

# Surgical Management of Left Anterior Descending Coronary Artery Aneurysm with Fistula: A Rare Case Report from Suriname

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**Abstract:** Coronary artery aneurysm (CAA) and coronary artery fistula (CAF) are rare cardiovascular anomalies, and their simultaneous occurrence is exceedingly uncommon. This case highlights the diagnostic, therapeutic, and logistical challenges of managing such anomalies in a low-resource setting. We present a 56-year-old woman with diabetes, hypertension, and hypothyroidism who developed a non-ST-elevation myocardial infarction (NSTEMI) in May 2023, nearly two years after being diagnosed with a proximal left anterior descending (LAD) artery saccular aneurysm (15.5 × 19.2 mm) with two fistulous connections (31.9 mm and 20 mm). Initial conservative management was chosen due to patient stability and operating room limitations during the COVID-19 pandemic. Despite optimal medical therapy, aspirin 80 mg/day, clopidogrel 75 mg/day, simvastatin 40 mg/day, and bisoprolol 5 mg/day, worsening symptoms prompted urgent surgical repair. The aneurysm and fistulas were ligated, and a left internal mammary artery (LIMA) to LAD bypass was performed. Postoperative complications included pulmonary congestion and pneumonia, both of which were successfully treated. The patient remains asymptomatic at two-year follow-up. In anatomically complex coronary artery anomalies, surgical intervention may offer a definitive treatment option. Our case emphasizes the importance of adaptable, case-specific strategies for cardiovascular care in resource-limited environments.

**Keywords:** Coronary Artery Aneurysm; Coronary Artery Fistula; Surgical Management; NSTEMI; Low- and Middle-Income Countries.

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## 1. Introduction

Coronary artery aneurysm (CAA) is defined as a focal dilation >50% the diameter of adjacent normal segments [1, 3]. Coronary artery fistula (CAF), an abnormal communication between a coronary artery and a cardiac chamber or great vessel, is similarly rare [4, 5]. The coexistence of CAA with CAF is exceptionally uncommon and can lead to myocardial ischemia, thrombosis, or rupture [1, 5, 6, 7]. Optimal management remains controversial, particularly in resource-limited settings [1, 7].

## 2. Case Report

A 56-year-old woman with type 2 diabetes, hypertension, and hypothyroidism presented in June 2021 with palpitations, NYHA class II-III dyspnea, and intermittent chest pain. ECG showed sinus rhythm and nonspecific ST-T changes; echocardiography revealed normal systolic function. Coronary angiography identified a saccular aneurysm (15.5 × 19.2 mm) of the proximal LAD with two fistulous connections (31.9 mm and 20

mm) to the LAD and TIMI II flow distally (Figure 1). Due to COVID-19 and surgical resource constraints, intervention was deferred. The patient was managed with aspirin, clopidogrel, simvastatin, and bisoprolol. In May 2023, she presented with an NSTEMI. Cardiac biomarkers were elevated, and repeat angiography confirmed persistent aneurysm dimensions. Urgent surgical intervention was indicated.

**Figure 1.** Preoperative coronary angiogram of our patient demonstrating the large saccular aneurysm of the LAD and fistulous connection to the aorta (own data; with patient consent).



### 2.1 Surgical Technique

A median sternotomy was performed under general anesthesia with cardiopulmonary bypass. The aneurysm and both fistulas were ligated (Figure 2). The LAD was occluded proximal and distal to the aneurysm, and a LIMA-to-LAD bypass graft was constructed. No aneurysm resection was performed to avoid injury to adjacent structures.

### 2.2 Postoperative Course

The patient was extubated on the day of surgery. Pulmonary congestion, attributed to fluid shifts and comorbidities, was managed with diuretics and non-invasive ventilation. Right lower lobe pneumonia was treated with ceftriaxone and azithromycin. She was discharged on postoperative day 11. At two-year follow-up, she remains asymptomatic with preserved cardiac function.

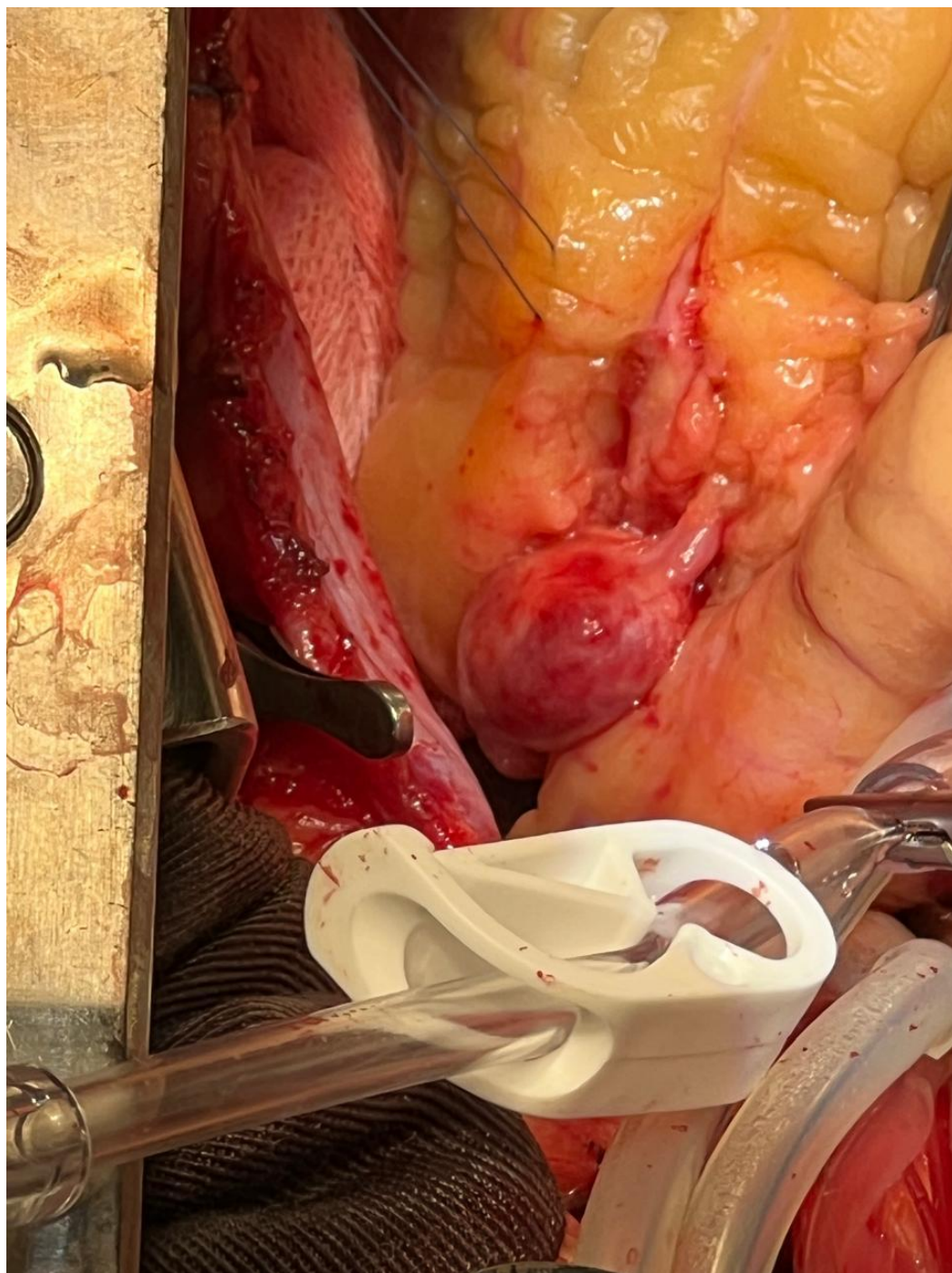
### 3. Discussion

Surgical repair of CAA with or without CAF is associated with excellent long-term survival and symptom relief, with most patients free of major adverse cardiovascular events (MACE) at 5–10 years [1,2]. In our patient, ligation of the aneurysm and fistulas combined with bypass grafting effectively eliminated the risk of rupture or thrombosis while ensuring distal perfusion [2,3]. Ligation is technically straightforward and reliable but sacrifices native flow, whereas reconstruction preserves anatomy but carries the risk of residual stenosis or recurrence [3]. In LMICs, limited access to interventional devices and expertise often favors surgical over percutaneous management [5]. Our experience supports this practice, demonstrating that even in resource-constrained environments, good outcomes can be achieved with tailored surgical strategies.

When deciding between percutaneous coronary intervention (PCI) and surgery, several factors must be considered, including lesion size, complexity, patient comorbidities, and institutional expertise. PCI is generally preferred for small, simple aneurysms and

fistulas in patients with low surgical risk and good coronary anatomy, particularly in centers with ready access to covered stents and closure devices [1,5]. In contrast, large, complex, or multiple lesions, or cases with failed PCI, are better suited for surgical repair, which offers more definitive and durable results [2,7].

**Figure 2.** Intraoperative photograph showing the aneurysm and ligated fistulas (with patient consent).



In recent years, novel percutaneous devices have been developed, such as covered stents and Amplatzer occlusion devices, which have improved success rates for selected CAFs and CAAs. However, their availability is often limited in LMICs, and long-term data on their efficacy in complex lesions remain sparse [4,6]. It is also noteworthy that

asymptomatic CAAs are increasingly discovered incidentally during coronary angiography or CT angiography performed for unrelated reasons. In such cases, management is individualized based on aneurysm size, location, presence of thrombus, and patient risk factors, with many small, asymptomatic aneurysms being managed conservatively with antiplatelet therapy and surveillance imaging [1,5].

A systematic review by Kamiya, Yasuda, Nagamine, Shimura, Kanazawa, Uchida, and Saito [7], covering 1007 patients with CAA and/or CAF, confirmed that surgical management resulted in higher long-term patency and lower recurrence rates than PCI in complex or large lesions, particularly in patients with concomitant fistulas. PCI was associated with shorter hospital stay and lower immediate morbidity but higher rates of reintervention in complex cases [7]. This case underscores the complexities of managing rare coronary anomalies in LMICs. The nearly two-year interval from diagnosis to surgery was dictated by systemic limitations and patient stability under medical therapy. The aneurysm's morphology, a wide-necked lesion near the first diagonal branch with dual fistulas, precluded safe PCI even if resources were available. Surgery was thus both a necessity and the preferred modality.

#### 4. Conclusion

This case reinforces surgical ligation and bypass as a viable option for LAD CAA with CAF when percutaneous intervention is impractical. Timely diagnosis, continuous surveillance, and adaptability to systemic constraints are vital. Broader reporting of similar cases is essential to guide future care in LMICs.

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**Conflicts of Interest:** The authors declare no conflicts of interest.

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