SUCCESSFUL VALVE-IN-VALVE TAVI IN PREGNANCY FOR SEVERE DEGENERATIVE BIOPROSTHETIC AORTIC VALVE STENOSIS

Javier Ganame, Sumeet Gandhi, Richard Whitlock, Madhu Natarajan, James Velianou
McMaster University, Hamilton, Canada

BACKGROUND

Pregnant women with severe symptomatic prosthetic valve stenosis are at high risk for maternal and fetal cardiovascular complications.

HISTORY AND PHYSICAL

29-year-old female at 12 weeks gestation presented with dyspnea and exertional angina. Her medical history included congenital bicuspid aortic valve stenosis. She underwent aortic valve replacement with a #23 Carpentier-Edwards Magna Ease porcine bioprosthesis at age 24. She then underwent two uncomplicated pregnancies. Her last echocardiogram one year prior to presentation showed mild valve degeneration with a peak/mean gradient of 41/27 mmHg across the bioprosthesis and normal left ventricular systolic function. Current echocardiogram showed severe prosthetic valve stenosis with peak/mean gradient of 149mmHg/98mmHg, dimensionless index of 0.28, aortic valve area 0.8cm2, no regurgitation, with hyperdynamic left ventricular systolic function. Auscultation revealed a normal S1, grade 2 late-peaking systolic ejection murmur best heard at the base with radiation to the carotid base, soft S2, and no S3 or S4. Lungs were clear to auscultation bilaterally. There was no pedal edema, all peripheral pulses were palpable, and the abdomen was soft, non-tender. A 12-lead ECG revealed sinus tachycardia, with normal axis, normal intervals, and borderline left ventricular hypertrophy by voltage criteria. Transesophageal echocardiogram did not reveal evidence of thrombus, pannus, or vegetation.

INDICATION FOR INTERVENTION

Consensus discussion with regional experts deemed that her current cardiovascular status would further deteriorate as the hemodynamic burden of pregnancy increased without an intervention. The increase in cardiac output that occurs as pregnancy progresses would not be tolerated given the fixed severe aortic valve orifice and would lead to decompensation. The patient was not keen for termination of the pregnancy. Balloon valvuloplasty was considered. We felt that, in the setting of prosthetic valve disease, the relief of stenosis would be limited, and this type of procedure could lead to significant prosthetic aortic valve regurgitation and acute hemodynamic decompensation. Both surgical aortic valve replacement and TAVI were considered. It was felt surgery would carry a 30% risk of fetal demise and at least a 2-3% risk of maternal mortality. If surgical aortic valve replacement would be pursued, the decision to choose which type of valve would be quite challenging. Implantation of a mechanical valve would require anticoagulation. Oral anticoagulation during pregnancy is associated with embriopathy. Anticoagulation with low molecular weight heparin is associated with increased risk of thrombo-embolism and maternal death. Surgical implantation of a new bioprosthesis would provide suboptimal durability requiring a third sternotomy in the future.
TAVI would provide lower intra procedural risk, a reasonable durability while avoiding complications related to on-pump surgery; avoid placental hypoperfusion of cardiopulmonary bypass, using a strategy to avoid fetal and maternal radiation.

INTERVENTION

At 13 weeks gestation, she underwent successful valve-in-valve TAVI with a #23 Edwards Sapien XT valve. The patient had a low left coronary take off. Therefore, a JL 4 short tip guiding catheter with a coronary wire was placed down the left anterior descending artery to maintain patency in case there was an issue with the prosthesis causing coronary obstruction.
Post-procedure echocardiogram showed normal functioning bioprosthesis and hyperdynamic systolic function. Fetal monitoring post-operatively did not reveal any evidence of distress. She was discharged postoperative day 5 without any complications. She progressed well throughout the remainder of pregnancy, without significant increase in gradients across her prosthetic valve. At 39 weeks, she underwent planned induction with epidural anesthesia without complications.
Two years after the procedure, she remains asymptomatic and gradients across the bioprosthesis have not increased.

LEARNING POINTS OF THE PROCEDURE

This case highlights degeneration of bioprosthetic aortic valve in pregnancy, importance of the heart team for clinical decision making in complex patients balancing maternal and fetal risks, the importance of maintaining good maternal health to allow for fetal development, and successful valve-in-valve TA