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INVITED COMMENTARY

Surgical treatment of a patient with heart disease and congenital coronary anomaly

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Introduction

The preceding case report by Hamamoto and colleagues [1] on aortic valve replacement for a patient with ectopic coronary arterial origin stimulates a few discussion and comments on congenital coronary anomalies.

The present case

A 75-year-old man, who had an anomalous origin of the left coronary artery from the opposite aortic sinus, carefully underwent aortic valve replacement for severe aortic stenosis and moderate regurgitation without any coronary events. Preoperative computed tomography (CT) scan revealed that the left coronary artery arose from the right aortic sinus and ran the intramyocardial course in the ventricular septum toward the epicardial surface at the left side of the pulmonary trunk. A stented bioprosthesis was implanted following the removal of calcified aortic valve and placing careful sutures on the annulus with appropriate depth. Relatively smaller bioprosthesis was inserted to avoid the risk of compression against the left coronary artery by the bioprosthetic ring. I agree with the authors' opinion that it is important to recognize the potential risks of the anomalous origin of coronary artery and thereby allow a careful surgical approach as they demonstrated.

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Importance of awareness of congenital coronary anomalies for adult cardiac surgeons

Congenital anomalous origin of the coronary arteries may not be uncommon [2]. Angelini [3] reported that it might occur in 1–1.2 % of all coronary angiograms performed, with 0.15 % incidence of anomalous origination of the left coronary artery from the right sinus as that of the present case. It is important to recognize the risks that the anomalous coronary artery encircling the aortic root can be injured by deeply placed sutures or compressed by a prosthetic ring during aortic or mitral valve procedures especially when it runs a retroaortic course, in which the left main or circumflex coronary artery courses posterior to the aorta at the level of aortic annulus [4–6]. When the left coronary artery runs an intramyocardial course through the ventricular septum as the present case, Ross procedure should be contraindicated because it is difficult to harvest the pulmonary trunk without injury to the affected coronary artery.

A group of American Armed Forces Institute of the Pathology [7] reported that in a continuous series of 6.3 million 18-year-old recruits who underwent intense military training for 8 weeks, 21(33 %) of 64 cardiac deaths were related to the left coronary artery arising from the opposite sinus of Valsalva, which was confirmed by the clinical and necropsy examination. The highest risk lesions of the left main or left anterior descending branch artery arising from the opposite sinus of Valsalva include the inter-arterial course between the aorta and the pulmonary artery [8]. In 80 % of autopsies in athletes with sudden cardiac death and anomalous coronary artery origins, the affected coronary artery coursed between the aorta and the pulmonary artery. Furthermore, in 90–94 % of such patients, the intramural course of the affected coronary

artery was noted [9, 10]. The intramural left coronary artery ran inside the aortic wall anteriorly or posteriorly and takes off from the aorta at the left coronary sinus [11]. The ACC/AHA writing committee [8] recommended that surgical coronary revascularization should be performed in such a high-risk group of patients. Excellent outcomes have been reported with a unroofing technique for the intramural course of the coronary artery between the aorta and the pulmonary artery [9–11].

The population of adult patient with congenital heart disease, commonly called grown-ups with congenital heart disease or GUCH, has been steadily increasing due to recent progress and improvement of the surgical management of the congenital heart defects [12]. Coronary anomaly was frequently associated with some congenital heart defects such as transposition of the great arteries [11], tetralogy of Fallot, supraaortic stenosis and pulmonary atresia with intact ventricular septum [13]. Then, coronary anomalies in GUCH patients have become important issues for adult cardiac surgeons, as well as pediatric cardiac cardiologists and surgeons. The need for knowledge of congenital heart disease in adult cardiac surgeons has been increasingly demanded. The specificities of GUCH surgery are, however, multiple and complex, and include (1) variety of the anatomo-clinical situations, (2) multiorgan involvement, and (3) many technical differences related to cardiopulmonary bypass, myocardial protection, and surgical technique. Hence, it is now agreed that GUCH surgery should be performed in specialized centers with large patient volumes and expertise of both surgical and medical disciplines [12].

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