Patent Ductus Arteriosus and Left Coronary Ostium Stenosis: A Surgical Approach

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Introduction

Congenital heart disease in adults is a field in constant evolution, with a quest for optimal management of adult patients. In the authors' part of the world, surgeons deal with all kinds of adult congenital heart diseases, such as atrial and ventricular septal defects, tetralogy of Fallot (TOF), and others. A study of adult TOF surgeries at Rehman Medical Institute in Peshawar, Pakistan, was conducted from 2002-2007. This was the second largest contemporary study on the subject. Unfortunately, most patients with large shunts become inoperable due to a lack of qualified services or financial problems. The war in Afghanistan and decades long insurgency in the Institute's tribal areas also contributed to this problem.

Patent ductus arteriosus (PDA) is an example of a congenital cardiac lesion that is compatible with survival to adult age. Unfortunately, the authors have seen some patients with shunt flow reversal (Eisenmenger syndrome). They report the treatment of a 40-year-old woman who had an incidental finding of PDA associated with left main coronary artery ostium stenosis. The management of this rare combination offers two options: management by interventional cardiology or surgical management. Due to the patient's anatomic features, the authors proceeded with the surgical option because of difficulties anticipated with device closure of the PDA and stenting of the left main.

Methods

A 40-year-old woman with a history of hypertension was referred to the authors' cardiovascular clinic from Afghanistan for PDA ligation. Clinical evaluation demonstrated the presence of continuous murmur. Echocardiography confirmed the clinical suspicion of a large PDA with a significant left to right shunt. Extreme diffuse calcification of the PDA was detected on chest x-ray. Coronary angiography showed the presence of a severe stenosis of the origin of the left main coronary artery.

Results

The authors proceeded with a routine median sternotomy. The pericardium was opened. The aorta and pulmonary artery were dissected. The pulmonary artery (PA) was dilated and very tense due to pulmonary hypertension caused by the large PDA. The authors proceeded very slowly, as when retracting the PA the patient's blood pressure would drop, which in turn was

harmful to the myocardium because of her coronary disease. The PDA was identified, and a nylon tape was put around it and snugged. The pressures in the PA dropped dramatically and it was then easier to doubly ligate the PDA with silk.

Cardio pulmonary bypass was established after left internal mammary artery (LIMA) and saphenous vein harvest. Myocardial protection was achieved by antegrade hyperkalemic blood cardioplegia. After cardiac arrest was achieved, the saphenous vein graft was anastomosed to the OM, and the LIMA, a good sized vessel with good flow, was anastomosed to the proximal left anterior descending artery. The patient had an uneventful recovery and was discharged home on the fifth postoperative day.

Discussion

PDA is the second most common congenital cardiac disorder, with an incidence of 1 in 2000 live births in term infants. Its occurrence in adults is rare in the West but the authors often encounter it in Pakistan. In a recent report by Ananthasubramanian [1] on 30,190 two-dimensional echocardiograms performed in a population more than 50 years of age, they incidentally detected a PDA in only 15 cases (0.04%). Since the first description of successful PDA surgical ligation by Gross and Hubard [2], its treatment has progressively moved towards transcatheter closure [3]. At the present time, percutaneous closure is the technique of choice for PDA treatment, which is evolving in Pakistan. Surgery is indicated for low-weight preterm infants, when an associated cardiac lesion is present, or when percutaneous techniques fail.

Isolated coronary ostium stenosis is another rare condition. Topaz and coworkers [4] reported an incidence of 0.07% (16 patients) among 21,545 coronary angiographies. Twelve out of 16 patients had an isolated ostium stenosis of the left main coronary artery. It occurred more frequently in women as reported by Thompson [5], and atherosclerosis is the most frequent etiology. Surgery is the treatment of choice. Two options are currently proposed: coronary artery bypass grafting (CABG) or direct surgical approach (angioplasty). The authors prefer CABG. The vein patch surgical technique first proposed by Effler and coworkers [6] has been abandoned due to a high postoperative mortality rate. Hitchcock and coworkers [7] reported a series of nine consecutive patients with neither hospital mortality nor perioperative myocardial infarction utilizing a transaortic posterior approach. Dion and colleagues [8, 9] in two different works confirmed the feasibility and reproducibility of the ostial angioplasty with a low hospital mortality rate. They emphasized the rationale of such an approach based on the Prizometer principle and proposed the anterior transaortic approach as the technique of choice.

Association of PDA with isolated left coronary artery ostial stenosis has been reported in the literature only once, in which treatment proceeded as described above [10]. This prompted the authors to establish a decision-making pathway personalized to this particular case. In their unit, PDAs are electively closed surgically. Diffuse PDA calcification is a specific indication for its percutaneous closure considering that in the presence of these conditions surgical closure carries an increased risk. Having this in mind, in accord with the cardiologist, the authors proposed to the patient stenting of the left main and device closure of the PDA. Because it was not possible, they opted for the surgical option.

This report demonstrates that in current clinical practice, surgeons may face rare cases characterized by a combination of different cardiac lesions for which treatment is not standardized. Flexibility is required to achieve a patient-centered outcome.

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