Late Second Trimester Dilation and Evacuation in a Morbidly Obese Patient with Newly Diagnosed Severe Pulmonary Arterial Hypertension

Catharine Keim MD[1], Dorian Batt MD[1], Maria Walline MD[1]

[1] Department of Anesthesiology, Weill Cornell Medicine, New York-Presbyterian Hospital, New York, NY

Weill Cornell Medicine
NewYork-Presbyterian

Introduction

- Pulmonary arterial hypertension (PAH) in pregnancy is associated with significant maternal mortality; historically up to 56%, through more recent studies suggest anywhere from 11-25%[1]
- PAH is classified as WHO Pregnancy Risk Category IV (contraindicated), however the incidence of PAH in pregnant patients is rising[2]
- Termination of pregnancy may be advised for certain high-risk patients, but is still associated with significant hemodynamic shifts that can result in RV failure and cardiovascular collapse
- Effective management relies on optimizing right heart function and maximizing cardiopulmonary reserve to best tolerate the physiologic insults at delivery and post-partum
- Advanced anesthetic planning and coordination with a multidisciplinary team of specialists is critical to prevent maternal decompensation

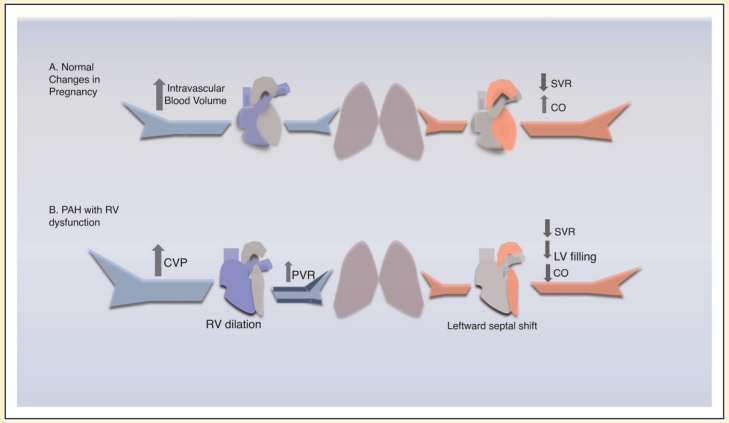

FIGURE 1. Physiological changes occurring in pregnancy and pulmonary arterial hypertension (Vaidy and Vaidya, 2023)

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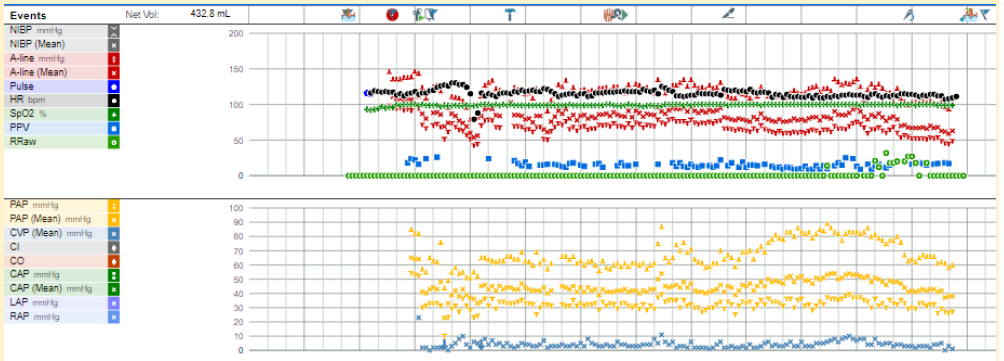
Case Presentation

A 33-year-old G2P1 with morbid obesity (BMI 48) and severe OSA was admitted to the CCU at 23w5d for expedited work-up following two syncopal episodes, increased SOB, and outpatient TTE concerning for pulmonary hypertension

CCU Course

- TTE: Normal LVF, septal flattening, dilated RA/RV, reduced RV function, 2+ TR, severe pulmonary hypertension (estimated PASP 99)
- RHC: severe pre-capillary pulmonary hypertension (PA 84/42 (58)), elevated CVP 11, normal PCWP 8, preserved Fick CO/CI 7.4/3.3, PVR 6.8 WU
- CTPE negative. Arterial line, cordis, PAC placed. Initiated on sildenafil, inhaled iloprost, intermediate-dose LMWH
- Multidisciplinary meeting: elected for termination given rapid progression of symptoms, plan for cervical dilators x 48h followed by D&E



OR Course

- Location: cardiac OR with cardiac anesthesia; CT surgery and perfusion available
- Dobutamine @ 5mcg/kg/min and iNO @ 20ppm via HFNC initiated on arrival to OR, vasopressin started prior to spinal dose, supplemented with norepinephrine, epinephrine started @ 2mcg/min as pressors increased and eventually weaned off
- Low dose CSE: 1.1mL 0.75% bupivacaine in dextrose + 15mcg fentanyl, 0.5mg midazolam x 2
- Venous and arterial femoral access obtained following neuraxial for possible ECMO cannulation, accessibility checked by CT surgery following lithotomy positioning
- Epidural removed at the end of procedure, transferred to CCU on iNO, dobutamine, low-dose vasopressin

Post-op: Remained in CCU for one week, dobutamine and iNO weaned as IV remodulin started and uptitrated, discharged on triple therapy

Contact: ckk9001@nyp.org

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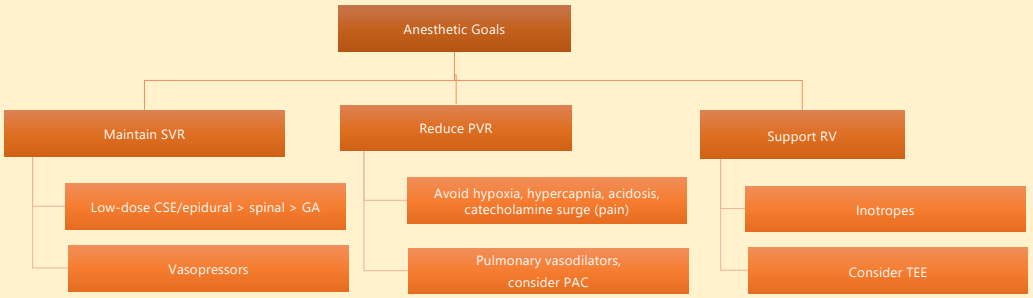
Key Points/Discussion

- Risk assessment is the first step in management
  - WHO Functional Class (WHO-FC), ESC/ERS three-strata model
- Outcomes are improved with a multidisciplinary approach[3]
  - Teams: cardiology (PH/HF), maternal fetal medicine, obstetric anesthesia, cardiac anesthesia, cardiothoracic surgery, child life services
  - Coordination regarding pre-op optimization, procedure location/timing, procedure preparation (e.g. cervical dilators), anticoagulation plan, ECMO
- Anesthetic goals: maintain SVR, reduce PVR, and support RV function; special considerations: coordination with cardiac anesthesia, specialized equipment/medications, oxytocin dosing, acceptable uterotonics, lithotomy position and access for ECMO

Determinants of prognosis (estimated 1-year mortality)	Low risk (<5%)	Intermediate risk (5–20%)	High risk (>20%)
Clinical observations and modifiable variables			
Signs of right HF	Absent	Absent	Present
Progression of symptoms and clinical manifestations	No	Slow	Rapid
Syncope	No	Occasional syncope[a]	Repeated syncope[b]
WHO-FC	I, II	III	IV
6MWD[c]	>440 m	165–440 m	<165 m
CPET	Peak VO_2 >15 mL/min/kg (>65% pred.) VE/VCO_2 slope <36	Peak VO_2 11–15 mL/min/kg (35–65% pred.) VE/VCO_2 slope 36–44	Peak VO_2 <11 mL/min/kg (<35% pred.) VE/VCO_2 slope >44
Biomarkers: BNP or NT-proBNP[d]	BNP <50 ng/L NT-proBNP <300 ng/L	BNP 50–800 ng/L NT-proBNP 300–1100 ng/L	BNP >800 ng/L NT-proBNP >1100 ng/L
Echocardiography	RA area <18 cm^2 TAPSE/sPAP >0.32 mm/mmHg No pericardial effusion	RA area 18–26 cm^2 TAPSE/sPAP 0.19–0.32 mm/mmHg Minimal pericardial effusion	RA area >26 cm^2 TAPSE/sPAP <0.19 mm/mmHg Moderate or large pericardial effusion
cMRI[e]	RVEF >54% SVI >40 mL/m^2 RVESVI <42 mL/m^2	RVEF 37–54% SVI 26–40 mL/m^2 RVESVI 42–54 mL/m^2	RVEF <37% SVI <26 mL/m^2 RVESVI >54 mL/m^2
Haemodynamics	RAP <8 mmHg CI ≥2.5 $L/min/m^2$ SVI >38 mL/m^2 SvO_2 >65%	RAP 8–14 mmHg CI 2.0–2.4 $L/min/m^2$ SVI 31–38 mL/m^2 SvO_2 60–65%	RAP >14 mmHg CI <2.0 $L/min/m^2$ SVI <31 mL/m^2 SvO_2 <60%

TABLE 1. ESC/ERS Comprehensive risk assessment in pulmonary arterial hypertension (three-strata model) (Humbert et al., 2022)



Resources

1. Humbert M, Kovacs G, Hoeper MM, et al. 2022 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension. *Eur Respir J*. 2023;61(1):2200879. Published 2023 Jan 6. doi:10.1183/13993003.00879-2022
2. Vaidy A, Vaidya A. Pulmonary arterial hypertension in pregnancy. *Curr Opin Cardiol*. 2023;38(3):250-256. doi:10.1097/HCO.0000000000001034
3. Dominoni M, Melito C, Schirinzi S, et al. When pulmonary arterial hypertension and pregnancy meet: a multidisciplinary clinical experts review. *Arch Gynecol Obstet*. 2024;310(6):2839-2852. doi:10.1007/s00404-024-07827-1

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