

Title: Transcatheter Mitral Valve Replacement in the Second Trimester of Pregnancy

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Background: Cardiac surgery during pregnancy is considered when maternal cardiac circumstances are grave and otherwise refractory to medical therapy. Gestational age is also a consideration in order to limit risks for fetal morbidity and mortality related to cardiopulmonary bypass, anesthesia as well as risks due to maternal thromboses and hypoxia. The decision to consider valve replacement is multifaceted, with additional decisions related to valve material, longevity thereof and the potential need for lifelong anticoagulation.

Objective/Purpose: This case report describes a 24 year-old female, gravida 2 para 1001 who presented as a maternal transport to Memorial Health University (MUMC) at 18 weeks EGA due to acute shortness of breath and evidence of congestive heart failure with pulmonary edema. The patient's relevant medical history was significant for a prior porcine mitral valve replacement 6 years ago at 18 years of age following a case of bacterial endocarditis that developed after dental surgery. The patient had not required any maintenance cardiac or other medication post valve replacement. She subsequently had a term vaginal delivery 2 years post valve replacement without complications. The patient also has a history of hyperthyroidism, with no current medication requirement.

Upon presentation to MUMC, the patient was tachypneic, tachycardic and in moderate distress. Her chief complaint was dyspnea at rest. Physical examination, labs and diagnostic studies were consistent with congestive heart failure. Diffuse rales were auscultated bilaterally. A BNP was elevated to 1270 pg/mL (normal < 100 pg/mL). Chest x-ray was consistent with pulmonary edema. Maternal echocardiogram revealed moderate valve regurgitation and severe valve stenosis of the prosthetic mitral valve, with 1 leaflet "fixed and immobile" and the other leaflet "mildly restricted." The ejection fraction was normal at 59%, however the right ventricle was severely dilated with severe depression of right ventricular function and severe pulmonary hypertension. After diuresis, potassium replacement and clinical stabilization our cardiology and cardiothoracic surgery consultants recommended transfer to an advanced cardiac facility for possible mitral valve replacement.

At Emory University Hospital, cardiac CT revealed early degeneration/calcification of the mitral valve leaflets. After contemplating an open thoracotomy and mitral valve replacement and less invasive options, the patient underwent a valve-in-valve (ViV) transcatheter mitral valve replacement (TMVR). This procedure was performed after accessing the femoral vein and a transseptal deployment and

seating of a bioprosthetic valve into the ring of the previous mitral valve. The patient was discharged home on post-operative day 4 with therapeutic enoxaparin, metoprolol, baby aspirin and furosemide. At a one month follow-up cardiology appointment the patient was asymptomatic, NYHA Class I, with a normal transthoracic echocardiogram.

After an entirely uneventful subsequent antenatal course, the patient presented in active labor at 38 weeks EGA prior to scheduled induction of labor. Telemetry and SBE prophylaxis were ordered. The patient had a vacuum-assisted vaginal delivery to shorten the second stage of labor. The neonate weighed 3002 g, with Apgar scores of 8/9. The patient's postpartum course was uncomplicated. She was discharged home on postpartum day 2 in stable condition, restarted on therapeutic enoxaparin.

Conclusion: Cardiac surgery during pregnancy should be avoided due to significant maternal and fetal risks for mortality. A large meta-analysis reported a maternal mortality rate of 7.3%, independent of trimester at the time of surgery or whether cesarean delivery occurred prior to or after cardiac surgery. Overall fetal mortality was 26.5%. According to expert opinion, the second trimester is considered the safest period to perform cardiac surgery. Less invasive transcatheter valve replacement will decrease surgical morbidity and may decrease mortality risks in pregnant patients who require valve replacement treatment. A single published case of TMVR has been identified in the literature.