

Pregnancy with Pulmonary Hypertension: A Case Study and Review

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Abstract

Pregnancy with pulmonary hypertension (a type of high blood pressure in the lungs) is very dangerous for both mother and baby. This condition, characterized by elevated pulmonary artery pressure (PAP) and pulmonary vascular resistance (PVR), can lead to right ventricular failure due to increased afterload. Other risks include thromboembolic complications and hemodynamic instability. There are newer treatments that help, but they don't make the risks go away completely.

In this study, I describe a 26-year-old woman pregnant for the first time (primigravida). She came to the emergency room struggling to breathe (dyspnea), with chest pain and swollen legs (peripheral edema). Doctors discovered she had severe pulmonary hypertension in the last part of her pregnancy (third trimester).

My goal is to help doctors understand the pathophysiology of this condition, the dangers involved, and how best to manage these critically ill patients.

Keywords: Primary Pulmonary Hypertension, Pregnancy, Maternal mortality.

1. Introduction

Pulmonary hypertension (PH) denotes abnormally elevated blood pressure within the pulmonary arteries. Normally, pulmonary pressures remain significantly lower than systemic blood pressures. PH can occur as a primary disease or secondary to other health problems. While uncommon, it can affect women of reproductive age.

Pregnancy places significant hemodynamic stress on the cardiovascular system, and women with PH have a diminished capacity to adapt to these changes. This physiological strain poses serious health risks to both mother and fetus. Therefore, pregnancy is strongly discouraged in women with established PH.

The main signs of PH include exertional dyspnea, fatigue, dizziness or syncope, chest pain (often angina-like), and lower extremity edema. These symptoms overlap with other cardiopulmonary

conditions, necessitating thorough diagnostic evaluation, including right heart catheterization, to confirm the diagnosis of PH.

If a woman with PH becomes pregnant (or is diagnosed during pregnancy) and elects to continue the pregnancy, she requires close monitoring by a multidisciplinary team specializing in both PH and high-risk obstetrics.

Case Study

A 26-year-old primigravida presented at 33 weeks of gestation with a one-month history of progressive dyspnea, palpitations, and mild intermittent cough. With a 4-year history of systemic hypertension and insulin-dependent diabetes mellitus, the patient exhibited tachypnea and tachycardia. Blood pressure was 180/119 mmHg, heart rate (HR) was 100/min, and respiratory rate (RR) was 28/min. Signs of right ventricular overload were evident, including elevated jugular venous pressure (JVP - 14 cm above the sternal angle), lower limb edema, and a right parasternal heave. Auscultation revealed an accentuated pulmonary component of the second heart sound (P2) and a pansystolic murmur consistent with tricuspid regurgitation (TR). Electrocardiogram (ECG) indicated a right heart strain pattern, and chest radiograph showed a prominent right heart silhouette with enlarged pulmonary arteries. Echocardiogram confirmed moderate TR, normal right ventricular wall motion abnormalities (RWMA), left ventricular ejection fraction (LVEF) of 55%, mild mitral regurgitation (MR), no evidence of clot, vegetation, or pulmonary embolism (PE), high normal left atrial (LA) and right atrial (RA) size, pulmonary artery systolic pressure (PASP) of 65mmHg, and inferior vena cava (IVC) collapse of 1.4mm. The diagnosis was severe pulmonary arterial hypertension (PAH), and the patient was referred to a higher center for intensive treatment. (fig1,2)

Discussion

Primary pulmonary hypertension (PPH) is defined as a sustained elevation of pulmonary artery systolic pressure (PASP - mean greater than 25 mmHg at rest) without an identifiable cause. Pathophysiological mechanisms contributing to this condition include pulmonary vasoconstriction, medial hypertrophy, in-situ thrombosis, and dysfunctional pulmonary vascular endothelium. Pregnancy places significant hemodynamic stress on the cardiovascular system, and women with pulmonary hypertension lack the physiological reserve to tolerate these changes. Symptoms like fatigue, dyspnea, syncope, and chest pain typically worsen in the second trimester as cardiac output and blood volume increase by approximately 40%. During labor, uterine contractions further increase circulating blood volume, while pain increases right atrial pressure, blood pressure, and cardiac output. Due to these risks, pregnancy is strongly contraindicated for women with PPH, and termination may be a necessary consideration in early pregnancy.

When PPH is discovered late in pregnancy, a planned cesarean section under controlled conditions is the preferred method of delivery. This allows for coordination between different medical specialists, early initiation of monitoring, minimizes the pain and circulatory stress of labor, and ensures the availability of an intensive care unit (ICU) bed. Premature spontaneous labor is common, so delivery

is typically scheduled between 32-34 weeks of gestation.

A study at AIIMS in New Delhi investigated maternal and neonatal outcomes, specifically comparing results between severe and mild pulmonary arterial hypertension (PAH). Out of 30 patients, 14 had severe PAH. Compared to women with mild PAH, those with severe PAH had significantly higher rates of preterm delivery (11 vs. 3, $P < 0.05$), small for gestational age infants (10 vs. 2, $P < 0.05$), and cardiac complications (6 vs. 1, $P < 0.05$). There was one case of maternal mortality in a patient with Eisenmenger syndrome. In women with severe PAH, pulmonary artery systolic blood pressure (PASBP) increased from 63.14 ± 7.6 to 71.57 ± 7.9 mmHg ($P < 0.05$), while in mild PAH, it increased from 40.37 ± 3.6 to 41.69 ± 4.1 mmHg ($P < 0.05$).

Women with pulmonary hypertension should be counseled extensively to avoid pregnancy. The risks are so severe that when a pregnancy occurs, even if the woman is in good clinical condition, termination should be discussed. It's important to understand that pregnancy termination itself carries risks and should only be performed in a facility with appropriate expertise.

If the woman decides to continue her pregnancy, it is critical that she is managed by a multidisciplinary team in a specialized pulmonary hypertension treatment center. This team should include a pulmonary hypertension specialist, a cardiologist, an obstetrician and an anesthetist experienced in managing high-risk pregnancies, and a neonatologist. The woman must be monitored closely, with at least monthly assessments to track her clinical status..

To reduce the demands on her heart, rest and a low-sodium diet are recommended. The patient should prioritize a lateral recumbent position to avoid inferior vena cava (IVC) compression. Although the benefit of hospitalization in the second trimester remains unproven, close outpatient monitoring has been associated with positive pregnancy outcomes. Supplemental oxygen should be administered when hypoxemia is present. When there is an established indication outside of pregnancy, anticoagulation therapy should be continued. However, for other women, it should be considered on an individual basis due to the risk of bleeding complications, particularly in those with Eisenmenger syndrome or portal hypertension. A detailed delivery plan should be developed, with the understanding that the optimal mode of delivery (vaginal vs. cesarean) remains a topic of debate.

Conclusion

Pulmonary hypertension, regardless of its classification, carries a very high risk of serious maternal health complications and even mortality during pregnancy. While women with severe cases are at the greatest risk, there's no 'safe' level of this condition in the context of pregnancy. Due to the significant dangers, pregnancy is strongly contraindicated for women with pulmonary hypertension.

However, if a woman elects to continue her pregnancy, it's imperative that she receives specialized care from a multidisciplinary team experienced in managing both pulmonary hypertension and high-risk obstetric cases..

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