SUCCESSFUL USE OF COMBINED SPINAL EPIDURAL ANESTHESIA (CSEA) FOR CESAREAN SECTION IN PATIENT WITH SEVERE MITRAL REGURGITATION/STENOSIS AND SEVERE PULMONARY HYPERTENSION

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Introduction

- Severe mitral stenosis during pregnancy carries a significant risk of morbidity and mortality compared to the average obstetric population
- Many hemodynamic shifts occur during pregnancy, including an increase in cardiac output of up to 50% above pre-pregnancy values and an increased baseline heart rate [1]
- Patients with severe mitral stenosis are often unable to maintain these demands, which can result in elevated pulmonary pressures and pulmonary edema
- This poses specific challenges and makes maintaining hemodynamics essential during delivery and the perioperative period
- This case report conveys a patient with severe mitral stenosis and associated severe pulmonary hypertension with a term pregnancy requiring delivery via C-section

Patient Background

- Patient is a 38-year-old G3P1011 at 37 weeks gestation
- Past medical history includes:
  - Rheumatic mitral valve disease,
  - Severe mitral valve regurgitation and stenosis
  - Severe pulmonary hypertension (PAP 68mmHg)
  - Current smoker
  - Asthma
  - History of drug abuse on Subutex
  - Obesity (BMI 38)
- During pregnancy, she was having NYHA Class 3 symptoms of heart failure, including:
  - Orthopnea
  - Dyspnea on exertion
- She was started on Lasix 20mg daily and Toprol 25mg daily two weeks prior to scheduled delivery with mild improvement in symptoms

Pre-Delivery Transthoracic Echocardiogram Report

Interpretation Summary

- The qualitative LV ejection fraction is 55-59% (normal).
- The right ventricular cavity is moderately dilated.
- The right ventricular systolic function is mildly reduced .
- The left atrium is severely enlarged.
- The mitral valve abnormalities are due to rheumatic heart disease.
- Severe mitral stenosis is present. Mean MV gradient is 13-15 mmHg at heart rate of 68 bpm.
- Severe mitral regurgitation is present.
- The estimated pulmonary artery systolic pressure is 68mm Hg.
- Dilated IVC with reduced collapsibility with sniff indicates an elevated right atrial pressure of 15mmHg.

- Given her degree of mitral stenosis and regurgitation with active symptoms of heart failure, several anesthetic techniques were considered, including:
  - Spinal
  - Epidural
  - CSEA
  - General anesthesia
- Her previous C-section was performed 13 years ago at a different facility
- Records were not able to be obtained
- Multidisciplinary discussion with maternal fetal medicine, anesthesiology, pulmonology, and cardiology
- American Society of Anesthesiology (ASA) 4
- Taken to the OR for C-section under CSEA

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Preoperative

- Radial arterial line
- Two 18G peripheral IVs
- CBC

Procedure

- Patient was prepped with 2% chlorohexidine and placed in the sitting position.
- Epidural space was found in lumbar 3-4 space with an 3.5 inch 18G Touhy needle
- Intrathecal space was found with a 3.5 inch 25G Pencan needle through the Touhy
  - 20mcg fentanyl and 150mcg morphine was given intrathecally
- Epidural catheter was then threaded
- Patient was placed supine while maintaining left uterine displacement
- 2% lidocaine was given in 1cc boluses every minute until a total of 20cc was given, with close hemodynamic monitoring
- Appropriate anesthetic level was obtained at T5 level

Intraoperative

- Patient's mean arterial pressure was maintained >65 and systolic blood pressure maintained >100 with a vasopressin infusion of 2-6 units/hour with a total of 2 units of vasopressin boluses
- Supplemental oxygen given through nasal cannula
- IV Fluids: 300 mL Plasmalyte
- Estimated blood loss: 600 mL
- Appropriate urine output of 150 mL
- 10mg IV Lasix was given intraoperatively
- Patient delivered a healthy baby and tolerated procedure well

Postoperative

- She was escorted to the ICU on vasopressin infusion of 2 units/hour
- Transferred to obstetric service post-op day 1
- Discharged home on post-op day 4

Post-Delivery Transthoracic Echocardiogram Report

Interpretation Summary

- No LV segmental wall motion abnormalities.
- The left ventricular systolic function is normal.
- The qualitative LV ejection fraction is 55-59% (normal).
- The mitral valve abnormalities are due to rheumatic heart disease.
- The mitral valve posterior leaflet severely restricted in motion.
- There is diffuse thickening of the chordal apparatus,
- Image and Doppler assessment of mitral stenosis severity is discordant: Severe mitral stenosis is suspected.
- The mean trans mitral gradient at a heart rate of 84 bpm is 18.9 mmHG
- Severe mitral regurgitation is present.
- The estimated pulmonary artery systolic pressure is 57mm Hg.

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Discussion

- Pregnant women with severe mitral stenosis are often unable to tolerate peripartum physiologic changes
- Increased heart rate decreases left ventricular filling and, combined with increased volume, can lead to pulmonary hypertension and edema
- Risk of maternal death is greatest during labor and immediately post-delivery due to auto-infusion from the uterus [2]
- Severe pulmonary hypertension is known to increase risk of morbidity/mortality in the peripartum period and is one of the few comorbidities that many physicians consider an absolute contraindication to pregnancy
- Our patient was given 11-19% maternal cardiac event rate during pregnancy
- Previous studies have described successful use of different types of anesthesia for similar situations
  - Krenz et al. presented a patient also with severe pulmonary hypertension who underwent successful C-section using epidural anesthesia [3]
- For our patient, both general anesthesia and CSEA were considered
- Ultimately, general anesthesia was deferred, in an attempt to avoid the severe hemodynamic shifts associated with induction
- Instead, we opted for CSEA, which allowed for a very slow, controlled increase in neuraxial anesthesia until surgical level block was obtained

Conclusion

- This presentation discusses successful use of epidural anesthesia for a high risk Cesarean Section complicated by severe mitral stenosis and pulmonary hypertension
- Although this approach was successful, there remains no gold standard in the peripartum anesthetic management in a patient with severe pulmonary hypertension, as more cases and controlled trials are needed to establish the safest option.

References

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