

Perioperative Anesthetic Management of Pulmonary Hypertension

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Background:

- WHO group I pulmonary arterial hypertension (PH), defined as mean pulmonary artery pressure >25 mmHg, is a progressive cardiopulmonary disease that results from inappropriate pulmonary vascular remodeling leading to right-sided heart failure [1]
- The combination of PH and class III obesity alongside the physiologic changes of pregnancy pose significant challenges to anesthetic management
- Despite therapeutic advancements, the mortality rate of pregnant women with PH remains high, with idiopathic PH having a mortality rate of about 20% [2, 3]

Case

- 35 yo F G2P1 at 34w0d presented for repeat cesarean section six days after being discharged from the MICU for acute hypoxic respiratory failure
- Past medical history significant for obstructive sleep apnea (OSA), hypertension (HTN), severe obesity (BMI 60), and WHO group 1 PH
- Airway exam: Mallampati III
- PH medications included tadalafil and IV treprostinil

Pre-operative

- Meeting of multispecialty pregnancy heart team including maternal fetal medicine, pulmonology, ICU, and anesthesiology
- mWHO class IV, CARPREG II score: 2
- Echo two days prior to C-section with pulmonary artery systolic pressure (PASP) of 55 mmHg (prior elevation to 75 mmHg on echo performed 6 weeks prior)

Intra-operative

- Radial arterial line
- Combined spinal epidural anesthesia (CSE) with 1.5 cc bupivacaine 0.75%, 20 mcg fentanyl, and 150 mcg of morphine
- 2L NC and positioned on ramp
- Norepinephrine and dobutamine used in low doses throughout the case
- IV treprostinil continued throughout case
- TEE and cardiac anesthesiologist available

Post-operative

- Patient tolerated well without complications
- Epidural removed on POD #0
- Monitored postoperatively in the MICU and discharged to home on POD #6

Teaching Points

- Pregnant patients with both PH and severe obesity require advanced multidisciplinary discussion regarding location of delivery, location of recovery, and availability of advanced therapies such as ECMO
- IV pulmonary vasodilators worsen shunt by ablating hypoxic pulmonary vasoconstriction
- The risk of volume overload and right heart failure persists in the days immediately following delivery [4]
- Careful positioning of the obese parturient with PH is essential to ensure safe neuraxial and airway management

1. Emmanuel, Y. and S.A. Thorne, *Heart disease in pregnancy*. Best Pract Res Clin Obstet Gynaecol, 2015. **29**(5): p. 579-97.
2. Low, T.T., et al., *Pulmonary arterial hypertension in pregnancy-a systematic review of outcomes in the modern era*. Pulm Circ, 2021. **11**(2): p. 20458940211013671.
3. Barańska-Pawęlczak, K., C. Wojciechowska, and W. Jacheć, *Pregnancy in Patients with Pulmonary Arterial Hypertension in Light of New ESC Guidelines on Pulmonary Hypertension*. Int J Environ Res Public Health, 2023. **20**(5).
4. Preston, I.R., et al., *Management of pulmonary hypertension in special conditions*. Eur Respir J, 2024. **64**(4).