A simple correction for anomalous coronary arteries in adults

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Although the risk of sudden death in children and young adults with anomalous coronary arteries arising from the wrong sinus of Valsalva is well described, the risk for older adults who present with such anatomy is unclear.¹ Age greater than 30 years has been shown to impart a diminished risk of sudden death, although it can occur in older adults.² Although simple coronary artery bypass for these patients has been described, the outcome can be hampered by competitive flow in the absence of concomitant coronary disease, and poor long-term patency can be expected.³ Other techniques include internal unroofing, either across the commissural post or not, with a possible effect on aortic valve function.⁴ We report a simple physiologic approach previously described in children and adolescents and now used in 2 cases of symptomatic adult patients with anomalous coronary arteries arising from the wrong sinus of Valsalva with an intra-arterial course between the pulmonary artery and aorta.⁵

CLINICAL SUMMARY

The first patient was a 53-year-old man who had exercise- and stress-related chest pain for several years, now worsened, along with a recent presyncopal episode. He underwent a single photon emission computed tomographic myocardial perfusion exercise stress test, which showed a reversible ischemic defect in the apex. Contrast and computed tomographic coronary angiographic analysis demonstrated anomalous origin of the left main coronary artery from the right sinus of Valsalva with a clear intra-arterial course between the aorta and pulmonary artery and no evidence of other coronary disease. A decision was made to proceed with surgical correction despite his age in light of his symptoms and these findings.

The second patient was a 42-year-old man with diabetes who had mild chest pain, increasing dyspnea on exertion, and recent presyncopal episodes. He underwent a stress thallium test demonstrating a reversible defect. Contrast and computed tomographic coronary angiographic analysis

FIGURE 1. Preoperative computed tomographic angiogram of a patient with anomalous origin of the right coronary artery from the left sinus of Valsalva.

demonstrated anomalous origin of the right main coronary artery from the left sinus of Valsalva passing between the aorta and pulmonary artery and no evidence of other coronary disease (Figure 1).

Both patients underwent a similar surgical approach. Median sternotomy and bicaval cannulation were used, along with both antegrade and retrograde cardioplegia. In both cases the aorta was nearly transected (leaving only the most posterior portion intact) just above the sinotubular junction. An incision was carried down into the ostium of the respective anomalous coronary origin and continued on the roof of the vessel externally until the coronary artery was clear of the aortic wall and the pulmonary artery and beginning to branch (about 1–2 cm). A triangular piece of bovine pericardium was used to patch this entire incision, leaving a widely open os without kinking. After this, the pulmonary artery was transected just proximal to its bifurcation. An incision was carried out onto the left pulmonary artery, and a patch of bovine pericardium was used to close the original bifurcation. The main pulmonary artery was then sewn to the left pulmonary artery, effectively moving the pulmonary artery to the left and increasing the intra-arterial distance dramatically (Figures 2 and 3). Both patients recovered well and experienced no ischemic symptoms with 1 year's follow-up. Each was started on aspirin indefinitely starting on postoperative day 1.

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FIGURE 2. An anomalous left main coronary artery originating from the right sinus of Valsalva is patched externally to widely open its origin and intramural portion. The pulmonary artery bifurcation is moved to the left, opening the space between the great vessels.

DISCUSSION

The relatively simple technique described in this report is physiologic in that it addresses most of the theoretic causes of ischemia in these patients: slit-like opening, intramural compression, intra-arterial compression, and kinking. Notably, it avoids the need to elevate the commissure with traditional unroofing procedures, which can lead to aortic insufficiency. It should provide a more durable result than simple bypass. Relocation of the anomalous coronary os might be more technically challenging and fails to address the slit-like opening and intramural compression issues. This technique should be considered an option for adults with an indication for repair of the anomalous left and right main coronary arteries passing between the great vessels.

We thank David Honigschmidt for drawing [Figure 2](#) for this publication.

FIGURE 3. Postoperative, 3-dimensional, reconstructed computed tomographic angiogram of a patient with anomalous origin of the right coronary artery from the left sinus of Valsalva demonstrating the coronary ostial patch and the pulmonary artery bifurcation moved leftward.

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