It is Not a Broken Heart; it Just Looks Different!

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Introduction

- Anomalous aortic origin of a coronary artery is an uncommon condition associated with acute coronary syndrome and sudden cardiac death in healthy individuals.
- The variable anomalous courses of the arteries are frequently benign.
- This case raises awareness of this rare finding and offers a reminder that anatomic anomalies do not always require intervention unto themselves.

Objective Findings

Laboratory work-up
- CBC – Hb 13.1, WBC 8.9, Pt 309
- BMP – Na 140, K 4.2, CO2 23, CI 106, BUN 16, Cr 0.97, Glu 119, Ca 10.4, Mg 1.7

Echocardiogram
- Left ventricular systolic function is focially abnormal.
- Focal LV systolic dysfunction consists of moderate hypokinesia of the mid inferolateral, basal inferior wall, mid inferior wall.
- The left ventricular ejection fraction (LVEF) is 60%.
- Normal RV systolic function.
- No left ventricular hypertrophy is present.
- Mild tricuspid valve regurgitation.
- Noninvasive hemodynamic assessment is consistent with normal pulmonary artery systolic pressure.

Left Heart Catheterization
- AO 127/79, LV 128, EDP 20
- LMCA: Anomalous left coronary artery arises from the right aorta and appears to go anterior to the pulmonary artery
- LAD: Anomalous, small caliber, mild disease
- LCx: Anomalous, small, mild disease
- RCA: The RCA is a large, dominant vessel with a large, branching posterolateral. The RCA has mild disease. There is a dual PDA- the smaller of the two has severe diffuse disease. A sub-branch of the posterolateral is subtotally occluded with severe distal disease.

Coronary CT Angiography
- 1. Anomalous left coronary artery arising from the right coronary cusp with a prepulmonic course.
- 2. No significant coronary artery stenosis. Coronary artery calciifications are present.
- 3. In the mid right coronary artery, there is circumferential wall thickening without significant stenosis.

Case Description

History of Present Illness
- A 64-year-old female presented to the emergency department for constant, severe, progressively worsening left arm pain radiating to her back and chest.
- Associated symptoms included diaphoresis, dizziness, and nausea.
- Sudden onset of these symptoms after one hour of exertion.
- One week prior, she experienced nocturnal chest tightness that prevented her from sleeping.

Past Medical History
- Obesity following Roux-en-Y gastric bypass
- Deep vein thrombosis
- Essential hypertension
- Hyperlipidemia
- Papillary thyroid carcinoma, treated with total thyroidectomy
- No other significant cardiovascular history.

Family History
- Death due to MI in both parents

Medications
- Aspirin 81 mg
- Clopidogrel
- Heparin
- Metoprolol
- Atorvastatin
- Levothyroxine

Vitals
- BP 169/103
- HR 50 BPM
- RR 16
- SpO2 98% on RA

Clinical Management
- Initial treatment included aspirin, clopidogrel, heparin, and metoprolol.
- Echocardiogram showed focal hypokinesia with normal LVEF as described.
- Coronary angiography demonstrated an abnormal LCA arising from the right aorta and appearing to run anterior to the pulmonary artery. The RCA was large with severe diffuse distal disease.
- CT angiography confirmed the above findings.
- Medications were optimized and the patient remained well on follow-up.

Discussion
- Anomalous coronary artery is second only to hypertrophic myopathy as cause of atraumatic sudden cardiac death.
- Numerous anomalies of the coronary arteries have been described, with RCA anomalies being 10-times more common than LCA anomalies.
- Intramural aortic course or a course between the aorta and pulmonary artery portend a worse prognosis.
- Confirmation of course is crucial and non-invasive testing with CT angiography may be superior to invasive angiography in delineating the course and identifying high risk abnormalities that might benefit from surgery.
- Patients with such anomalies may present at young ages with unstable angina, shortness of breath, syncope, arrhythmias, or sudden death.
- Recognition and characterization of these anomalies remains important to identify those at greater risk for sudden cardiac death to optimize medications and lifestyle modifications and institute surgical referral if necessary.

Conclusion
- This patient’s prepulmonic course of the anomalous LCA is likely benign and unrelated to her myocardial infarction.
- Her case reassures that anomalous coronary arteries may remain undetected throughout a patient’s lifetime, do not necessarily require invasive intervention, and may be spared of atherosclerosis when non-anomalous coronaries are diseased.