Asymptomatic Progression of an Atherosclerotic Giant Right Coronary Artery Aneurysm Over 12 Years

Characterization Using Cardiovascular Magnetic Resonance and Computed Tomography Imaging

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Coronary artery aneurysm (CAA) refers to dilatation of a coronary artery segment by ≥50% of the reference vessel diameter. CAAs are termed giant when the diameter exceeds 8 mm or 4-fold the diameter of the reference vessel. Despite paucity of data on the natural history and long-term outcomes of CAAs, progressive increase in size over time is 1 of the indications for intervention. We report a case of asymptomatic progression of an atherosclerotic giant right CAA to a diameter of 82 mm, occurring over a period of 12 years.

Case Presentation
A 91-year-old male was referred for cardiovascular magnetic resonance imaging (cardiovascular MRI) after the incidental discovery of a paracardiac mass on computed tomography (CT) imaging of the abdomen and pelvis performed for hematochezia. He had no history of coronary artery disease or cardiac symptoms. His atherosclerotic risk factors were old age and male sex. His physical examination was unremarkable. Cardiovascular MRI showed a large mass in the right atrioventricular groove measuring 82 mm, with homogeneous signal intensity similar to that of the blood pool on cine (Figure 1A and 1B, and Movies I and II in the online-only Data Supplement), T1-weighted, and T2-weighted imaging, consistent with a giant right CAA. Cine imaging in the short axis view revealed the origin of the aneurysm from the proximal right coronary artery (Figure 1B, and Movie II in the online-only Data Supplement), which was also confirmed on coronary magnetic resonance angiography. First-pass perfusion imaging revealed prompt contrast uptake in the CAA simultaneous with the first pass through the aorta (Figure 1C, and Movie III in the online-only Data Supplement). Delayed enhancement imaging with a long inversion time to null thrombus did not demonstrate a thrombus in the giant CAA (Figure 1D, and Movie IV in the online-only Data Supplement). A review of previous imaging revealed the CAA on chest CT scans performed for evaluation of pulmonary nodules in 2002 (Figure 2A) and 2003 (Figure 2B), and on a noncontrast abdominal CT performed for suspected cholecystitis in 2008 (Figure 2C). Although the CTs were nongated and thus suboptimal for coronary imaging, side-by-side comparison of axial images at the same level revealed progression of the CAA from 19 mm to 82 mm over the span of 12 years (Figure 2A–2H). The CAA was not visualized on serial chest radiographs (Figure 3A–3E). Given his lack of symptoms and advanced age, the patient declined further evaluation and opted for a conservative approach without interventions for the CAA. Anticoagulation was not recommended because of the patient’s risk for bleeding.

Discussion
CAAs are uncommon, with incidence rates ranging between 1.5% and 5% on angiographic series. Most CAAs occur in the right coronary artery. Whereas Kawasaki disease is the most common cause of CAAs in children, atherosclerosis is the most common cause in adults. Only a few cases of giant CAAs with diameters >80 mm have been reported in the literature. The rate of growth of CAAs has not been described. In our patient, the diameter of the giant CAA doubled approximately every 6 years. The average growth rate was 5.3 mm per year, with an exponential growth over time (Figure 4). Giant CAAs are more likely to be symptomatic than clinically silent; on 1 literature review of 14 cases with diameters >80 mm, 11 (79%) were symptomatic. Interestingly, our patient did not develop any symptoms despite compression of the right atrium and the right ventricle by the giant CAA (Figure 1A). Although untreated CAAs have been noted to result in ischemia, myocardial infarction, distal embolization attributable to thrombus formation within the CAA, calcification, fistula formation, and spontaneous rupture, the optimal management strategy for asymptomatic giant CAAs remains unknown. Our report demonstrates that atherosclerotic giant CAAs grow at a rate of ≥5.3 mm per year, have exponential growth, and can remain asymptomatic even at a size of 82 mm in diameter.

Disclosures
None.

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Figure 1. Multi-technique cardiovascular MRI of the giant coronary artery aneurysm (CAA). A, Four-chamber cine image showing the giant CAA compressing the right ventricle, the right atrium, and the tricuspid valve. B, Short axis cine image showing the origin of the giant CAA from the proximal right coronary artery (red arrow). C, Rest perfusion image showing perfusion of the giant CAA with signal intensity similar to that of the blood pool. D, Delayed enhancement image with a long inversion time to null thrombus demonstrating the absence of thrombus within the giant CAA.

Figure 2. Computed tomography imaging of the giant coronary artery aneurysm (CAA) over 12 years. A, The CAA in June 2002 measuring 19 mm. B, The CAA in October 2003 measuring 24 mm. C, The CAA in January 2008 measuring 42 mm. D, The CAA in March 2014 measuring 82 mm. E through H are cartoon representations of the growth of the giant CAA.
Figure 3. Chest radiographs of the patient over 11 years. A, Single anteroposterior view from October 2003 with no suggestion of a coronary artery aneurysm (CAA). B, Posteroanterior (B) and lateral (C) views from June 2008 showing cardiomegaly and a tortuous and calcified aorta but no suggestion of a CAA. Posteroanterior (D) and lateral (E) views from April 2014 again showing cardiomegaly and a tortuous and calcified aorta but no suggestion of a CAA.

Figure 4. Graphical representation of the exponential growth of the giant CAA. The growth rate increases from 3.8 mm per year in the first year to 6.5 mm per year over years 6 through 12.
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