

# Anomalous coronary artery in a transplanted heart: a rare incidental diagnosis



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Coronary artery anomaly is a rare postoperative coronary angiographic finding in heart transplant recipients. We report a case of anomalous origin of the right coronary artery in an asymptomatic 70-year-old heart transplant patient. Most coronary artery anomalies are benign, but surgical treatment may be necessary in major coronary artery anomalies that are known to have adverse outcomes.

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## Introduction

Anomalies of the coronary artery in transplanted hearts are an extremely rare incidental finding during postoperative angiographic coronary artery evaluation. When encountered clinically, defining the coronary anomaly, understanding its physiological consequences, and looking for objective evidence of myocardial ischemia are necessary to establish the need for surgical intervention. The management of an anomalous coronary artery in heart transplant patients is similar to that in nontransplant patients and is briefly outlined in this report.

## Case report

A 70-year-old man was referred for surveillance coronary angiography following orthotopic heart transplantation performed at our institution 1 year previously for end-stage heart failure secondary to cardiac amyloidosis. His post-transplant course was complicated by calcineurin inhibitor-related progressive renal failure. The patient was asymptomatic on a stable immunosuppressive regimen. On surveillance endomyocardial biopsy performed 1 month previously, there was no evidence of rejection. Vital signs were stable, physical examination was unremarkable, and laboratory data was significant for chronically elevated creatinine (creatinine clearance 52 mL/min). Transthoracic

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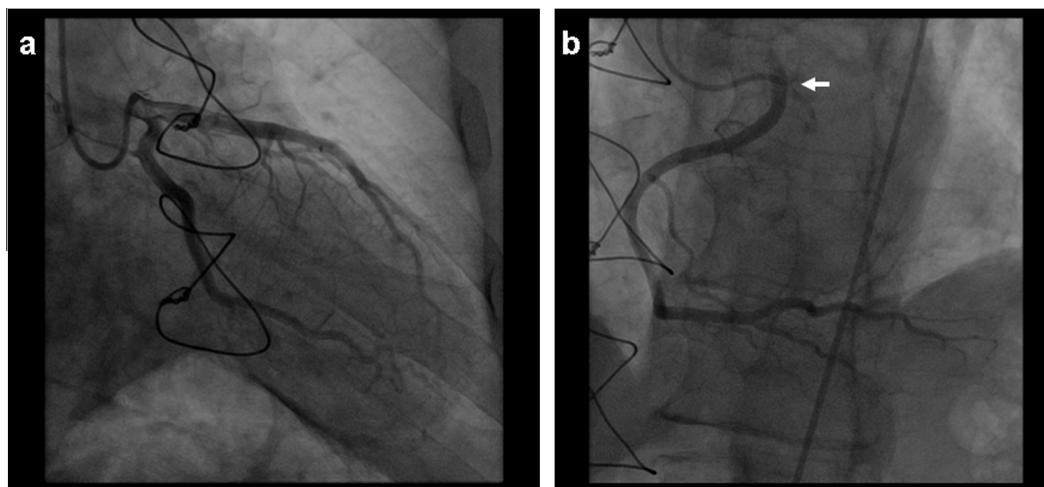


Figure 1. (a) Selective coronary angiography of the left main coronary artery in the right anterior oblique caudal view; and (b) selective coronary angiography of the right coronary artery in the left anterior oblique cranial view showing anomalous origin of the right coronary artery from the left coronary cusp (arrow).

echocardiography performed 2 weeks previously showed normal cardiac function.

## Results

At the time of coronary angiography the right coronary artery (RCA) was difficult to cannulate. However, during angiographic examination of the left coronary system the RCA was seen to arise from the left coronary sinus. Subsequent selective coronary angiography of the RCA revealed its anomalous origin from the left coronary sinus (Fig. 1). There was no angiographic evidence of coronary artery disease. Intravascular ultrasound of the left anterior descending and left main coronary arteries

showed no evidence of allograft vasculopathy. Coronary computed tomography angiography confirmed the findings seen on conventional coronary angiography and also demonstrated an RCA course between the main pulmonary artery and aorta (Fig. 2). Left knee osteoarthritis precluded exercise stress testing; therefore, dobutamine stress echocardiography was performed and was negative for myocardial ischemia.

Anomalous origin of the RCA from the left coronary cusp does not have clinical significance in a majority of patients. In this case, given absence of symptoms and myocardial ischemia by physiologic testing, no intervention was necessary. The patient continues to do well.

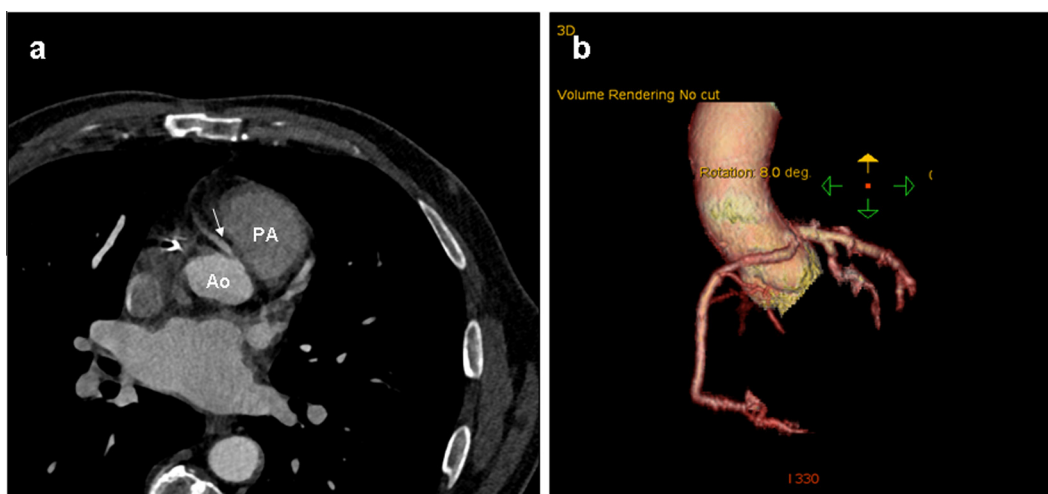


Figure 2. (a) Coronary computed tomography angiography with coronal section; and (b) volume rendering technique, showing right coronary artery arising from the left coronary sinus. Right coronary artery (arrow) can be seen coursing between the aorta and the pulmonary artery. Ao = aorta; PA = pulmonary artery.

## Discussion

Coronary artery anomaly in the heart transplant recipient population is a rare postoperative coronary angiographic finding. Herein, we report the first case of anomalous RCA from the left coronary cusp in a transplanted heart. In a review of perioperative coronary angiograms in 75 consecutive patients undergoing heart transplantation, Young et al. [1] reported only one heart with an anomalous coronary (left circumflex) artery. Taylor et al. [2] reported myocardial bridging of the left anterior descending artery (LAD) in a heart transplant recipient who died of massive myocardial infarction secondary to thrombosis of the bridging coronary artery. The diagnosis was established at autopsy. Bresseleers et al. [3] reported an anomalous origin of the LAD from the pulmonary artery in a 62-year-old heart transplant recipient, which had not been detected during harvesting and transplantation of the organ. The patient was symptomatic and had documented exercise-related ischemia in the LAD territory on myocardial perfusion imaging [3]. The outcome of the patient was not available. Vasseur et al. [4] reported anomalous origin of the LAD from the right coronary cusp in a 40-year-old donor during pre-explant coronary angiography. Modification of the aortopulmonary groove was undertaken at the time of heart implantation to create a favorable geometry and prevent LAD compression. The patient was symptom free at the 1-year follow-up visit.

Heart transplant donors undergo extensive evaluation prior to explantation [5]. Since coronary artery anomaly is rare in the general population [6], and heart donors are often young and less likely to have coronary artery disease, pre-explant invasive coronary angiography or coronary computed tomography angiography are not routinely performed. However, surgeons palpate coronary arteries for atherosclerotic plaque and visually inspect the heart for congenital anomalies at the time of organ harvesting and transplantation [5]. When a major coronary artery anomaly that is known to predispose an adverse outcome is noted,

rejection of the organ by the surgeon may be justified. However, due to the long patient waiting times, such hearts are often accepted and surgical modifications of anomalous coronary arteries are performed at the time of heart implantation to prevent ischemic events after transplantation. Since heart transplant patients are subjected to yearly surveillance coronary angiography for early detection of allograft vasculopathy, the issue of coronary artery anomaly will continue to arise. This finding occurs due to lack of detection or acceptance due to little clinical significance at the time of organ harvesting and transplantation. Heart transplant patients who are diagnosed with anomalous coronary artery during postoperative follow-up should be managed in a similar fashion as in the nontransplant population. More than 80% of these coronary anomalies are benign and have no clinical significance [6].

## Conclusion

Anomalous coronary artery in a transplanted heart is rare. When encountered clinically, as in native hearts, the decision regarding management requires knowledge of the type of coronary anomaly and physiological consequences.

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