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Case report
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# Pulmonary Hypertension in Pregnancy: A Case Report

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## ABSTRACT

**Background:** Pulmonary Hypertension (PH) is a disease characterized by distressing symptoms and decreased life expectancy due to the narrowing of the blood vessels of the lungs, which often leads to right heart failure. The prevalence of PH in women is 97 cases per million, with 64% of the main causes of PH in pregnancy congenital heart defects, resulting in a very high maternal and fetal mortality rate.
**Case Report:** A 38-year-old G4P1A2 31-week gestational age complained of shortness of breath for 5 days. Physical examination revealed blood pressure was 107/62 mmHg, Heart Rate was 98 beats per minute, respiration 40x per minute, and SpO2 88% with NRM 10 Lpm. The heart examination obtained heart sound I -II regular and a systolic murmur was heard between the left 2nd ribs. Abdominal examination was single fetus, intrauterine, breech presentation, His (+), fetal heart rate 160 beats per minute. vaginal toucher 2 cm in labour. ultrasound examination singles fetal, transverse lies, with an estimated fetal weight of 1600 grams. Echocardiography finding: ASD II L to R shunt with LV EF 60%(T), 62% (S), dilated RA-RV, TR severe, MR mild, High Probability of Pulmonary Hypertension. The patient was diagnosed with Dyspnea, Pulmonary edema caused by cardiogenic, ASD II, High probability of PH, NYHA IV, and Breech presentation in labor. Decided to perform a caesarian section and sterilization. The Male baby was born with 1570 grams Apgar Score 3-5-7. post operation patient was admitted to ICU. Twelve hours after the operation the patient had decreased control and became a PH crisis then the patient was declared dead.
**Results:** The death of the patient, in this case, was caused by cardiogenic shock due to Pulmonary Hypertension Crisis.
**Conclusion:** Early diagnosis along with collaborative and comprehensive management of pulmonary hypertension is needed for good maternal and fetal outcomes.

**Keywords:** pulmonary hypertension, pregnancy, heart disease.

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## BACKGROUND

Cardiovascular disease in pregnant women remains one of the medical conditions with the highest risk of causing maternal and fetal mortality and morbidity, the most avoidable cause was pulmonary hypertension in pregnancy (Petersen et al., 2019). Pulmonary hypertension (PH) is a disease characterized by symptoms that decrease life expectancy due to the narrowing of the pulmonary blood vessels, which often leads to right heart failure (Thomas et al., 2019). PH can be primary in pathogenesis or a result of congenital heart disease (CHD), valvular heart disease (VHD), cardiomyopathy, or associated with chronic thromboembolic disease or other systemic diseases Siu et al., 2001). Pulmonary hypertension is a rare disorder that may occur in women of childbearing age, including pregnant women (Pieper et al.,2011).

In pregnant women, the risk of death for both the mother and fetus is high, with some data showing high maternal mortality rates, which are around 30-56% (Afify et al., 2022). Pregnant women also recorded the majority of hospitalizations due to pulmonary hypertension (63%), with rates increasing by 57% (George et al., 2014). Pregnancy in women with PH has always been considered a high risk for maternal and neonatal complications, including maternal mortality, especially during labor and the postpartum period (Sliwa et al., 2016). Therefore, PH is considered a contraindication of pregnancy (Canobbio., 2017). This is mainly due to the inability of the right ventricle to adapt to the volume and hemodynamic changes associated with pregnancy, labor, and increase in plasma volume and cardiac output, decreased systemic vascular resistance, and increased susceptibility to thromboembolic events due to hypercoagulability (Martin et al., 2019). Complications and mortality are related to the inability of the heart to accommodate the increased plasma volume and cardiac output, decreased systemic vascular resistance (RVS), as well as the hypercoagulability that accompanies pregnancy (Hemnes et al., 2015). World Health Organization (WHO) classifies pulmonary hypertension from all causes as a class IV heart disease and advises against pregnancy (Regitz-Zagrosek et al., 2011). Nevertheless, several women with PH decide to become pregnant while others may be newly diagnosed with PH during pregnancy. In one study, 1 in 4 women diagnosed with PH related to congenital heart disease (CHD) and 16% of primary PH were diagnosed for the first time during pregnancy (Bédard et al., 2009). In this case presentation, we report an unavoidable maternal mortality caused by the PH crisis.

## CASE PRESENTATION

A 38-year-old female G4P10021 was referred from a secondary hospital with dyspnea caused by suspected cardiomyopathy. The patient complained of shortness of breath since 5 days ago. Shortness is felt getting worse when doing activities. The patient felt comfortable sleeping with 3 pillows. The patient was 7 months pregnant. Pregnancy history: (1) abortion at 12 weeks gestational age (2). Spontaneous delivery, 2650 grams, (3), abortion 12 wga, curettage in 2016, and (4), abortion12 wga curettage in 2017 (4) current pregnancy. History of hypertension, DM, asthma, allergies, or hepatitis were denied. Patient routine antenatal care every month. Physical examination revealed a height of 156 cm, weight of 45 kg with a BMI of 21. Physical examination revealed blood pressure was 107/62 mmHg, Heart Rate was 98 beats per minute, respiration 40x per minute, and SpO2 88% with NRM 10 Lpm. The heart examination obtained heart sound I -II regular

and a systolic murmur was heard between the right 2nd ribs. Abdominal examination was single fetus, intrauterine, breech presentation, His (+), fetal heart rate 160 beats per minute. vaginal toucher 2 cm in labour. ultrasound examination singles fetal, transverse lies, with an estimated fetal weight of 1600 grams. Echocardiography finding: ASD II L to R shunt with LV EF 60%(T), 62% (S), dilated RA-RV, TR severe, MR mild, High probability of Pulmonary Hypertension. Thorax X-ray found cardiomegaly accompanied by pulmonary edema and minimal right pleural effusion. The patient was diagnosed with dyspnea, Pulmonary edema caused by cardiogenic, ASD II, High probability of PH, NYHA IV, and Breech presentation in labor. Decided to perform a caesarian section and sterilization. The Male baby was born with 1570 grams Apgar Score 3-5-7. post operation patient was admitted to the ICU with post-operative lab results: Hb 8.0, Ht 23, AL 7.4, AT 137, AE 2.58, Alb 1.8, Na 141, K 2.8, and Cl 118. Patient Echocardiogram examination post-operation with interpretation: ASD II R to L Shunt, with LV Function Good EF 60% (T), 62% (S) RV Function Good (TAPSE 2.0), RA - RV, LA Dilated, TR Severe, MR Mild, High Probability of PH, Eisenmeinger syndrome. Twelve hours after the operation the patient got decreased control and became a PH crisis then the patient's ECG was asystole and was declared dead.

## RESULTS

Physical examination revealed Blood pressure was 107/62 mmHg, Heart Rate was 98 beats per minute, respiration 40x per minute, temperature 36,70 C, and SpO2 88% with NRM 10 Lpm. On physical examination found the eyes were not pale and the sclera was not icteric, there was no increase in jugular venous pressure, the ictus cordis was not palpable, and on percussion, the heart border was not widened; on auscultation, the heart first and second sounds were normal, regular and a systolic murmur was heard between the right 2nd ribs. On auscultation of the lungs, normal vesicular baseline sounds were found in both lung fields, and no additional sounds were found. On abdominal examination single fetus, intrauterine, breech presentation, His (+), fetal heart rate 160 beats per minute, vaginal toucher 2 cm in labor. Examination of the extremities did not reveal edema and cold acral. Ultrasound examination single fetal, breech presentation, with an estimated fetal weight of 1600 grams, cardiomegaly in the fetus. Echocardiography finding (Figure 2): ASD II L to R shunt with LV EF 60%(T), 62% (S), dilated RA-RV, TR severe, MR mild, High Probability of Pulmonary hypertension. Thorax X-ray found (Figure 2) cardiomegaly accompanied by pulmonary edema and minimal right pleural effusion. The patient was diagnosed with dyspnea, pulmonary edema caused by cardiogenic, ASD II, High probability of PH, NYHA IV, Breech presentation in labor. Decided to perform a caesarian section and sterilization. The Male baby was born 1570 grams, Apgar Score 3-5-7. Post-operation patient was admitted to the ICU with post-operative lab results: Hb 8.0, Ht 23, AL 7.4, AT 137, AE 2.58, Alb 1.8, Na 141, K 2.8, and Cl 118. Patient Echocardiogram examination post-operation with interpretation: ASD II R to L Shunt, with LV Function Good EF 60% (T), 62% (S) RV Function Good (TAPSE 2.0), RA - RV, LA Dilated, TR Severe, MR Mild, High Probability of PH, Eisenmeinger syndrome. Twelve hours after the operation the patient got decreased control and became PH crisis then the patient's ECG was asystole and was declared dead.

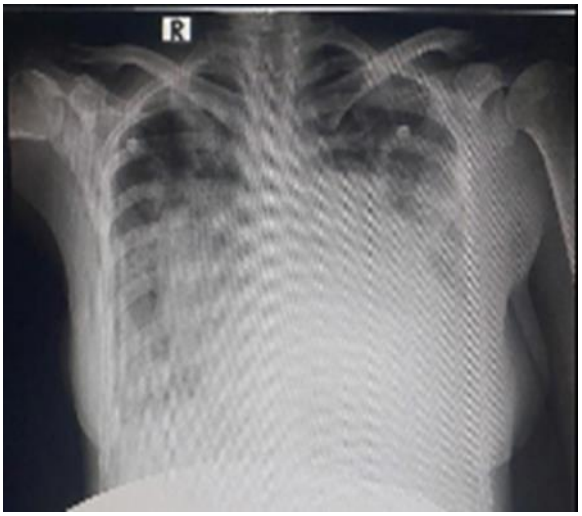

**Figure 1. Chest X-ray shows cardiomegaly**

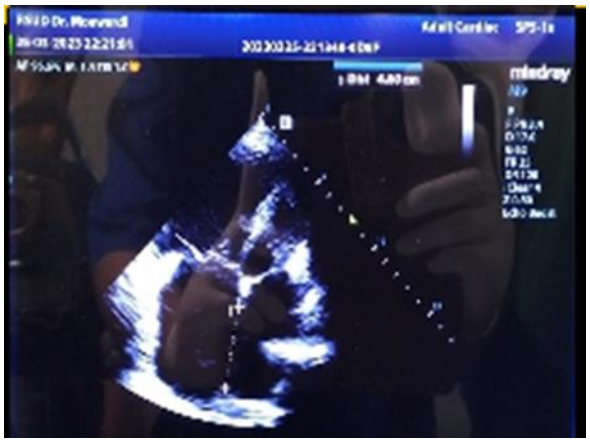

**Figure 2. Echocardiography shows atrial septal defect**

## DISCUSSION

The prevalence of Pulmonary Hypertension (PH) in women is 97 cases per million, with 64% of the main causes of PH in pregnancy being congenital heart defects, resulting in a very high maternal and fetal mortality rate, especially if there is a delay in diagnosis so that it was late to manage or terminate. Pregnancy is contraindicated in patients with Pulmonary Hypertension (Kaemmerer et al., 2018). Delayed diagnosis of pulmonary hypertension in patients is due to the non-specificity of clinical manifestations in patients. In this patient's shortness of breath was suddenly lasted 5 days without any improvement in the quality of shortness of breath, there were no symptoms of leg edema, chest pain, and no right ventricular dysfunction found, so it masked by physiological symptoms in pregnant women. The patient had never complained of shortness of breath before, ASD heart defect as the main risk factor for PH in the patient was found accidentally during an examination at the hospital at 31 weeks gestation. The prevalence of ASD in all cases of congenital heart defects was 8-10%. These ASD heart defects are often undiagnosed in childhood and are asymptomatic in adulthood. 6%-35% of patients with

secundum ASD are at risk for Pulmonary Hypertension, with 9-22% of cases having a High

Probability of PH (Mayeux et al., 2021. Pregnancy with PH has a high mortality rate, especially in the peri or postpartum period, associated with right ventricular failure right ventricular failure. In this patient, there was a delay in the diagnosis of ASD, therefore patient fell into severe Pulmonary Hypertension and then Pulmonary hypertension crisis. The diagnosis of the cardiac abnormalities should be established since the beginning of pregnancy and referral during the first trimester to a tarsier hospital so that close monitoring and collaborative management can be carried out on the patient (Sliwa et al., 2016).

Predictors of PH in ASD include age, defect size, and female gender. Pulmonary vascular disease associated with systemic to pulmonary shunts can be prevented by early correction of the defect in most patients can be prevented by early defect correction in the majority of patients. Prevention of PH and pulmonary vascular repair may still be reversible after surgical closure of the ASD defect. If a shunt has occurred and Eisenmenger syndrome has developed, ASD closure is contraindicated and PH-specific therapy should be initiated if functional capacity declines (Anjum et al., 2021). PH-specific therapy should be initiated if functional capacity declines. Maternal death in this case was unavoidable. Death can be avoided if early diagnosis and early management of the etiology are done to void mortality and morbidity in the patient, diagnosis of cardiac abnormalities has been established since early pregnancy, a referral can be made early in pregnancy, a referral could be made during the first trimester, so that close monitoring of the patient can be carried out, and multidisciplinary treatment is carried out multidisciplinary treatment that is faster and more comprehensive.

## AUTHOR CONTRIBUTION

Trisulo Wasyanto is the main author who determines the concept and review. Nutria Anggraini searching for literature, editing, and reviews.

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None.

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## CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

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