

Right Coronary Artery to Coronary Sinus Fistula: Computed Tomography, Angiography and Echocardiography

Clinical Case Portal

Date of publication:

23 Jan 2008

Topics: Invasive Imaging: Cardiac Catheterisation and Angiography

Authors:

Graham Jenkins BSc DMU (Cardiac), Michael Muhlmann MBBS

Cardiology Dept

Sir Charles Gairdner Hospital

Hospital Ave NEDLANDS

Western Australia

Contact: graham.jenkins@health.wa.gov.au

Case Report

This case involves a 48 year old woman with a coronary fistula to coronary sinus. It demonstrates the complimentary nature of left and right heart catheterisation, echocardiography and coronary CT in the investigation of a coronary artery fistula.

Patient history prior to current observation :

The patient presented with increasing dyspnoea on minimal exertion which had progressed over the preceding four months.

A recent echo demonstrated a dilated coronary sinus and mildly dilated left ventricle with mild systolic impairment.

She was referred for right and left heart catheterisation and ongoing management.

Clinical findings on admission, evolution and outcome :

Clinical examination found the patient to be normotensive with clear lungs, pulse of 80bpm, dual heart sounds with a continuous murmur at the left lower sternal edge. There were no signs of heart failure. ECG was normal.

Left and right heart catheterisation showed normal left coronary anatomy with retrograde filling of the PDA (fig 1). The right coronary artery (fig. 2) was markedly dilated and occluded at the PDA. A coronary fistula was noted that was thought to drain to the coronary sinus. Right heart pressures were normal and the calculated left to right heart shunt ratio was 1.6:1.

Echocardiography showed a 'windsock' appearance of the right coronary sinus of valsalva and turbulent flow directed anteriorly consistent with ostial stenosis of the aneurysmal right coronary artery (fig. 3). The coronary sinus was also markedly dilated (fig. 5), and there was hyperdynamic flow from the coronary sinus to the right atrium (fig. 4). The Apical four chamber (fig. 6), parasternal short axis and subcostal four chamber views showed various portions of the right coronary artery in cross section consistent with the serpiginous nature of the vessel. The exact location of the fistulous connection could not be determined. There was mild global impairment of left ventricular systolic function. Cardiac valves were normal. There was mild bi-atrial dilatation. The right ventricle was normal size with normal systolic function. Left to right heart shunt ratio calculated by the continuity equation was 1.6:1.

CT coronary Angiogram (fig. 7,fig. 8,fig. 9 and fig. 10) showed a large 'serpentine' vascular structure centred in the right atrio-ventricular groove consistent with known fistula. The proximal right coronary had a diameter of 32 mm. Beyond this the majority of the right coronary artery measured 20 - 25 mm. The distal portion of the vessel terminated in an aneurysmally dilated coronary sinus. The dilated terminal segment of the coronary sinus measured 20 mm in diameter. Left ventricular end diastolic volume was 210 ml and ejection fraction was 51%.

Discussion

Coronary fistulas are congenital or acquired anomalous shunts from a coronary artery to a cardiac chamber or great vessel, bypassing the myocardial circulation (1). Population studies with angiography have reported the incidence of coronary artery fistula as approximately 0.3% (3). Clinical symptoms include angina, fatigue, and dyspnoea and are thought to be caused by a phenomenon known as coronary steal, where blood is drawn away from the distal coronary vasculature by the fistulous connection (1). If a large shunt is present there may be signs of right heart failure and pulmonary hypertension similar to any left to right heart shunt (2).

This case demonstrates the complimentary relationship of echocardiography, left and right heart catheterisation, and CT coronary angiogram in the diagnosis and investigation of aneurysmal right coronary artery with fistulous connection to the coronary sinus. Using these three imaging techniques we were able to determine the nature of the fistulous connection, the probable shunt location, the left to right shunt ratio (1.6:1 by catheterisation and echo), and rule out other cardiac cause for the patients symptoms.

Conclusion

Our patient presented with debilitating dyspnoea. Following investigation and diagnosis she was reviewed by cardio-thoracics, and is awaiting semi-urgent surgical repair.

References

1. Gowda RM et al. (2006) Coronary artery fistulas: clinical and therapeutic considerations. *International Journal of Cardiology* **107**: 7-10
2. Spektor G et al. (2006) A case of symptomatic coronary artery fistula. *Nature Clinical Practice Cardiovascular Medicine* **Vol 3 NO 12**: 689-692
3. Yamanaka O and Hobbs RE (1990) Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. *Catheter Cardiovascular Diagnosis* **21**: 28-40

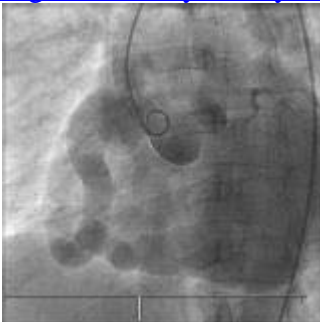
Fig. 1 :

[Right Coronary Artery to Coronary Sinus Fistula: Angiogram - LCA](#)



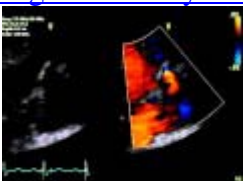
Fig. 2 :

[Right Coronary Artery to Coronary Sinus Fistula: Angiogram - LCA](#)



Video 1 :

[Right Coronary Artery to Coronary Sinus Fistula: Echo Plax Aortic Root](#)



Video 2 :

[Right Coronary Artery to Coronary Sinus Fistula: Echo Plax Aortic Root](#)

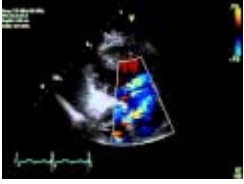


Fig. 3 :

[Right Coronary Artery to Coronary Sinus Fistula: Echo PLAX - Coronary Sinus dimension](#)



Fig. 4 :

[Right Coronary Artery to Coronary Sinus Fistula: Echo Ap4ch](#)

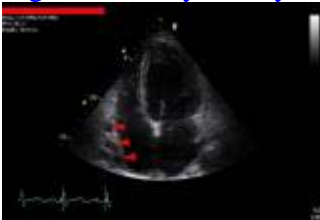


Fig. 5 :

[Right Coronary Artery to Coronary Sinus Fistula: Coronary CT RCA and coronary sinus](#)

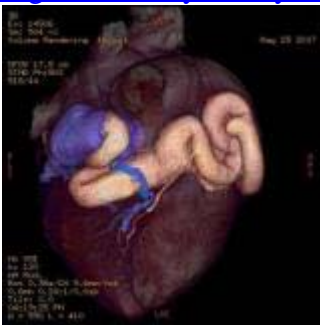


Fig. 6 :

[Right Coronary Artery to Coronary Sinus Fistula: Computed Tomography - RCA and coronary sinus cutout](#)



Fig. 7 :

[Right Coronary Artery to Coronary Sinus Fistula: Computed Tomography: Anterior view](#)



Fig. 8 :

[Right Coronary Artery to Coronary Sinus Fistula: Computed Tomography - Right side of the heart](#)

