



# What's next? Approach to Management of a Coronary Cameral Fistula after Failed Surgical Ligation



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## INTRODUCTION

- Coronary artery fistulas (CAF) are rare coronary anomalies that affect 0.1% to 0.2% of the population and often are incidentally discovered during coronary angiography or non-invasive cardiac imaging.
- The majority of CAFs are congenital, but have been seen with increasing frequency following intra-cardiac device implantation, cardiac surgery, myocardial biopsy and direct chest trauma.
- If left untreated CAFs can lead to myocardial ischemia, endarteritis, cardiac chamber enlargement, or ventricular dysfunction.

## CASE PRESENTATION

- 67-year-old women with large right coronary artery (RCA) fistula to left ventricle (LV) that was previously surgically ligated in 2014 due to increased left ventricular dilation and increased shunt fraction.
- Serial cardiac imaging to include cardiac magnetic resonance imaging and echocardiography demonstrated progressive left ventricular dilation, reduced left ventricular ejection fraction and increased shunt fraction following her surgical ligation (Table 1).
- Patient was seen in ambulatory clinic with complaint of progressively worsening angina, dyspnea on exertion and orthopnea.
- Non-invasive and invasive coronary angiography revealed an aneurysm RCA with distal segment of the RCA demonstrating re-cannulation of her previously ligated CAF (Figures 1 and 2). Coronary pressure wire assessment identified a 18mmHg systolic gradient between the aorta and the left ventricle diastolic pressure across the the focal stenosis in the RCA.
- Through shared decision making with the patient, she elected to have definitive surgical correction (Figure 3). She had successful complete resection of the RCA from the ostium to the distal RCA.
- She has had an uncomplicated post-op course with improvement in her systolic LV function.

	01 FEB 2007	19 DEC 2013	03 FEB 2015	12 SEP 2019	22 DEC 2020
LVEF (%)	60	47	53	47	35
SF(%)	30-40	44	7-12	22	21
LVEDVi (mL/m <sup>2</sup> )	mild	155	100	121	118

Table 1: Serial cardiac magnetic imaging data with increased shunt fraction (SF) and LV dilation prior to surgical repair in 2014 with recurrence in the subsequent years.

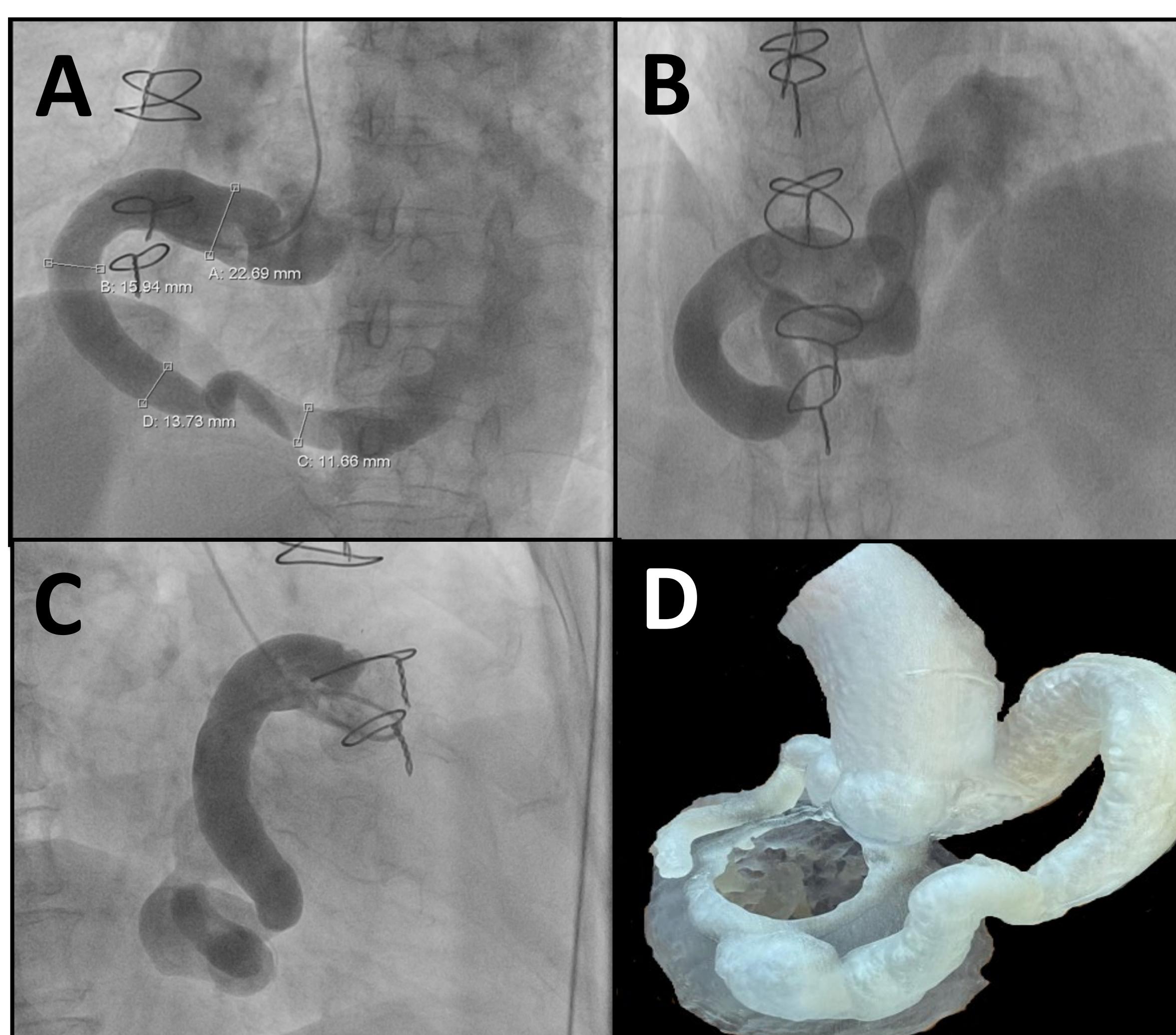


Figure 2: Coronary angiography in multiple orthogonal views revealing an aneurysm RCA to LV coronary-cameral fistula (A,B,C). A model of the RCA to LV fistula (D).

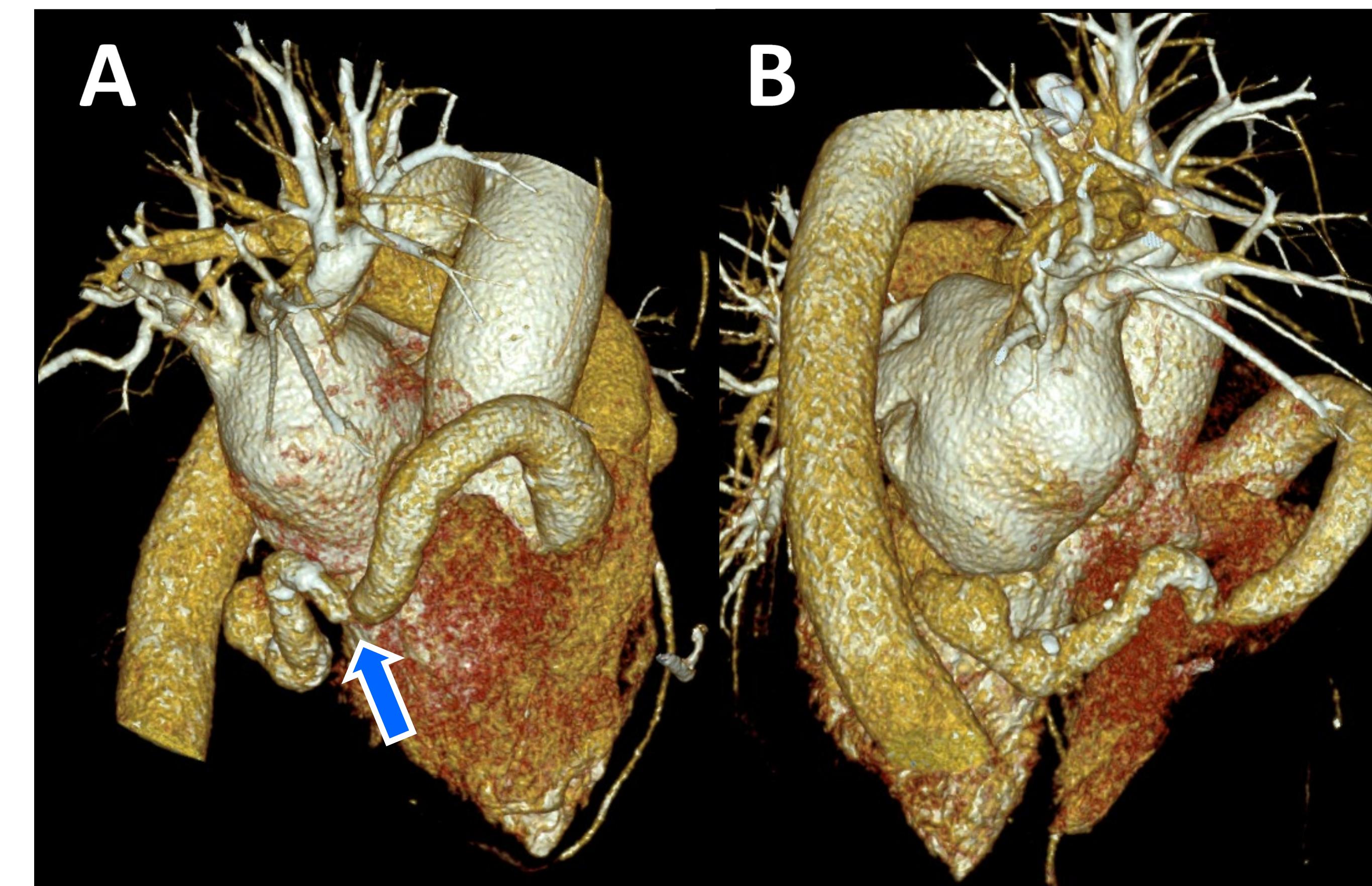


Figure 1: Three-dimensional reconstruction cardiac computed tomography images with aneurysm RCA from the coronary ostium (A) to its insertion in the left ventricle (B). A focal stenosis at the previous ligation in the distal RCA (blue arrow).

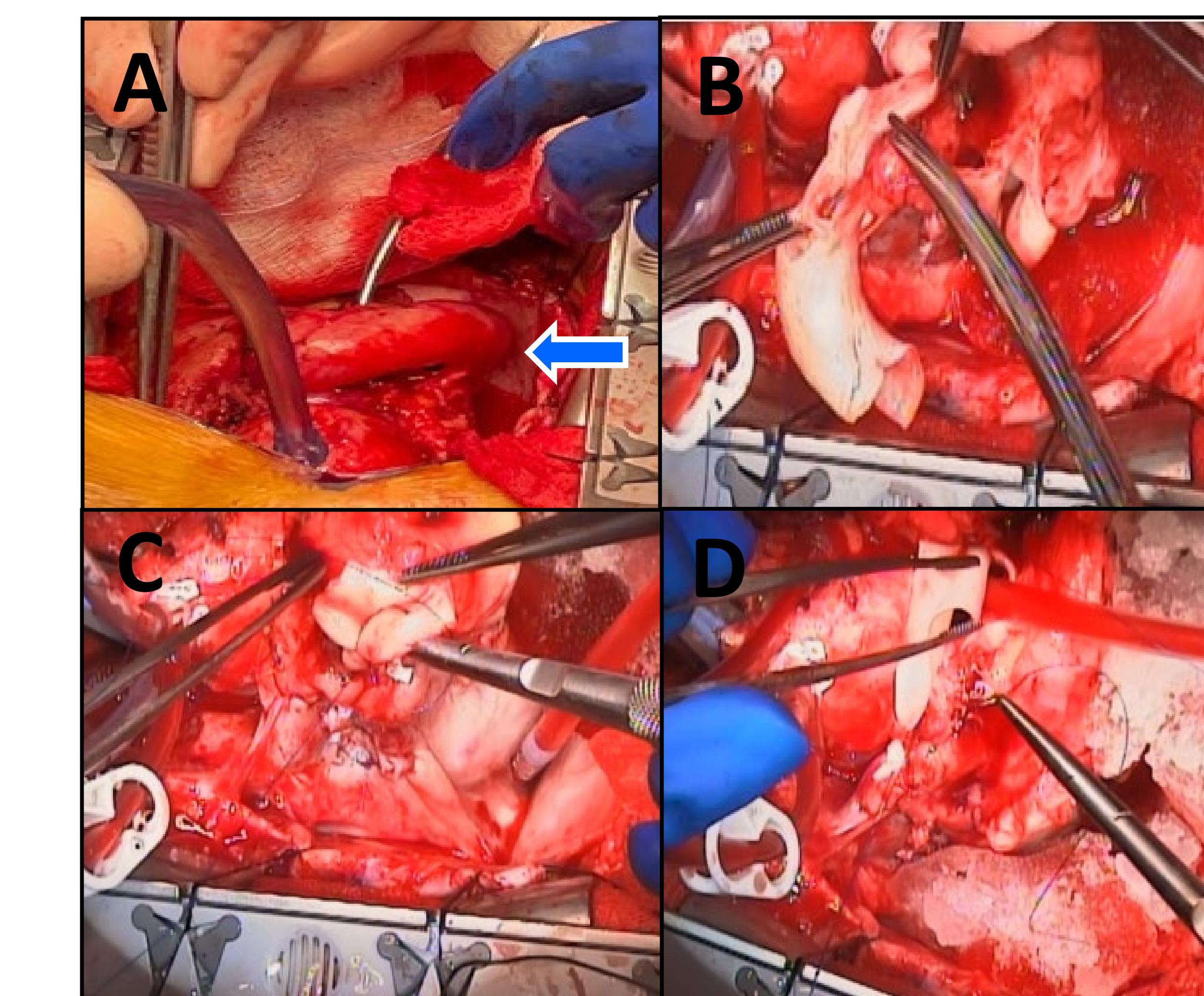


Figure 3: Surgical resection of the aneurysm RCA (blue arrow) from the coronary ostium (A) to the insertion in the myocardium (B). The distal artery was closed with a purse-string suture (C) and a bovine patch was used to close the aortotomy (D).

## DISCUSSION

- Historically, diagnostic coronary angiography has been used to establish the diagnosis of CAFs, with advances in noninvasive cardiac imaging, CAFs are being increasingly diagnosed by multimodality imaging particularly cardiac computed tomography .
- The management of patients with symptomatic CAFs either percutaneous or surgical closure should be guided by a heart team approach and often based on anatomic considerations such as the size of the proximal coronary artery as well areas of threatened myocardium.
- Surgical methods of closure are associated with low mortality and morbidity, however there is a risk of myocardial infarction postoperatively and also a risk of recurrence.
- Advancements in trans-catheter closure devices has led to promising treatment options, however these strategies also come at the risk of device embolization.

## CONCLUSIONS

- CAF are rare cardiac anomalies, but should always be part of the differential diagnosis in patients with symptoms of chest pain and dyspnea, especially in patients without significant risk factors.
- This case highlights the management strategy of a previously ligated large CAF in a symptomatic patient with progressive increased shunt fraction, reduced LV systolic function and LV dilation.

## REFERENCES

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