Concurrent Early-onset Peripartum Cardiomyopathy in a Preeclampsia Patient with Acute Pulmonary Edema

Erdal Belen¹, Fahri Fatih Tipi¹, Aysen Helvaci² and Akif Bayyığıt²

Abstract

We herein report the case of a preeclampsia patient with comorbid peripartum cardiomyopathy (PPCMP). A 22-year-old woman in the 26th week of gestation was admitted with acute pulmonary edema. Hypertension and proteinuria were detected, and echocardiography showed an ejection fraction of 33%. It is remarkable that PPCMP particularly that associated with preeclampsia was observed in the early gestational period. In conclusion, while dyspnea and pretibial edema are often noted during normal pregnancies, the potential for PPCMP should be considered if these symptoms are excessive and/or comorbid paroxysmal nocturnal dyspnea and orthopnea are present, even in patients with preeclampsia.

Key words: cardiomyopathy, preeclampsia, pregnancy


Introduction

Preeclampsia is a pathology that occurs in 3-5% of all gestations and is associated with both maternal and neonatal morbidity and mortality (1). Generally, this condition presents with hypertension and proteinuria after the 20th week of gestation (2). In contrast, peripartum cardiomyopathy (PPCMP) is a rare type of heart failure that manifests in the last month of gestation or first five months postpartum (3). These two clinical conditions, with different underlying mechanisms and pathophysiologies, were observed concurrently in the current case. In addition, PPCMP was detected in an earlier stage than expected.

Case Report

A 22-year-old pregnant woman was admitted to the emergency service with shortness of breath, chest pain and faintness. The patient, with a singleton pregnancy, had no previous history of gestation or miscarriage. Her blood pressure and laboratory data were normal on the prepregnancy examination, and she had no known cardiac anamnesis. In addition, echocardiography performed two years earlier to assess nonspecific complaints was normal. The patient stated that her shortness of breath had increased gradually over the past two days. A physical examination performed on admission showed her to be tachypneic, dyspneic, orthopneic, sweaty and cold. Furthermore, she was anxious and exhibited slight peripheral edema. Auscultation revealed widespread bilateral crepitant rales in the lungs with signs of tachycardia.

The patient’s blood pressure was 170/100 mmHg, her heart rate was 135/min and her respiratory rate was 29/min. Electrocardiography showed sinus tachycardia with progression loss in the precordial R wave. The arterial blood gas data were as follows: PaO₂=70 mmHg and PaCO₂=27 mmHg. She was subsequently transferred to the intensive care unit, where she received fluid restriction, oxygen (10 L/minute), intravenous nitroglycerine and furosemide. This treatment led to a dramatic recovery in her tachypnea, dyspnea and orthopnea, and the patient’s blood pressure returned to near the normal range. Moreover, biochemical tests showed a normal blood cell count, electrolyte levels and renal, hepatic and thyroid functions. However, 4+ proteinuria was detected according to the dipstick method, and an echocardiographic examination showed a left ventricular ejection fraction of 33%, a globally hypokinetic left ventr-

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cle and mild mitral regurgitation. Treatment with a beta blocker and low-molecular-weight heparin was therefore initiated. Normal vanillylmandelic acid, cortisol and catecholamine levels were detected on a subsequent urine examination. Furthermore, findings consistent with fetal distress were observed during a gynecological consultation, and the patient underwent Caesarean section under regional anesthesia. Her general condition was good, and the fetus, born at 750 g, was transferred to the newborn intensive care unit.

### Discussion

In the present case, the patient exhibited hypertension, proteinuria and left ventricular systolic dysfunction and was admitted to the emergency service with acute pulmonary edema. Another remarkable aspect of this case is the coexistence of preeclampsia, a relatively common condition, and PPCMP, which is considerably rare, in addition to the detection of PPCMP in an earlier period rather than the last month of gestation.

While the cause of preeclampsia is not clear, insufficient trophoblastic invasion and the appearance of endothelial dysfunction following impaired spinal artery remodeling are thought to underlie this condition (4). PPCMP is a form of idiopathic heart failure that develops during gestation (3) and is characterized by four criteria: 1) development in the last month of gestation or during the first five months postpartum, 2) no other causes of heart failure, 3) no history of heart failure, regional anesthesia is preferred in order to avoid the effects of general anesthesia, including myocardial depression and a reduction in positive pressure ventilation-associated venous return, since this technique lowers the left ventricle load via peripheral vasodilation.

The current patient’s prognostic findings were good, including a left ventricular end-diastolic diameter of <5.5 cm, ejection fraction of >30-35%, fractional shortening of >20% (8), a normal troponin level (9), the absence of left ventricular thrombi and no history of Afro-American decent. While there is a correlation between the left ventricular ejection fraction and the rate of recovery, 70% of patients with an ejection fraction of 10-20% and 87% of those with an ejection fraction of 20-30% recover after six months. Although recovery is usually seen three to six months postpartum, it is also possible for the patient to recover up to 48 months postpartum.

Postpartum echocardiography follow-up should be performed in the sixth week and month. Among patients with PPCMP, even those whose left ventricular function returns to normal, cardiac dysfunction is noted in 23% of future gestations, while mortality occurs in 2% of future pregnancies. In comparison, cardiac dysfunction is observed in 54% and mortality occurs in 9% of future gestations in patients whose left ventricular function does not return to normal. Dobutamine stress echocardiography may be used to deter-

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**Table 1. Possible Etiologies and Risk Factors of Peripartum Cardiomyopathy**

<table>
<thead>
<tr>
<th>Possible Etiologies</th>
<th>Risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Viral myocarditis</td>
<td>-Afro-American ethnicity</td>
</tr>
<tr>
<td>-Abnormal immune response</td>
<td>-Age</td>
</tr>
<tr>
<td>-Abnormal response to gestational hemodynamic stress</td>
<td>-Gestational hypertension</td>
</tr>
<tr>
<td>-Myocyte apoptosis</td>
<td>-Multiparity</td>
</tr>
<tr>
<td>-Cytokine-induced inflammation</td>
<td>-Multiple gestation</td>
</tr>
<tr>
<td>-Malnutrition</td>
<td>-Obesity</td>
</tr>
<tr>
<td>-Genetic factors</td>
<td>-Chronic hypertension</td>
</tr>
<tr>
<td>-Excess prolactin production</td>
<td>-Prolonged tocolysis</td>
</tr>
<tr>
<td>-Abnormal hormonal function</td>
<td></td>
</tr>
<tr>
<td>-Increased adrenergic tonus</td>
<td></td>
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<tr>
<td>-Myocardial ischemia</td>
<td></td>
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criteria (7).

Echocardiographic examinations are the most important method for distinguishing PPCMP from other conditions involving leg edema and shortness of breath that occur during normal gestation. Echocardiography should be performed in such cases, especially in patients with severe symptoms and/or pulmonary edema that develops in association with blood pressure elevation, as these symptoms are often tolerated by young pregnant patients. Such examinations allow for the diagnosis of comorbid diseases and provide vital information for monitoring the pregnancy, thus allowing the clinician to determine the timing and method of delivery and treatment options as well as the mother’s future prognosis and risks for future pregnancies.

While the etiology of PPCMP and its risk factors is not clear, various theories have been proposed (Table 1) (7). The details of the current case mostly diverged from these risk factors. For example, the patient was young, in her first pregnancy, exhibited a body mass index of 23 and had no chronic disease or hypertension anamnesis.

Due to the nature of PPCMP, there are differences in treatment compared to other types of heart failure (Table 2). Generally, most authors recommend using noninvasive follow-up methods as long as the patient remains hemodynamically stable. Since PPCMP usually develops in late gestation, delivery is performed in most cases, with the method of delivery being determined according to the patient’s obstetric indications. Caesarean delivery was preferred in the current case, as the patient was in week 26 of gestation and showed signs of fetal distress. As in other patients with heart failure, regional anesthesia is preferred in order to avoid the effects of general anesthesia, including myocardial depression and a reduction in positive pressure ventilation-associated venous return, since this technique lowers the left ventricle load via peripheral vasodilation.

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Table 2. Multidisciplinary Approach for Treatment (Cardiology, Obstetrics, Anesthesia, Pediatrics)

<table>
<thead>
<tr>
<th>Recommended</th>
<th>Not recommended</th>
</tr>
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<tbody>
<tr>
<td>Liquid restriction, oxygen</td>
<td>Class 3 antiarrhythmic agents (e.g. amiodarone)</td>
</tr>
<tr>
<td>Digoxin, diuretics, vasodilators (nitrate and hydralazine)</td>
<td>Class 4 antiarrhythmic agents (e.g. verapamil)</td>
</tr>
<tr>
<td>Beta blockers (only beta-1 selectives)</td>
<td><em>Contraindicated</em></td>
</tr>
<tr>
<td>Heparin or low-molecular weight (especially ejection fraction below 35%)</td>
<td>ACE inhibitors (teratogenicity, neonatal anuric deficiency, neonatal mortality)</td>
</tr>
<tr>
<td>Positive inotropic agents (only in cases of severely low output due to hemodynamic disturbance)</td>
<td>Warfarin (cerebral hemorrhage in the fetus, teratogenicity)</td>
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**Delivery**

Vaginal delivery

Caesarean section (If possible with regional anesthesia) (in early gestational stages or if fetal stress exists)

mine the contractile reserve in patients who wish to again become pregnant.

Echocardiography should be performed in patients with dyspnea and edema in the legs, complaints that are normally observed during gestation, if these symptoms are excessive or comorbid orthopnea and/or paroxysmal dyspnea are noted. Given that hypertension is well-tolerated by pregnant women with preeclampsia, comorbid cardiac diseases, such as PPCMP, should be considered in patients exhibiting symptoms of heart failure. Performing echocardiography in such cases provides vital information for determining the treatment and method of delivery as well as the mother’s prognosis and risk for future gestations.

The authors state that they have no Conflict of Interest (COI).

**References**


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