Case report

Chronic Coronary Syndrome Revealing a Proximal Left Anterior Descending Artery Aneurysm: A Case Study and Literature Review

ABSTRACT

Context: Coronary artery aneurysms (CAA) are rare entities associated with significant clinical consequences, including thrombotic occlusions. Chronic coronary syndrome (CCS) may reveal CAA, complicating patient management, particularly when associated with coronary thrombosis. This case discusses a 55-year-old male presenting with angina and dyspnea, later found to have a proximal left anterior descending artery (LAD) aneurysm with thrombotic occlusion.
Case Presentation: A 55-year-old male with a history of hypertension, diabetes, and hyperlipidemia presented with exertional chest pain and dyspnea over three months. Coronary angiography revealed a large proximal LAD aneurysm with thrombotic occlusion of the mid-LAD. Initial management included thrombo-aspiration and stent placement, followed by dual antiplatelet therapy (DAPT). Despite recanalization, the patient developed a no-reflow phenomenon, managed with vasodilators and anticoagulation.
Conclusion: CAA can complicate the course of coronary syndromes, especially when associated with thrombosis. Percutaneous intervention can be successful, but complications like reocclusion and no-reflow may require intensive management strategies.

Keywords: Chronic Coronary Syndrome; Proximal Left Anterior Descending Artery Aneurysm; A Case Study; Literature Review.

1. INTRODUCTION

Takayasu arteritis is a chronic large-vessel vasculitis that predominantly affects the aorta and its major branches. It primarily impacts young women and can lead to severe complications, including ischemic strokes and coronary involvement. Coronary arteritis is a

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rare but serious complication, often leading to acute coronary syndromes. Here, we present a case of Takayasu arteritis revealed by ischemic stroke and complicated by coronary arteritis.

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2. CASE PRESENTATION

A 55-year-old male with a history of type 2 diabetes mellitus, hypertension, and dyslipidemia presented with chest pain and exertional dyspnea (NYHA class II) over three months. Physical examination was unremarkable, with no signs of heart failure or other notable findings.
A 12-lead ECG showed no acute ischemic changes. Transthoracic echocardiography (TTE) demonstrated a left ventricular ejection fraction (LVEF) of 50%, with severe hypokinesia of the apex, anterior, and septal walls, but no evidence of a thrombus or valvular abnormalities.

Coronary angiography revealed a normal left main coronary artery (LMCA) and a large ectatic left anterior descending artery (LAD) with a fusiform aneurysm in the proximal segment (Figure1).

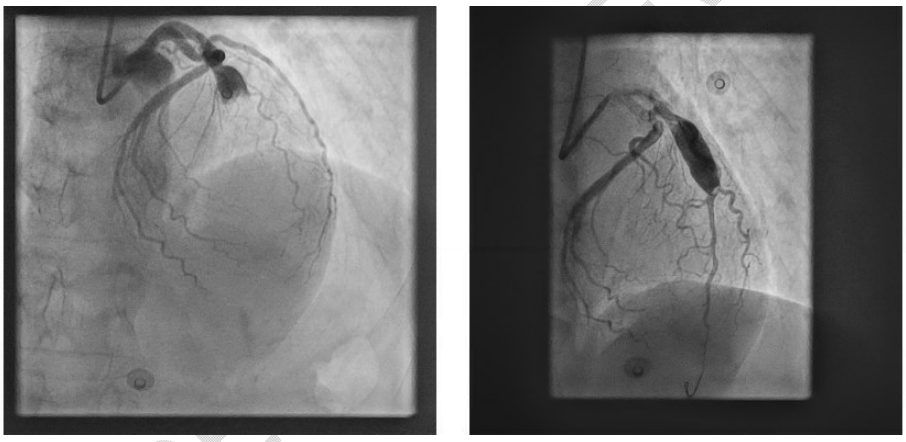

Figure 1: Coronary angiography showing the aneurysm of the proximal left anterior descending artery.

The mid-LAD had a thrombotic occlusion (type B1), extending into the aneurysmal region.

There was an intraluminal thrombus at the occlusion site (Figure 2).

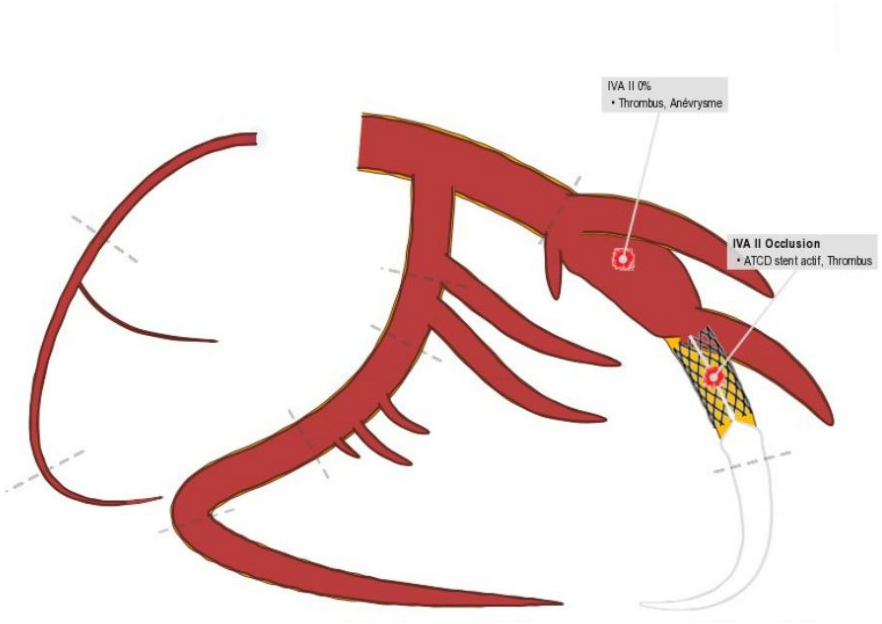

Figure 2: Schematic representation of the active stent placed on the distal LAD with intraluminal thrombosis.

The left circumflex artery (LCx) was a large-caliber vessel without significant stenosis, while the right coronary artery (RCA) was rudimentary and free of stenosis.

Multiple thromboaspirations were performed, followed by the deployment of a drug-eluting stent (DES) in the distal LAD beyond the aneurysm.

The LAD achieved TIMI 3 flow with vasodilators, but reocclusion occurred within minutes, accompanied by a no-reflow phenomenon.
Intravenous nitroglycerin (Risordan) was administered to improve microvascular circulation, and low-molecular-weight heparin (LMWH) was initiated as part of the anticoagulation regimen. Repeat angiography showed a recent thrombotic occlusion at the stent site, with incomplete perfusion of the distal LAD (TIMI 1).

The aneurysmal region remained patent but demonstrated slow flow.

Figure 3: Schematic representation of the management of coronary aneurysms according to current guidelines.

TTE revealed a non-dilated left ventricle with severe hypokinesia of the apical and mid-anterior segments, with an LVEF of 50%. No left ventricular thrombus was observed, and there were no significant valvular pathologies.

3. DISCUSSION

CAA is an uncommon finding, with an incidence of 0.15-4.9% on coronary angiography (1). It is defined as a dilation of a coronary artery segment to at least 1.5 times the normal diameter. The LAD is the most frequently affected artery, accounting for approximately 40% of cases (2). CAA may be congenital, but in most cases, it is associated with atherosclerosis (3). Thrombosis within the aneurysm can result in acute coronary syndromes, including myocardial infarction or, as seen in this case, chronic coronary syndrome with exertional angina (4).

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The management of CAA, particularly when associated with thrombosis, remains challenging. Percutaneous coronary intervention (PCI) is the first-line treatment for symptomatic patients, but the presence of aneurysms complicates stent deployment and increases the risk of complications such as rethrombosis, stent malapposition, and no-reflow (5). In this case, the patient's LAD was ectatic with a large aneurysm, making it prone to thrombotic occlusion. Despite successful thromboaspiration and stenting, the patient experienced a no-reflow phenomenon, which can occur in up to 5-15% of patients undergoing PCI for thrombotic lesions (6). Vasodilators, including nitroglycerin, have been shown to be effective in improving microvascular flow, although recurrence of occlusion remains a concern (7).

Anticoagulation with LMWH and dual antiplatelet therapy (DAPT) was crucial in this case, given the thrombotic nature of the occlusion. Current guidelines recommend DAPT for at least 12 months following stent placement in the context of an acute coronary syndrome or high thrombotic risk (8). Long-term management of CAA involves balancing the risks of thrombosis and rupture, with surgical options reserved for large or symptomatic aneurysms that do not respond to medical therapy (9).

The presence of an aneurysm significantly impacts prognosis. While small CAAs may remain asymptomatic, larger aneurysms carry a higher risk of complications, including rupture, thrombosis, and embolization (10). In this patient, the aneurysm was large and fusiform, complicating both PCI and medical management. Careful long-term follow-up is essential to monitor for restenosis, rethrombosis, or aneurysm expansion.

4. CONCLUSION

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Coronary artery aneurysms (CAA) are rare but clinically significant, especially when complicated by thrombotic occlusion. This case highlights the challenges in managing a proximal LAD aneurysm with thrombosis. Although percutaneous coronary intervention (PCI) successfully restored blood flow through

thromboaspiration, stent placement, and dual antiplatelet therapy (DAPT), the no-reflow phenomenon emerged as a significant complication, reflecting microvascular dysfunction.

Effective management requires balancing PCI risks with microvascular complications, alongside aggressive antithrombotic therapy. Long-term care must address cardiovascular risk factors to prevent further aneurysmal progression. This case underscores the importance of multidisciplinary collaboration and the need for further research to refine interventions and optimize outcomes in CAA management.

REFERENCES

1. Li, D., Wu, Q., Sun, L., et al. "Coronary Artery Aneurysm: A Review of the Epidemiology, Pathophysiology, Diagnosis, and Treatment." Journal of American College of Cardiology, 2020. doi:10.1016/j.jacc.2020.02.045

2. Swaye, P. S., Fisher, L. D., Litwin, P., et al. "Aneurysmal coronary artery disease." Circulation, 1983. doi:10.1161/01.CIR.67.1.134

3. Nichols, L., Lagana, S., Parwani, A. "Coronary Artery Aneurysm: A Review and Hypothesis Regarding Etiology." Archives of Pathology & Laboratory Medicine, 2008. doi:10.5858/2008-132-1206

4. Daoud, A. S., Pankin, D., Tulgan, H., Florentin, R. A. "Aneurysms of the coronary artery." American Heart Journal, 1963. doi:10.1016/j.ahj.2015.04.002

5. Kalantzis, M., Konstandinides, A. "Complications During Percutaneous Intervention in Aneurysmal Coronary Arteries." Journal of Cardiac Surgery, 2021. doi:10.1111/jocs.15478

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6. Wilson, R. F., Marcus, M. L., White, C. W. "Mechanisms of No-Reflow Following PCI." European Heart Journal, 2018. doi:10.1093/eurheartj/eht067

7. Kis, K., Remadi, J. P., Hakim, J. "Management of Coronary Artery Aneurysms with Thrombosis: Case Series and Literature Review." InterventionalCardiologyReview, 2019. doi:10.15420/icr.2019.19.2

8. Valgimigli, M., Bueno, H., Byrne, R. A., et al. "2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation." European Heart Journal, 2017. doi:10.1093/eurheartj/ehx393

9. Topaz, O., DiSciascio, G., Griffith, L. S. "Aneurysmal Coronary Arteries in Association with Severe Atherosclerosis." American Journal of Cardiology, 1991. doi:10.1016/j.amjcard.2018.12.035

10. English, B. D., Zahir, R., Meehan, K. "Coronary Artery Aneurysm Rupture: A Rare Catastrophe." Journal of Thoracic and CardiovascularSurgery, 2022. doi:10.1053/j.jtcvs.2022.04.076