



Preoperative risk assessment using coronary CTA in a patient with aortic valve endocarditis

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BACKGROUND

Conventional coronary angiography (CCA) prior to aortic valve surgery has been traditionally recommended in the majority of patients so that significant obstructive coronary artery disease (CAD) can be addressed at the time of surgery. However, catheter-based CCA is associated with a small risk of serious complications directly related to its invasive nature. Based on the specificity and sensitivity of modern 64-slice cardiac computed tomography angiography (CTA) for detecting obstructive CAD,¹ many advocate and some have reported the successful use of coronary CTA to exclude CAD in low-to-intermediate cardiovascular risk patients prior to valve surgery.² Current appropriateness criteria developed jointly by the American College of Cardiology and American College of Radiology do not address the use of coronary CTA in patients prior to undergoing cardiac surgery.³

CASE HISTORY

The patient reported here is a 54-year-old man with a history of hypertension, hyperlipidemia, and recurrent urinary tract infections of his ileal neobladder, which was created following resection of transitional cell carcinoma. He was admitted for new-onset New York Heart Association class III heart failure, subjective fevers, and a new diastolic murmur. Transesophageal echocardiogram (TEE) showed a bicuspid aortic valve with 2-cm vegetation (Figure 1), severe aortic insufficiency, and a possible perivalvular abscess. A comparison

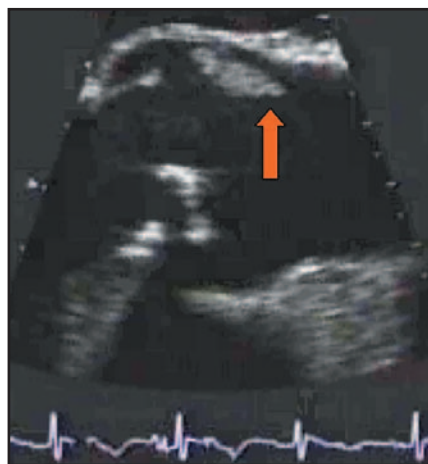


FIGURE 1. A transesophageal echocardiogram shows a large mobile vegetation (arrow) adherent to the aortic valve leaflet as seen during systole.

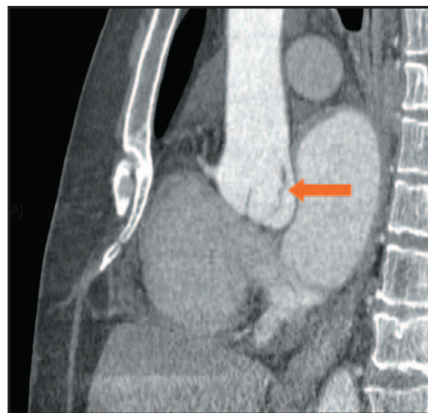


FIGURE 3. A cardiac CT angiographic image (sagittal view) shows the large, long aortic valve vegetation (arrow).

transthoracic echocardiogram performed 6 months earlier showed no vegetation or aortic insufficiency. Blood and urine cultures grew *Enterococcus faecalis*, and he

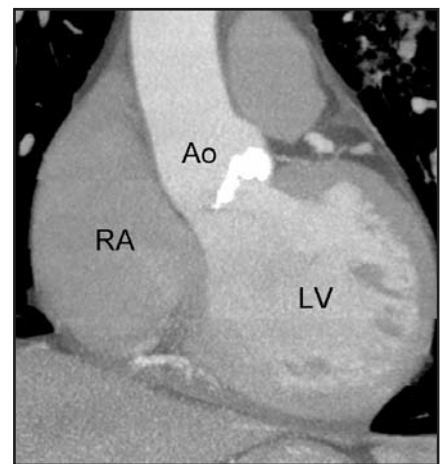


FIGURE 2. This cardiac CTA (coronal view) of the heart shows significant aortic valve calcification. (Ao = aorta; RA = right atrium; LV = left ventricle.)

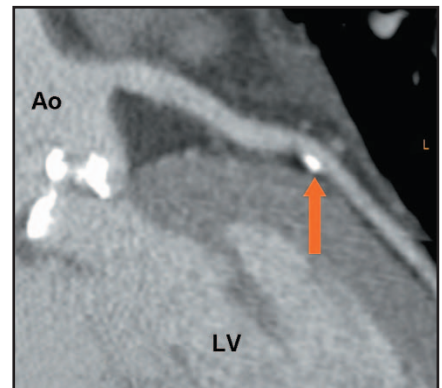


FIGURE 4. This CTA image reveals the primarily calcified, nonobstructive plaque (arrow) in the midportion of the left anterior descending artery. (Ao = aorta; LV = left ventricle.)

was treated with intravenous penicillin and gentamicin based on organism sensitivities.

Because of the presence of heart failure secondary to severe aortic insufficiency



FIGURE 5. A curved multiplanar reconstruction image of the left main coronary artery and its continuation as the left circumflex artery show no obstructive disease.

and possible perivalvular abscess, the patient was referred for aortic valve replacement, in accordance with current guidelines.⁴ There was concern that invasive CCA could lead to septic emboli caused by dislodgement of the highly mobile aortic vegetation located near his coronary artery ostia. Given his low-to-intermediate risk for obstructive CAD, we elected to use coronary CTA for preoperative assessment. Imaging was performed using a 64-row multidetector CT scanner (LightSpeed VCT, GE Healthcare, Waukesha, WI) with the following parameters: 120 kVP, gantry rotation time 0.35 seconds, 0.625-mm detector thickness, 700 mA, cardiac helical application, and retrospective gating. Following a timing bolus, contrast (Iovue 370, Bracco Diagnostics, Princeton, NJ) was infused at a rate of 5 mL/sec for a total 85 mL, followed by 20 mL of saline. The cardiac CTA showed a heavily calcified bicuspid aortic valve (aortic valve Agaston calcium score of 2973) with a long vegetation (Figures 2 and 3). The left ventricle was mildly dilated with normal systolic function. Coronary CTA images



FIGURE 6. A curved multiplanar reconstruction image of the right coronary artery (RCA) shows no obstructive disease. Note that there is a slight motion artifact affecting the mid and distal portions of the RCA that does not inhibit the ability to assess for obstructive disease.

showed only a nonobstructive mixed (calcified and noncalcified) lesion in the mid left anterior descending artery (Figure 4). There was no significant CAD seen in the left main, left circumflex, or right coronary arteries (Figures 5 and 6). Additionally, no perivalvular abscess was seen, and the aorta was normal. The possible perivalvular abscess seen on the TEE was actually a dilated left atrial appendage.

The patient underwent uncomplicated aortic valve replacement with a 2-mm SJM Regent valve (St. Jude Medical, Inc., St. Paul, MN). Culture of his aortic valve was positive for *E faecalis*, and no evidence of perivalvular abscess was appreciated intraoperatively. The patient has since recovered well.

CONCLUSION

Based on this case, our experience in similar patients, and current literature, we

believe that modern 64-slice CTA is an accurate method to assess for obstructive CAD prior to valve surgery in patients who are at low-to-intermediate risk for CAD or in patients who are deemed high risk for cardiac catheterization, such as those with aortic valve endocarditis. Furthermore, cardiac CTA may help to better define possible structural abnormalities seen on other noninvasive imaging modalities.

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