Cardiovascular surgical procedures with CPB have been reported to constitute an especially high risk for patients with MMD because of decreasing cerebral perfusion pressure owing to the perfusion pressure variability in the initial stages of CPB and nonpulsatile (continuous) flow [2–5]. Therefore, it is a challenging operation and requires strict intraoperative management, including the maintenance of blood pressure, hematocrit, mean arterial pressure, and body temperature in patients with MMD [2–5]. Furthermore, to maintain pulse pressure, the use of an intraaortic balloon pump in coronary artery bypass grafting was reported [6].

TAVR is a therapy developed for severe aortic stenosis in high-surgical risk patients [7, 8]. Surgeons must keep in mind that major complications can occur at any step during TAVR, and we should prepare for fast cannulation to perform CPB. Particularly in patients with MMD, we routinely secure not only one artery and one vein for immediate CPB but also one additional artery for IABP if nonpulsatile (continuous) flow occurs because of intraoperative complications. We performed TAVR in 3 patients with aortic valve stenosis complicated with MMD and did not observe additional neurologic events. Although CPB was not required in the other 2 patients, in this case, unfortunately, the hemodynamics collapsed after balloon valvuloplasty, and CPB was required immediately. Still, IABP was not necessary because the hemodynamics rapidly improved as soon as CPB was started, and the patient’s pulse pressure was well preserved during the CPB support.

The use of CPB and cardiac arrest for TAVR is needed a significant minority of cases, and therefore, this procedure may be a useful treatment for patients with aortic valve stenosis complicated with severe cerebral ischemia, including Moyamoya disease.

Conclusion

We successfully performed TAVR in patients who had severe aortic valve stenosis complicated with Moyamoya disease. TAVR is a very useful treatment for patients with aortic valve stenosis complicated with Moyamoya disease.

References


Primary Modified Bentall’s Procedure in a Case of Laubry-Pezzi Syndrome

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Modified Bentall’s procedure done as part of the primary repair in Laubry-Pezzi syndrome is very rarely described in the literature. We present a case of a 33-year-old man with a subpulmonic ventricular septal defect, aneurysmal dilatation of the aortic root and ascending aorta, with an associated patent ductus arteriosus, corrected by the incorporation of Yacoub’s technique for ventricular septal defect closure with a modified Bentall’s procedure and transpulmonary patent ductus arteriosus ligation. The postoperative course was unremarkable. Early follow-up reports show good biventricular function without residual ventricular septal defect or iatrogenic ventricular outflow tract obstructions.

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A 33-year-old man with symptoms and signs of severe aortic insufficiency (New York Heart Association class III) was referred to us for an elective operation from the cardiology department of our hospital. His echocardiographic reports were consistent with a 0.5-cm subpulmonic VSD jet, with prolapse of the right coronary cusp into the VSD, thereby partly closing the defect and producing severe aortic regurgitation. The left ventricle was dilated, with an end-diastolic diameter of 9.5 cm and an ejection fraction of 0.44. A right ventricular outflow tract gradient of 30 mm Hg was noted, and a 0.5-cm patent ductus arteriosus (PDA) was also found, with moderate pulmonary artery hypertension. The aortic root and ascending aorta were aneurysmally dilated. Computed tomography angiography showed aortic root dimensions of 6.3\times 6.1\text{ cm} and sinotubular junction dimensions of 5.6\times 5.5\text{ cm}. The ascending aorta measured 5.5\text{ cm} (Fig 1). Considering the patient's age and the long-standing nature of the right coronary cusp prolapse, which might have caused structural abnormalities of the cusp, with severe aortic regurgitation, we planned to proceed with a modified Bentall's procedure and closure of the VSD and PDA.

The operation was performed through a median sternotomy, with the patient under cardiopulmonary bypass with aortic cross-clamping, under moderate hypothermia. Transpulmonary closure of the PDA was done with pledgetted 4-0 polypropylene suture. For the VSD closure, which was 5\times 5\text{ cm} (Fig 2), we used Yacoub's technique. In the area of the right coronary sinus, horizontal mattress sutures with pledgetted 2-0 polytetrafluoroethylene were passed from the crest of the interventricular septum and brought out through the aortic annulus, which on pulling up approximated the crest with the aortic annulus, thereby closing the VSD. In the other areas, everting annular sutures were taken (Fig 3). A valved conduit prepared on the table, with use of a No. 29 tilting disc valve and a no. 30 albumin-coated polyester graft, was seated onto the annulus by use of these sutures and secured. The left and right coronary buttons were anastomosed to the graft with 5-0 polypropylene sutures. A distal anastomosis was performed with the distal ascending aorta by use of 3-0 polypropylene sutures. The aortic cross-clamp was removed after meticulous deairing, and the patient was weaned from cardiopulmonary bypass, with minimal inotropic support of adrenaline $0.05\ \text{ mg/kg/min}$. His postoperative recovery was unremarkable, and he was discharged on postoperative day 7.

Echocardiography at discharge showed no residual VSD or PDA, good biventricular function, and a mild right ventricular outflow tract gradient (which was present preoperatively also and was attributed to a prominent muscle bundle in the right ventricle). The left ventricular end-diastolic diameter decreased to 7 cm. At the 6-month follow-up visit, he had good biventricular function, without progression of the right ventricular gradient, as shown by echocardiography.

**Comment**

Knowledge of the natural history of Laubry-Pezzi syndrome is limited in the literature because of the early intervention recommended in the form of VSD closure with or without aortic valve repair or replacement [4]. In the later stages of the disease, the hemodynamics are

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**Fig 1.** Computed tomogram showing aortic root and ascending aortic aneurysm.

**Fig 2.** A view through the open aorta, after excision of valve leaflets. Right and left ventricles are seen communicating at the septal defect. Right and left coronary buttons can be seen.
Isolated Tricuspid Valve Repair After Metastatic Tumor Resection

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Isolated tricuspid valve repairs are performed in adults most commonly as a result of infective endocarditis, traumatic injury, rheumatic involvement, and ischemia. The use of neochordae made from polytetrafluoroethylene, being widespread in mitral valve operations, is gaining ground in tricuspid valve repair. We report a very rare case that describes isolated tricuspid valve repair using neochordae after resection of a right ventricular tumor involving the tricuspid valve. The tumor isolated was metastatic teratoma in a patient with growing teratoma syndrome. We further describe our technique of tricuspid neochord implantation and the rationale behind the repair. (Ann Thorac Surg 2014;98:1447–9)

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We present a case of an adult patient with a diagnosis of growing teratoma syndrome, which involved the right ventricle and the tricuspid valve. For the excision of the tumor, tendinous chords of the anterior leaflet had to be excised. The tricuspid valve was repaired with artificial polytetrafluoroethylene (PTFE) neochordae. Few reports have been published presenting the above repair technique for the tricuspid valve, but in this report this technique is being used after tumor resection.

A 25-year-old patient received a diagnosis of growing teratoma syndrome after neoadjuvant chemotherapy, left orchidectomy, and excision of a para-aortic lymph nodal mass and an inferior vena cava mass. During the operation, a transesophageal echocardiography (TEE) probe was deployed to identify the proximal limit of the inferior vena cava tumor extension. This scan revealed a pedunculated mobile mass of unknown origin in the right ventricle. Cardiac magnetic resonance imaging (CMR) and transthoracic echocardiography (TTE) elucidated the possible causes in the postoperative period. TTE revealed a...

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