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Intensive Care Management of Preeclampsia: A Case Report

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ABSTRACT

Background: The prevalence of preeclampsia is around 5% - 15% of all pregnant women. It can cause severe complications and even death in the mother and fetus if not adequately managed. **Case presentation:** A 36-year-old housewife was admitted to the emergency department with a chief complaint of shortness of breath before hospital arrival. The patient also complained of headaches. From the physical examination, consciousness was compos mentis, blood pressure 162/100 mmHg, HR 90 x/min, RR 24x/min, SpO₂ 96%. From abdominal ultrasound gravid 36-37 weeks according to biometry, fetal alive, gemelli, intrauterine, transverse lie right head dorsoinferior- breech presentation, the Laboratory in emergency room result, haemoglobin: 10,4, leukocyte, 13.020, thrombocyte 359.000, hematocrit 31, ureum: 11, creatinin: 0.5, glucose: 72, protein urine: +2. **Conclusion:** In patients with preeclampsia, proper diagnosis and appropriate treatment in the intensive care unit and management by a multidisciplinary team can prevent preeclampsia complications and improve preeclamptic patients' outcomes.

1. Introduction

Hypertension in pregnancy is one of the leading causes of increased maternal morbidity and mortality. Preeclampsia is common during pregnancy. The prevalence of preeclampsia is around 5% - 15% of all pregnant women. It can cause severe complications and even death in the mother and fetus if not adequately managed.^{1,2}

Preeclampsia occurs in 2-5% of all pregnancies. Preeclampsia is one of the causes of increased rates of maternal morbidity and mortality worldwide. The symptoms of preeclampsia occur due to the disruption of endothelial function that persists in the occurrence of disorders of cerebral autoregulation. Preeclampsia can occur with or without HELLP syndrome (hemolysis, elevated liver enzymes, low platelets). If

this dysfunction persists and worsens postpartum, it increases maternal mortality.³

The prevalence of preeclampsia has increased in the last 3 decades. This is due to several risk factors, such as extremes in reproductive age, such as being too young or too old, multiple pregnancies, and aggravating comorbidities, such as chronic hypertension, obesity, and diabetes.^{4,5}

The incidence of preeclampsia may progress to eclampsia, occurring in 5% of all cases; in about 19% of cases, preeclampsia progresses to HELLP syndrome. Preeclampsia is one of the most common indications for admission to the ICU. Still, it is not limited to hypertension disorder, neurological dysfunction (intracranial haemorrhage, seizures), refractory hypertension, increased intracranial pressure), liver or

kidney disorders, pulmonary oedema, and HELLP syndrome.¹

In patients with preeclampsia, proper diagnosis and appropriate treatment in intensive care unit and management by a multidisciplinary team can prevent preeclampsia complications and improve preeclamptic patients' outcomes.⁶

2. Case Presentation

A 36-year-old housewife was referred from Batusangkar Hospital to the emergency department of Dr. M. Djamil General Hospital with a chief complaint of shortness of breath before hospital arrival. The patient also complained of headache but no heartburn symptoms or blurred vision. No history of seizure occurred. This expectant mother was on her third pregnancy of 36-37 gestational weeks with Gemelli and severe pre-eclampsia. She denied having abdominal contractions or vaginal discharges. The fetal movement was within normal. She has had a history of hypertension during pregnancy (179/110 mmHg) and did not take any regular medication.

The history of hypertension from a previous pregnancy, DM type 2, heart problems, and asthmatic episodes was denied. Delivery history: (1) Giving birth assisted by a midwife, spontaneous delivery of a fully termed male baby, birth weight was 4000 grams, alive. (2) Giving birth assisted by midwife, spontaneous delivery with a fully termed male baby, birth weight was 3100 grams. (3) This pregnancy.

From the physical examination, consciousness was compos mentis, blood pressure 179/110 mmHg, HR 90 x/min, RR 24x/min, SpO₂ 96% with NRM 10 lpm. Body mass index 21.2 (normoweight), Vesicular breathing sounds, ronchi low pitched wheeze and no rales, USG examination is fetal heart rate 1: 135 bpm, fetal heart rate 2: 131 bpm, uterine contraction: (-). Genitalia examination is normal. pretibial edema (+/+).

From abdominal ultrasound Gravid 36-37 weeks according to biometry, fetal alive, gemelli, intrauterine, transverse lie right head dorsoinferior- breech presentation, the laboratory in emergency room result,

haemoglobin: 10,4, leukocyte, 13.020, trombocyte 359.000, hematocrite 31, ureum: 11, creatinin: 0.5, glucose: 72, protein urine: +2.

The diagnose is G3P2A0H2 36-37 weeks of preterm pregnancy + severe preeclampsia, fetal alive, gemelli, intrauterine, transverse lie right head dorsoinferior- breech presentation. Early management in the emergency department: (1) observation intensively of general condition, vital signs, and fetal heart beat regularly, (2) O₂ supplementation (3) MgSO₄ 40% 10 grams as maintenance dosage in 500ml of Ringer lactate solution, dripped intravenously, (4) Methyldopa 3x750 mg per-oral, (5) Informed consent to patient and families, (6) Pregnancy termination (sectio caesarea).

After termination, the patient was admitted to ICU. The patient was intubated and assisted by a mechanical ventilator. Blood pressure on admission is 165/92 mmHg, heart rate: 78 x/m, Temp: 36,5°C, SpO₂: 99%. from Abdominal examination, uterine fundal palpated 2 fingers below umbilical, contraction (+), genitalia: v/u normal, vaginal bleeding (-).

Laboratory result in ICU: Haemoglobin 9,8, hematocrit 29, leucocyte: 18.790, thrombocyte: 317.000, albumin 2.1, procalcitonin 0.86, from blood gas analysis pH 7,435 pCO₂ 34,9, PO₂ 124,7 HCO₃ 23,6, BE_{ecf} -0,8, SO₂% 99,0 %. The patient was diagnosed post-sectio caesarea a.i preeclampsia + gemelli + CAP + moderate anemia+ hypoalbuminemia, D1. The patient planned for transfusion of PRC 1 unit, Inf albumin 20%, Initiate feeding test. Then the patient was given therapy as follows: Ceftriaxone IV 2x1 gr, tranexamide acid IV 3x500 mg, Vit K IV 3x10 mg, Ketorolac IV 3x30 mg, Omeprazole IV 2x40 mg, Methyldopa 3x 500 mg.

From the thoracic X-ray examination results, infiltrates were found in both lung fields. Then the patient was referred to the pulmonary department. From the pulmonary consult, the patient has been assessed as community-acquired pneumonia.

While in the ICU, the target blood pressure was still not achieved with the administration of antihypertensive methyldopa 3 x 500 mg, so the patient was then given nicardipine titration according

to body weight to achieve the target blood pressure.

On the second day of monitoring the ICU, the goal of blood pressure was achieved and stable. The patient was extubated, and the consciousness was composmentis. From vital signs were normal, blood pressure 132/86 mmHg, heart rate: 72 x/m, Temp: 36,5°C, SpO₂: 99%. The patient is planning to transfuse 1 unit of PRC and move to the obstetric ward.

3. Discussion

This case report discusses a 36-year-old female patient diagnosed with G3P2A0H2 36-37 weeks of preterm pregnancy + severe preeclampsia+ gemelli. Due to impaired endothelial function and extensive vasospasm, preeclampsia usually occurs after 20 weeks of gestation and may also present as late as 4-6 weeks postpartum. 2% to 8% of pregnancy-related complications that occur result from preeclampsia and account for 9% to 26% of maternal deaths in low-income countries and 16% in high-income countries.⁸

The patient has had a history of hypertension during pregnancy (160/100 mmHg) and did not take any regular medication. Based on the 2019 National Institute for Health and Care Excellence (NICE) Guidelines, women at high risk of preeclampsia are classified based on several factors, namely if they have a history of hypertensive disease in previous pregnancies or have other comorbidities including chronic kidney disease, autoimmune disease, diabetes, or chronic hypertension. Multiple pregnancies are also one of the risk factors for preeclampsia, and moderate risk factors for preeclampsia include being nulliparous, aged ≥ 40 years, having a family history of preeclampsia, having a body mass index (BMI) ≥ 35 kg/m, multiple pregnancies, or interval between pregnancies of more than 10 years.⁹

The definitive treatment for preeclampsia, especially with disorders such as HELLP syndrome, is fetal and placental delivery. Doctors must be able to make decisions to balance the safety of maternal and fetal risks. Preeclamptic patients with complications require multidisciplinary intensive care. The pillars of

preeclampsia management include tight blood pressure control (no more than 140/90 mmHg), correction of abnormal clotting factors, and good seizure prevention and management. Antihypertensives with a good safety profile in pregnancy include labetalol, hydralazine, and nifedipine.¹⁰

In the intensive care unit, the mother's blood pressure will be monitored closely to keep her blood pressure stable and under control to reduce the risk of seizures. Fluid balance and urine output are monitored, and periodic complete blood and urine tests are performed. The most crucial points in preeclampsia are blood pressure control and seizure prevention.

Antihypertensive drugs in preeclampsia patients aim to control blood pressure and prevent an increase in intracranial pressure because an increased intracranial pressure will cause brain oedema and intracranial haemorrhage. Postoperatively, the patient is still intubated and transferred to the intensive care unit (ICU) to be managed by a multidisciplinary team.⁶

The patient presented with a chief complaint of shortness of breath before arriving at the hospital. She was in her third pregnancy at 36-37 weeks gestation with Gemelli and severe preeclampsia. In patients with preeclampsia, the most common complaint is a new-onset headache that cannot be explained by other causes (for example, a history of headaches or migraines). Usually, headache pain in preeclampsia does not improve with medication. Visual disturbances may also accompany it. Shortness of breath and swelling of the extremities may also be present, which can worsen early pregnancy-related symptoms.⁸

There are several criteria in the diagnostic enforcement of preeclampsia, namely, systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg, at least in two measurements, which were examined within 4 hours, proteinuria at ≥ 20 weeks of gestation without a previous history of hypertension. In some cases, during preeclampsia, proteinuria may not be found on laboratory examination. However,

preeclampsia can still be diagnosed as hypertension accompanied by thrombocytopenia, renal insufficiency, impaired liver function, central nervous system dysfunction, pulmonary oedema, and new-onset visual disturbances.¹¹

Intensive and adequate care management in preeclampsia can provide better outcomes and reduce maternal mortality. Management in the ICU includes intensive monitoring, organ support, mechanical ventilation, and management of complications that can occur in preeclampsia. Outcomes vary due to the severity of the associated complications and the management of these complications. Therefore, it may be necessary to critically evaluate the diagnosis, management and outcomes of critically ill patients with hypertensive disease of pregnancy in the ICU. This may assist clinicians in identifying patients and may select the type of treatment that would most benefit from capital and personnel intensive care.¹²

Preeclampsia can be a multisystem disorder requiring a multidisciplinary management approach, intensive mechanical ventilation, and follow-up monitoring also required. Studies show that mechanical ventilation is necessary for up to 30% of patients with preeclampsia, especially those with complications such as HELLP syndrome. The most common causes of preeclamptic patients for intubation and mechanical ventilation are respiratory failure, hemodynamic instability, blood pressure that is difficult to control, and a history of emergency caesarean section.^{2,11}

In preeclamptic patients with mechanical ventilators, it is necessary to determine the duration of ventilation in patients to provide insight and assess the severity of respiratory disorders. However, studies show preeclampsia patients should not be on a mechanical ventilator for too long. If the patient can be weaned, the hemodynamics are stable, and the clinical condition improves, the patient should be extubated.²

Preeclampsia accompanied by altered consciousness often requires intense intervention to maintain adequate oxygenation while minimizing metabolic activity in other organs. Fluid

administration in preeclampsia patients at risk of developing acute kidney failure, especially in patients with pulmonary oedema, is still debated. It is believed that acute tubular necrosis can be reversed by kidney dialysis and pulmonary edema is treated.¹²

An uncontrolled blood pressure can cause disruption and damage to cerebrovascular flow, thus causing hypertensive encephalopathy. High increases in intracranial pressure can result in cerebral oedema or intracranial haemorrhage. To avoid complications occurs, antihypertensive agents (IV bolus dose of 5-10 mg of hydralazine given over 2 minutes or IV bolus dose of 20-80 mg of labetalol over 2 minutes or oral dose of 10-20 mg of nifedipine) are used to maintain blood pressure within the safe range (140 -150/90-100). Second-line alternatives to control blood pressure include nicardipine drip. Blood pressure must be monitored closely for at least 72 hours after delivery because of the risk of possible recurrence of severe hypertension. Monitoring and Vigilance for the development of complications, including pulmonary oedema and stroke, is also required.¹³

When a complication occurs, early intervention and treatment on a multidisciplinary basic, including intensive monitoring, blood pressure controlled, ventilator support, and vasoactive drug infusions, can alleviate the progression of organ dysfunction and improve prognosis and outcome in preeclampsia patients.

4. Conclusion

In patients with preeclampsia, proper diagnosis and appropriate treatment in intensive care unit and management by a multidisciplinary team can prevent preeclampsia complications and improve preeclamptic patients outcomes.

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