentally in most cases but can lead to a number of complications, including myocardial infarction, stable angina, compression of adjacent anatomical structure, and cardiac tamponade. In this article, we discussed the case of a middle-aged male patient who presented to the hospital with chest discomfort along with EKG changes and was found to have a coronary artery aneurysm of multiple vessels that was treated with anticoagulation, and the patient did not have any recurrence of symptoms on long-term follow-up. We also briefly discussed our understanding of the etiology, diagnosis, and different management options of coronary artery aneurysm after reviewing the literature.

Keywords: Coronary Artery Aneurysm (CAA); Angiotensin-Converting Enzyme (ACE); Coronary Computed Tomography Angiography (CCTA)

Introduction

The first mention of coronary dilation on autopsy was found in the literature by Morgagni in 1761, who discovered coronary dilation in syphilitic patients, and the first demonstration of coronary artery aneurysm on angiography was done by Munker in 1958 in patients of Kawasaki disease [1,2]. Now, with the availability of advanced medical diagnostic technologies, number of reported cases and our understanding of the etiology and natural course of this rare disease has been increased.

Definition and epidemiology

A coronary artery aneurysm is defined as an aneurysmal or focal dilatation of the coronary artery with a diameter > 1.5 times the adjacent normal coronary artery. On the other hand, coronary

artery ectasia is defined as diffuse dilation that is more than one-third of coronary artery length and 1.5 times greater than adjustment normal segment [3]. There are different shapes of coronary aneurysm. Coronary pseudoaneurysm is defined when all three layers of vessels are not involved. Other types of coronary aneurysms are saccular, fusiform (Longitudinal diameter more than transverse diameter) and large coronary artery aneurysm (size usually > 8 mm), and giant coronary artery aneurysm (> 20 mm). Coronary artery aneurysm prevalence is between 0.3% to 5.0%. It is more predominantly in males [3,4]. Among coronary arteries, right coronary artery (RCA) is most affected vessel, about 40%, followed by Left anterior descending (LAD), which is about 32%, and involvement of left main is lowest, which is 3.5% [5].

Etiology and risk factors

Congenitally coronary artery aneurysm or ectasia is very rare. If it is present, it is frequently associated with other cardiac abnormalities like a bicuspid aortic valve, aortic root dilation, VSD, or pulmonary stenosis. Angiotensin-converting enzyme (ACE) genotype polymorphism seems to be a potential risk factor for the development of coronary artery ectasia. Interestingly patients with familial hypercholesterolemia have more incidence of coronary artery ectasias. Among acquired causes, atherosclerosis is most common followed by Kawasaki disease, other notable causes are infectious and mycotic aneurysms, connective tissue disease like Marfan syndrome, rheumatological diseases like poly arteritis nodosa (PAN), temporal arteritis and SLE. A coronary aneurysm can also be iatrogenic in nature, following percutaneous coronary intervention (PCI), use of brachytherapy and atherectomy. Risk factors for coronary artery disease include smoking, male gender, substance abuse, especially cocaine [7-11,16,23].

Clinical presentation and diagnosis

Many coronary artery ectasias or coronary artery aneurysm are asymptomatic and found incidentally but sometimes coronary artery aneurysm can also present with myocardial ischemia and infarction as in our case explained below. If the aneurysm is very large, it can compress the adjustment structure and cause mass effects, and that can be presenting complaints also. Rarely coronary artery aneurysms can rupture, leading to cardiac tamponade that can be fatal. Coronary artery aneurysm can also cause stress-induced myocardial ischemia because of microvascular dysfunction in affected vessels [13-15]. Modalities available to diagnose coronary artery aneurysm include coronary angiogram, echo, and CCTA (Coronary Computed Tomography Angiography). Coronary angiogram alone is not very ideal for evaluation of coronary artery aneurysm because of slow forward flow due to stasis of blood. Use of IVUS (intravascular ultrasound) along with coronary angiogram is very helpful in differentiating pseudo from a true aneurysm and for accurate assessment of the exact size of coronary artery aneurysm especially for intervention purposes. CCTA is also a particularly good imaging modality for the evaluation of coronary artery aneurysm and can better evaluate the size of CAA. Echocardiography can detect coronary aneurysm only if it involves the very proximal segment [17,18,27,30].

Case Presentation and Discussion

The patient was a 37-year-old male with a past medical history significant for hypertension and obesity admitted to the hospital

with typical left-sided chest pain from the last two days. On blood work-up patient was found to have elevated troponin 0.105 ng/mL. Blood work also showed hyperlipidemia with LDL of 132 and total cholesterol of 203 mg/dl. Although the patient EKG showed non-specific ST-changes but on echo because of wall motion abnormality it was decided to take patient for a left heart catheterization. Left heart catheterization (LHC) showed a significant thrombus burden in mid LAD with TIMI-3 flow. The right coronary artery was a large ectatic vessel > 9 mm with thrombus in the distal segment and TIMI-3 flow distally. Left main, left circumflex, ramus was normal vessel angiographically. At that time, a decision was made to start the patient on Integrelin drip for 48-hour and reevaluate him with repeat coronary artery catheterization. Dual antiplatelet therapy was initiated. The patient had a repeat left heart catheterization after 48-hours that again showed thrombus in LAD and RCA with TIMI-3 flow. Because of TIMI-3 flow, it was decided not to use the Angio Jet for thrombus extraction due to the risk of distal embolization. Because of the presence of thrombus and large ectatic vessels, it was decided to start the patient on warfarin and aspirin. Clopidogrel was discontinued. The patient did not have any events during the hospital course, and he was discharged home. The patient continues to follow up in the outpatient cardiology clinic for the last two years with good exercise capacity and without any recurrence episode of chest pain. In addition to aspirin and warfarin patient was started on statin and target LDL was achieved.

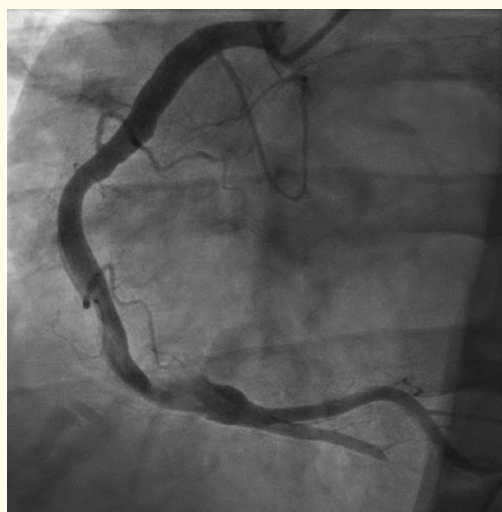


Figure 1: Coronary angiogram of patient showing ectasia of right coronary artery with thrombus.

Management

Management of coronary artery aneurysm continues to be very challenging and depends upon patients' symptoms. Risk factors modification, especially for atherosclerotic diseases like control of diabetes and hyperlipidemia, is important. Most of the medical management strategies is derived from the treatment of Kawasaki disease. General rules are NSAIDs should be avoided, and medications that can increase the risk of thromboses like oral contraceptive pills and bromocriptine should also be avoided. ACE (Angiotensin Converting Enzyme) inhibitors and beta-blockers can have beneficial effects. Vasodilators such as nitrate can be potentially harmful. The role of antiplatelet agent and anticoagulation is not very clear, especially if a coronary artery aneurysm is found incidentally. Many factors can play a role in the choice of antiplatelet or anticoagulation, especially the size of aneurysm, presence of thrombus, presence of obstructive disease, and a risk factor for anticoagulation. Previously studies showed anticoagulation might not be beneficial. But a recent study by Doi T showed that patients who were treated with warfarin have no MACE event which was happened in 33% who was not on warfarin, another study in Kawasaki disease patients of the pediatric population showed in case of giant coronary artery aneurysm, i.e., size more than 8 mm warfarin plus aspirin showed lesser adverse event as compared to aspirin monotherapy. Given not very clear data, it seems reasonable to reserve coagulation for those who have a large or aneurysm in size > 8mm or have recurrent event despite being on dual antiplatelet therapy. There is no data about the use of a novel anticoagulation agent [6,19,24,28,29].

Role of percutaneous intervention

In asymptomatic patients' role of percutaneous intervention is not very clear, and intervention to exclude coronary artery aneurysm should be performed if there is more risk of rupture i.e. large saccular aneurysm. Percutaneous intervention to exclude coronary artery aneurysm includes using of covered stent and coil embolization. Many factors play a crucial role in selecting the type of approach, including location of aneurysm, risk of jailing side branch, and size of aneurysm. In the case of acute coronary syndrome, PCI and coronary artery aneurysm is associated with a low procedure success rate with more risk of no-reflow phenomena due to the risk of distal embolization. So, it's advisable if the flow can be restored using thrombectomy and GP IIb/III A inhibitors like Integrin intervention should be avoided [6,21-23].

Role of surgery

If a coronary artery aneurysm cannot be treated percutaneously, a surgical approach is a reasonable option, especially in a large saccular aneurysm. Different surgical procedures can be used includes aneurysm resection, aneurysm thrombectomy, and proximal close distal ligation with end-to-end anastomosis of the coronary artery [24,25].

Conclusion

Coronary artery aneurysm severe disease, but with advancement in imaging modalities, incidence and prevalence has been increasing. The exact pathophysiological mechanism is still not very well understood. The etiology can be multifactorial, but Kawasaki disease in young individuals and atherosclerosis and history of percutaneous intervention are important causes in the older population. Regarding management, there are no very specific guidelines, but it should be on a case-by-case basis, and the use of multimodality imaging can be helpful to management.

Conflicts of Interest

None.

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