Management of Coronary Artery Aneurysm with Anticoagulation: A Case Report

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- **Introduction:** Coronary artery aneurysm (CAA) is a rare condition involving abnormal dilatation of the coronary arteries. While atherosclerosis and vasculitis (such as Kawasaki disease) often affect multiple vessels, congenital and iatrogenic CAAs typically involve a single artery. We report the case of a patient with diffuse coronary artery aneurysmal dilatation who presented with angina. The patient was managed conservatively with anticoagulation and followed for four years, during which time chest pain symptoms improved significantly.

- **Case representation:** 65-year-old man with hypertension, hyperlipidemia, prediabetes, and a history of smoking was referred for preoperative evaluation. He has chest discomfort. EKG and Echocardiogram are unremarkable. Nuclear stress testing revealed a small area of reversible ischemia. Coronary angiography demonstrated diffuse coronary artery aneurysmal dilation without significant stenosis with sluggish flow. Treated with anticoagulation and follow up 4 years later with resolved angina.

- **Discussion:** The patient was suspected of having Kawasaki disease as an underlying etiology for the development of diffuse coronary artery aneurysms (CAA). Coronary angiography remains the gold standard for diagnosing CAA and was performed in this case. Given the large aneurysmal size (≥ 8mm) and associated high risk of thrombosis and embolization, anticoagulant therapy was initiated [(1)] . Ongoing follow-up is required to monitor treatment effectiveness and long-term outcomes.

- The reported incidence of coronary aneurysms ranges from 0.3% to 5%. They are more common in men than women and tend to affect the proximal segments of the coronary artery more than the distal parts [2]. Various causes have been identified, with atherosclerosis and vasculitis being the most common. Most cases of CAE are silent. However, when there is also obstructive atherosclerosis or local thrombosis, patients can develop symptoms such as angina or acute coronary syndrome.
- Managing both symptomatic and asymptomatic CAA is challenging because there are no randomized trials or large studies to guide treatment. Given these limitations, treatment should be tailored to each patient based on the location and shape of the CAA.

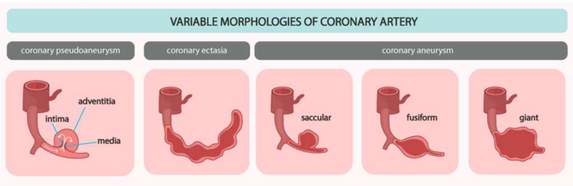

Figure 1. Possible morphologies and clinical manifestations of aneurysmal dilatation of coronary arteries. White arrow indicates the blood flow. (http://mdpi.com/2227-9059/12/9/1984)

CASE PRESENTATION

- A 65 -year-old man was referred to our clinic for a preoperative examination. He has multiple risk factors for cardiovascular disease, including hypertension, hyperlipidemia, prediabetes and remote smoking. He also complained about chest discomfort. EKG on demonstrated sinus rhythm with nonspecific ST - T change (Figure 2)

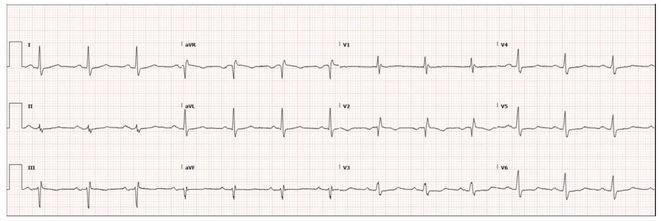

Figure 2: EKG with sinus rhythm and nonspecific ST – T change

- A nuclear stress test showed a small area of moderate-intensity reversible ischemia in the inferolateral wall, though inferior attenuation could not be ruled out. An echocardiogram showed moderate concentric left ventricular hypertrophy with hyperdynamic systolic function. The ejection fraction was 70%. Because of his chest discomfort, abnormal stress test results, and multiple risk factors for coronary artery disease, a coronary angiogram was performed for further evaluation.
- The angiogram showed that the **left main trunk** was very large, measuring **about 6–8 mm** in diameter, and it bifurcated into the LAD and LCx. There was no disease seen in the left main artery. The left anterior descending (LAD) artery was also very large and gave rise to a small diagonal branch and a medium-sized second diagonal branch. No significant narrowing was found in the LAD or its diagonal branches, but blood flow in the LAD was sluggish with a low TIMI flow grade. The circumflex (LCx) artery was large, with no significant stenosis. The **right coronary artery (RCA)** was also very large, **about 10 mm in diameter**, with no significant narrowing. It gave rise to a normal PDA (posterior descending artery) without any significant disease (Figure 3).

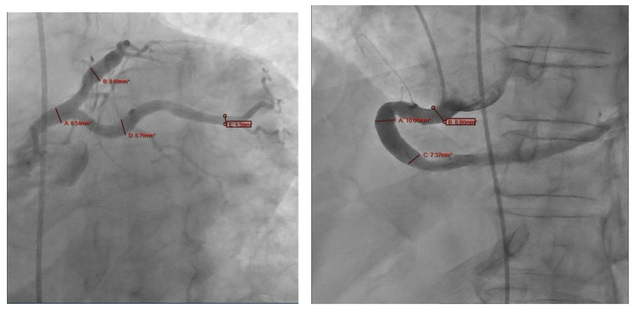

Figure 3: Figure 3.1 The left main trunk, LAD, and circumflex artery are enlarged. Figure 3.2 the right coronary artery is enlarged.

- The diagnosis of diffuse coronary artery aneurysm (CAA) dilation was confirmed. The lipid panel showed: cholesterol 183, triglycerides 203, HDL 36, and LDL 111. The likely cause of the dilated CAA is Kawasaki disease; however, atherosclerosis remains a potential cause. Treatment with apixaban 5 mg twice daily was started, but patient refused statin . Four years later, the patient continues to follow up at our clinic with resolve angina.

DISCUSSION

- The reported incidence of coronary aneurysms ranges from 0.3% to 5%, with predilection to men more than to women (2). In contemporary studies, the incidence of true CAA is <1% (3-5). The right coronary artery is usually the most affected artery (40%) followed by the left anterior descending (32%), and the left main being the least affected artery (3.5%) (6). Atherosclerosis in adult and Kawasaki disease in children are the primary causes of coronary artery aneurysms (CAAs).
- Regarding medical treatment, the use of anticoagulation in atherosclerosis is still unclear. Some retrospective studies have shown similar event rates in patients with and without CAE, suggesting that anticoagulation might not be necessary 11-13 . However, other studies revealed contradictory results 14. There is limited evidence that anticoagulation reduces thrombotic events in patients with Kawasaki disease. Consequently, current guidelines recommend anticoagulation only for selected patients with large or rapidly expanding coronary artery aneurysms (CAA). The recent AHA scientific statement highlights a size-based approach: for giant aneurysms (≥10 mm) or those with an absolute dimension ≥8 mm, anticoagulation with agents such as DOACs or warfarin is advised, often in combination with dual antiplatelet therapy.

Case-Specific Features

- The patient in this case report was found to have diffuse coronary artery aneurysm (CAA) dilation during a preoperative examination. He experienced chest discomfort. The EKG and echocardiogram were normal, and the nuclear stress test showed mild, reversible ischemia in the inferior lateral wall. The angiogram revealed diffuse CAA dilation in the left main trunk, LAD, LCx, and RCA. The two most common causes of diffuse CAA dilation are atherosclerosis and Kawasaki disease. Given the patient's lipid panel indicating mild hyperlipidemia, Kawasaki disease is suspected as the cause.
- The treatment with anticoagulation for dilated CAA is still unclear, regardless of whether the cause is atherosclerosis or Kawasaki disease. According to current guidelines, anticoagulation is only recommended for Kawasaki disease if there is a large or giant aneurysm. However, this is a class IIA recommendation, meaning it should be considered based on the clinical situation1,18. In our case, the angiogram showed slow flow in the LAD with a low TIMI score. Therefore, we decided to start the patient on anticoagulant therapy with Apixaban 5 mg twice a day. The patient is required to follow up annually, and after four years, he reports no symptoms. This case suggests that anticoagulation can be beneficial for patients with diffuse dilated CAA.

Risk Level	Antiplatelet Therapy		Anticoagulation	
	2017	2024	2017	2024
5 - Giant aneurysm (z≥10) or absolute dimension ≥8 mm				
5.1 Persistent (z≥10)	ASA, may consider clopidogrel	ASA, may consider clopidogrel	Reasonably indicated	Warfarin, LMWH, or DOAC
5.2 Regressed to medium (z≥5, <10)	ASA, clopidogrel reasonably indicated	ASA, may consider clopidogrel	Not indicated	Warfarin, LMWH, or DOAC may be considered
5.3 Regressed to small (z≥2.5, <5)	ASA	ASA, may consider clopidogrel	Not indicated	Not indicated
5.4 Regressed to dilated/normal (z<2.5)	ASA reasonably indicated	ASA	Not indicated	Not indicated

Figure 4: Updates in Thromboprophylaxis for Kawasaki Disease

- This case shows that Kawasaki disease can occur in adults and lead to diffuse coronary artery aneurysms (CAA). The best way to diagnose this condition is through coronary angiography. Anticoagulant treatment may be beneficial for these patients. Long-term follow-up is important to monitor the patient's symptoms.

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