



Succesful Management For Cesarean Delivery In a Patient With Pulmonary Hypertension



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Background

- Pulmonary hypertension (PH) is the result of endothelial dysfunction and remodeling causing an increased pulmonary vascular resistance and Right Ventricular (RV) failure.
- Pregnancy increases plasma volume, cardiac output, and induces a hypercoagulable state elevating the risk of morbidity and mortality in PH [1].
- We present a case of a 31-year-old G1P0 with severe PH secondary to Hereditary Hemorrhagic Telangiectasias (HHT) with pulmonary Arterio-Venous Malformations (AVM) who underwent a successful cesarean section at 36 weeks gestation.

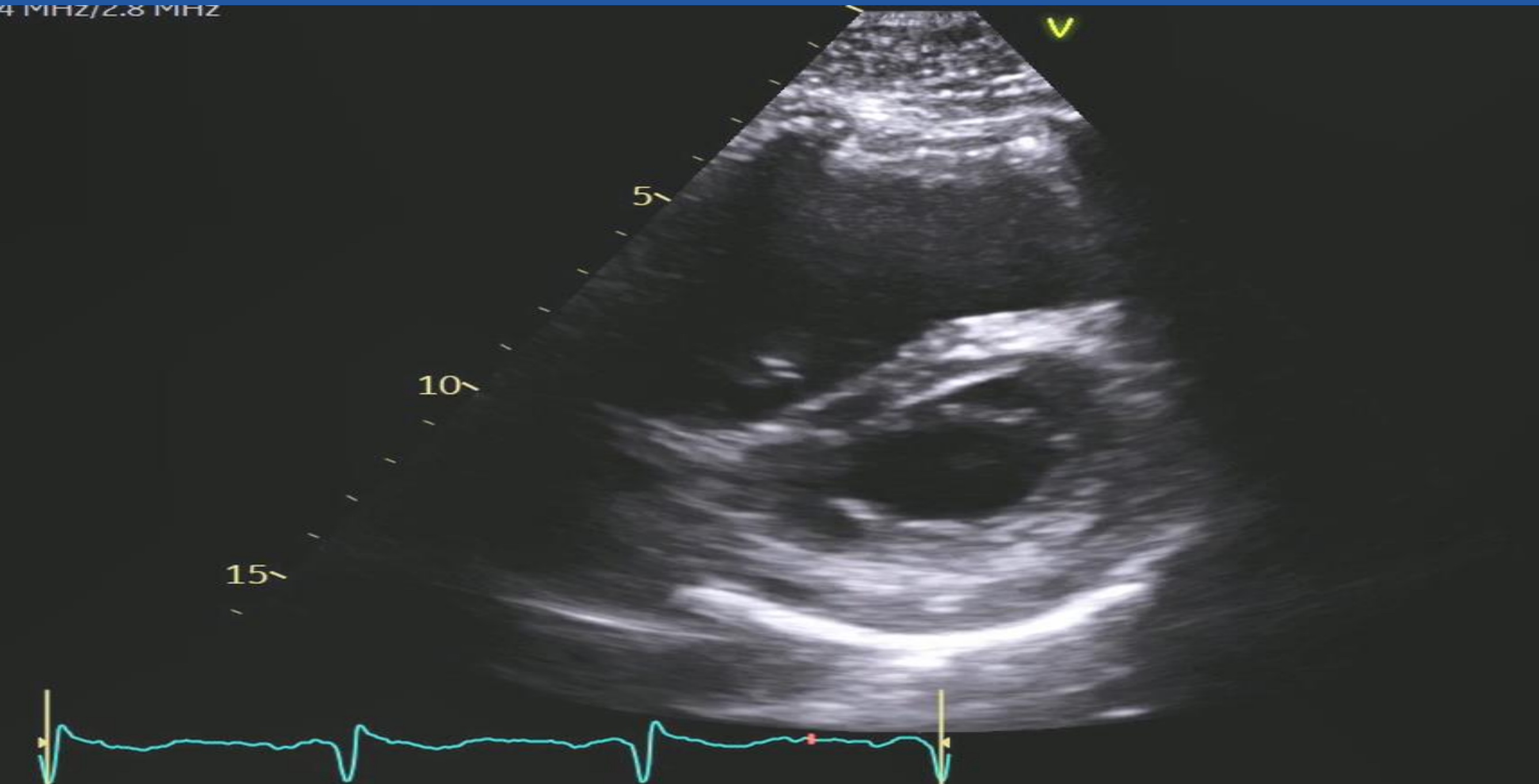
Case presentation

- Prior to pregnancy the patient was diagnosed with pulmonary AVM that caused her shortness of breath and hypoxia.
- She had a right lower lobectomy leaving a small AVM on the left lung.
- She remained symptomatic and genetic testing revealed she had HHT.
- Cardiac workup showed a RV, pulmonary artery, and wedge pressures of 60/19, 60/35, and 19 mmHg respectively.
- Vasodilator therapy was held for concern of worsening shunt and hypoxia due to her residual AVM.
- A non-contrast lumbar spine MRI was negative for any neuraxial AVM.
- Repeat imaging at 34 weeks showed: mildly reduced RV systolic function, RV Systolic Pressure (RVSP) of 75 mmHg (68% of systemic BP), R→L shunt through a PFO and septal flattening at the end of systole (Image 1).

Modified WHO Class IV for Cardiac Disease [2]

DIAGNOSIS	Pulmonary arterial hypertension Severe systemic ventricular dysfunction Previous peripartum cardiomyopathy Severe MS, AS, aortic dilation Systemic RV with decreased function Vascular Ehlers–Danlos Severe (re)coarctation Fontan with any complication
RISK	Extremely high risk of maternal mortality or severe morbidity
MATERNAL CARDIAC EVENT RATE	40–100%
COUNSELING	Yes: pregnancy contraindicated: if pregnancy occurs, termination should be discussed
CARE DURING PREGNANCY / LOCATION OF DELIVERY	Expert center for pregnancy and cardiac disease
MINIMAL FOLLOW UP VISITS DURING PREGNANCY	Monthly

Image 1



Anesthetic management

- The patient had a radial arterial line, a 2nd PIV and external defibrillator pads placed prior to an intrathecal catheter insertion.
- ECMO team was alerted and on standby.
- Dural puncture done with a Tuohy needle 17 G and a wire reinforced catheter was threaded 4 cm in the intrathecal space.
- 0.5 mL of Bupivacaine 0.5% (2.5 mg) given through the intrathecal catheter with Morphine (150 mcg) and Fentanyl (15 mcg) while monitoring anesthetic response and levels.
- Appropriate surgical anesthesia was achieved after 6.25 mg of Bupivacaine (volume of 1.25 mL) and maintained with two additional doses (1.25 mg each = 0.25mL) after 15 and 60 minutes of initial dosing.
- Supplemental oxygen was supplied to avoid hypoxic pulmonary vasoconstriction.
- A peripheral IV Norepinephrine infusion was used to maintain hemodynamics (max dose 0.02 mcg/kg/min) and Ephedrine was administered during uterine incision for inotropic support of RV function.
- An oxytocin infusion without bolus was used for uterine tone.
- At the time of delivery patient had a transient decrease in saturation to low 90's that recovered without intervention secondary to R→L shunt through PFO.
- No arrhythmias were noted.
- Patient tolerated the procedure well and was directly admitted to the Cardiac Intensive Care Unit.
- She was discharged on POD3 with no issues.
- Nov/2022 ECHO showed an enlarged RV with a moderate reduction in systolic function, a RVSP of 68 mmHg and a preserved left ventricular function.
- No IUD or sterilization was done.

Discussion

- PH poses significant morbidity and mortality to parturients throughout all stages of pregnancy.
- The increased CO found in pregnancy specially after delivery may not be accommodated by the fixed pulmonary vasculature resulting in RV failure.
- A decrease in SVR can result in reduced diastolic BP and thereby decreased coronary perfusion pressure especially in a dilated and failing RV [3].
- The hypercoagulable state can result in pulmonary emboli which can exacerbate pulmonary hypertension.
- The anesthetic management should focus on optimization of the RV perfusion and function considering the changes in pregnancy and critical times of delivery to avoid acute RV failure [3].
- General anesthesia and neuraxial techniques can be used, but the latter allows slow titration for hemodynamic stability and optimized respiratory parameters [4].
- CICU monitoring is necessary since acute heart failure can occur after delivery.
- Many patients have an intense pre delivery follow up but fall short on post-partum follow up.
- This is particularly worrisome since many of the maternal deaths occur as early as one week postpartum to several months after delivery [5].

References

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