

Management and Anesthetic Considerations for Mitral Stenosis in Pregnancy



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Introduction

- Mitral stenosis (MS) is the most common valvular lesion managed during pregnancy and the prevalence is higher in areas of the world with more rheumatic heart disease
- Increased cardiac output (secondary to 30-40% increase in preload, 10-20% increase in HR) is poorly tolerated due to restricted ventricular inflow and resultant increase in left atrial and pulmonary pressures
- In up to a quarter of women, pregnancy may be the first time a diagnosis of MS is made (4)
- Adverse maternal events in women with mitral stenosis include pulmonary edema, arrhythmia, and thromboembolism
- Women with moderate or severe MS (mitral valve area (MVA) 1.5cm2), baseline maternal NYHA class III or IV, or a history of cardiac complications before pregnancy represent the groups at highest risk of maternal complications
- In symptomatic women with severe valvular heart disease who are considering pregnancy, intervention before pregnancy is recommended on basis of standard indications – Class I recommendations from the 2020 ACC/AHA guidelines
- Percutaneous balloon mitral valvuloplasty (PBMV) is effective and safe during pregnancy and is the preferred procedure for improving mitral valve area and gradients

Case Description

- 38 year old female G7P2042 at 24 weeks pregnancy with a past medical history of pyelonephritis presented with shortness of breath on exertion for 1-2 weeks, chest pain, orthopnea, and leg swelling, found to be hypertensive and tachycardic. A transthoracic echo was performed demonstrating an LVEF of 70%, normal RV size and function, moderately dilated left atrium, rheumatic mitral valve, severe mitral stenosis with MV area of 0.8cm2, mean mitral gradient of 15 mmHg, minimal mitral regurgitation.

Hospital Course

Cardiology was consulted and a recommendation for PBMV was made. The patient was diuresed with lasix and a labetalol regimen was started. A multidisciplinary team meeting was conducted including OB/GYN, Anesthesia, MFM, and Structural Cardiology. The decision was made to further optimize with metoprolol, diltiazem, and lasix PRN prior to performing PBMV.

Intraoperative Course

Monitored anesthesia care with preinduction A line was planned. A line was placed, along with standard ASA monitors. The patient’s airway was anesthetized with topical lidocaine. Remifentanyl and propofol infusions were started. Small boluses of fentanyl and propofol were given for additional sedation. The PBMV was well tolerated by both patient and fetus without any complications. Post-intervention TEE demonstrated an improved MVA of (1.7cm2), however moderate to severe MR was noted. The patient remained clinically improved and medication adjustments were made for MR. The patient was discharged with plans for close follow up.

Anesthetic Considerations For Percutaneous Balloon Mitral Valvuloplasty

- PBMV should be performed after the 1st trimester or 4 months gestation due to risk of ionizing radiation exposure during organogenesis
- The indications for PBMV are congestive heart failure NYHA class >II and MVA <1.5-1.7cm2
- Complications of the procedure are rare, the most common being MR, which occurs in 12% of patients
- The goals of anesthetic management are to avoid tachycardia; revert acute atrial fibrillation to sinus rhythm; avoid aortocaval compression; maintain adequate venous return and SVR, and prevent increases in pulmonary vascular resistance (7)
- Any new onset atrial fibrillation may result in decreased cardiac output in these patients with poor cardiac reserve and requires faster intervention and cautious use of medication to avoid harm to the fetus and to prevent thromboembolism, diltiazem is preferred over amiodarone because of relatively less toxicity to the fetus (7)
- MAC or regional anesthesia is generally preferred over general anesthesia to avoid risks of aspiration and difficult airway management and to minimize fetal exposure to potent anesthetic agents, PBMV in a pregnant patient can be performed in an awake state with minimal dose of opioids to avoid fetal bradycardia (7)
- The more advanced the pregnancy, the greater the chance of uterine irritability and preterm labor. There is no evidence to suggest that any anesthetic agent, dose, or technique influences the risk; it is more likely to result from the disease process itself.

Anesthetic Considerations For Vaginal Delivery

- In vaginal deliveries epidural analgesia is recommended for most women with stable valvular disease (4)
- The primary goal during labor is avoidance of tachycardia and excess preload, carefully titrated epidural analgesia is recommended for pain relief, which will decrease catecholamine release associated with sudden increases in heart rate and stroke volume
- Invasive hemodynamic monitoring during L&D is recommended for patients with class III or IV functional status
- Hypotension should be treated promptly with crystalloids and phenylephrine
- In moderate to severe MS, second stage of labor and vasalva efforts should be reduced and shortened by instrumental delivery (1,4)
- C-section should be reserved for patients for obstetric indications and decompensated heart failure (4)

Conclusion

- Women with moderate or severe rheumatic MS who were symptomatic before pregnancy are at significant risk of complications during pregnancy
- In particular, women with symptomatic or severe MS should be advised against pregnancy until valve intervention has taken place.
- PBMV has been performed successfully in women who fail medical therapy and is recommended over open commissurotomy
- Vaginal delivery can be safely performed with c-section reserved for patient with obstetric indications. The anesthetic goals during labor and delivery is to minimize tachycardia by controlling pain with the use of epidural analgesia
- Patients with mitral valve disease should be evaluated preconception when possible and should be followed closely by a team of specialists, including obstetricians, cardiologists, and anesthesiologists.

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