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Peripartum Cardiomyopathy Due to Gestational Hypertension and Tocolytic Therapy

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Abstract

BACKGROUND: Peripartum cardiomyopathy (PPCM) is a rare and sometimes fatal systolic heart failure that affects women during late pregnancy or the early postpartum period. The risk factors contributing to this condition are advanced maternal age, multiparity, administration of tocolytic agents, underlying cardiac disease, iatrogenic volume overload, preeclampsia, and hypertension. In patients with gestational hypertension (GH) and other risk factors, close monitoring is mandatory during pregnancy as well as in the postpartum period.

CASE REPORT: A 38-year-old patient previously treated for endometriosis, infertility, and GH was transferred from the clinic of gynecology due to diagnosed congestive heart failure. 5 days before admission, she gave birth to her first child. Before delivery, she was treated with tocolytic therapy. She received methyldopa due to GH which was abruptly discontinued after her delivery. Echocardiography on admission revealed moderately reduced left ventricular (LV) systolic function with an ejection fraction (EF) of 37% with dilated left ventricle (LV) and pulmonary artery hypertension secondary to LV failure. During hospitalization, the patient was with signs of volume overload, but with a good response on parenteral diuretic therapy. She was additionally treated with guideline-recommended heart failure therapy. The controlled echocardiography showed improvement of LV function with an EF of 42%.

CONCLUSION: PPCM is a rare condition with high morbidity and mortality. An LVEF <30%, marked LV dilatation, LV end-diastolic diameter >6.0 cm, and RV involvement are associated with adverse outcomes. Although delivery of the fetus and the placenta triggers the resolution of symptoms and recovery to the nonpregnant state of various organisms, the contrary happens with blood pressure. Its peak time is 3–6 days after delivery. Hypertension medication must not be immediately terminated. Prolonged tocolytic therapy is a risk factor for PPCM due to causing decreased baroreflex sensitivity. Patients with risk factors should be closely monitored for eventual cardiac complications.

Introduction

Peripartum cardiomyopathy (PPCM) is a rare and sometimes fatal systolic heart failure that affects women during late pregnancy or the early postpartum period [1], [2]. It is characterized with a left ventricular ejection fraction (LVEF) of <45% during the last month of pregnancy or within 5 months following delivery [3]. The risk factors contributing to this condition are advanced maternal age, multiparity, administration of tocolytic agents, underlying cardiac disease, iatrogenic volume overload, preeclampsia, and hypertension. In patients with gestational hypertension (GH) and other risk factors, close monitoring is mandatory during pregnancy as well as in the postpartum period [4], [5], [6].

Case Report

A 38-year-old patient previously treated for endometriosis and infertility was transferred from the clinic of gynecology due to diagnosed congestive heart failure. There, she was hospitalized under suspicion of acute cardiac decompensation with the symptoms of severe dyspnea, orthopnea, and leg swelling. 5 days before admission, the patient gave birth to her first child. During pregnancy, she was diagnosed with GH and was treated with methyldopa. The medication was abruptly discontinued after her delivery. 1 month before delivery, she was treated with tocolytic agents. On presentation, the patient was in sinus tachycardia and dyspneic with elevated blood pressure (Figure 1).

Echocardiography was made before admission in our hospital and showed dilated ventricle with left ventricular (LV) dimension (58 mm), increased LV volumes, and severely reduced LV systolic function with ejection fraction (EF) 34% with the global wall. Pulmonary artery hypertension (PAH) was also present with sPAP of 55 mmHg (Figure 2).

The laboratory findings had increased NT-proBNP 5500 pg/mL, troponin I – 215 ng/L (RF 15.6), and a very low level of potassium – 2.7 mmol/L. All other parameters were in their referential value. She was

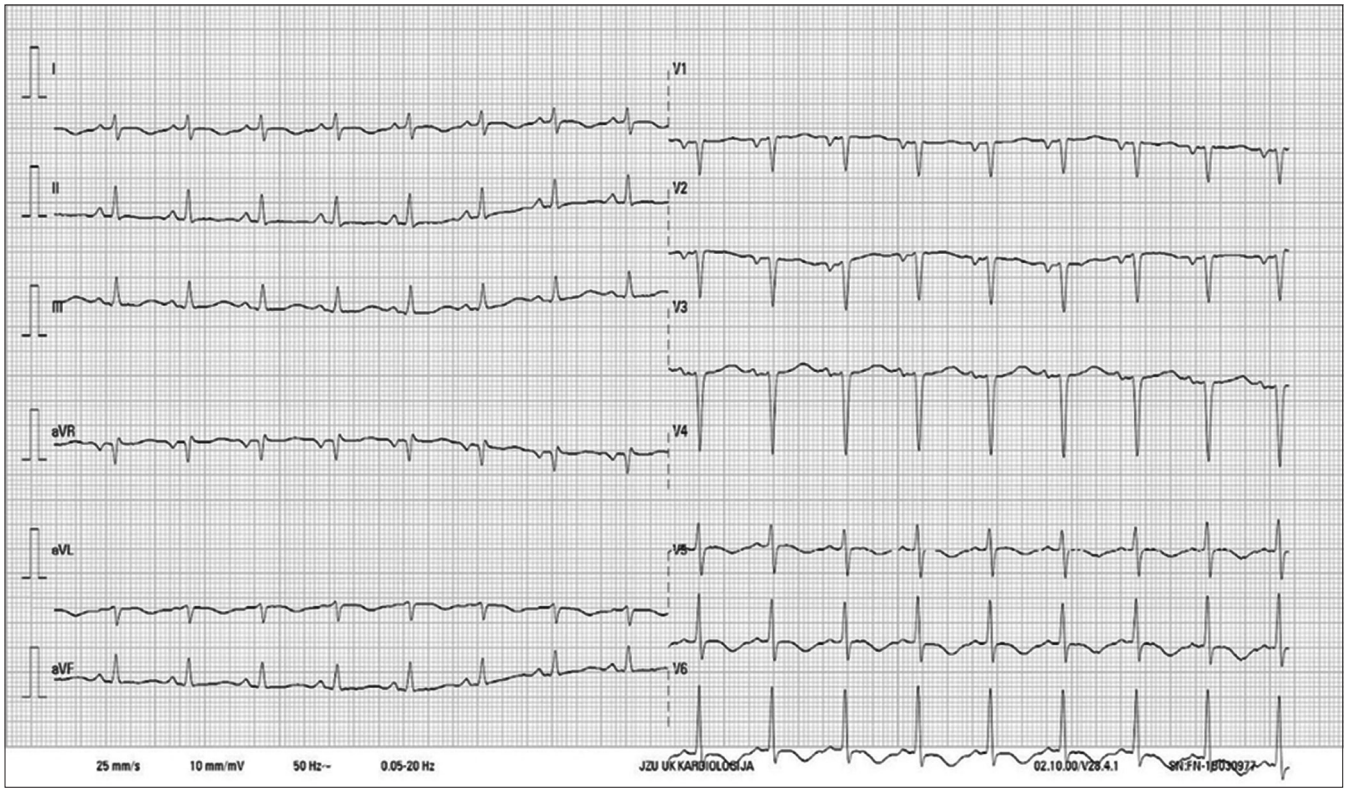


Figure 1: ECG on admission

hospitalized in the intensive care unit and immediately started parenteral diuretic therapy and antihypertensive medications. Because of persistently low potassium, despite its substitution, a nephrologist and endocrinologist were consulted. Urinary and hormonal analyses were made that detected no abnormalities. What should be noted is that the patient had polyuria here for the first 3 days with diuresis reaching up to 10 L per day, demonstrating the high-volume overload she had. The potassium level was normal on the 4th day of admission.

Her controlled echocardiography showed improvement in LV function with an EF of 40% and LVEDD of 54 mm (Figure 3). After 1 week, she was hemodynamically stable, euvolemic, and discharged home with optimal medicament therapy for heart failure.

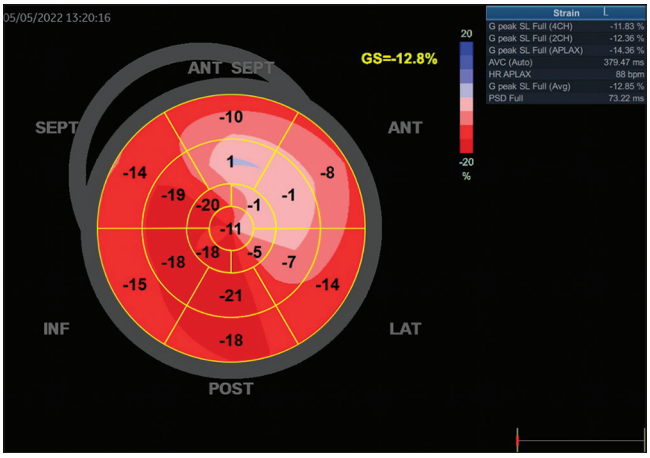


Figure 2: Strain echocardiography

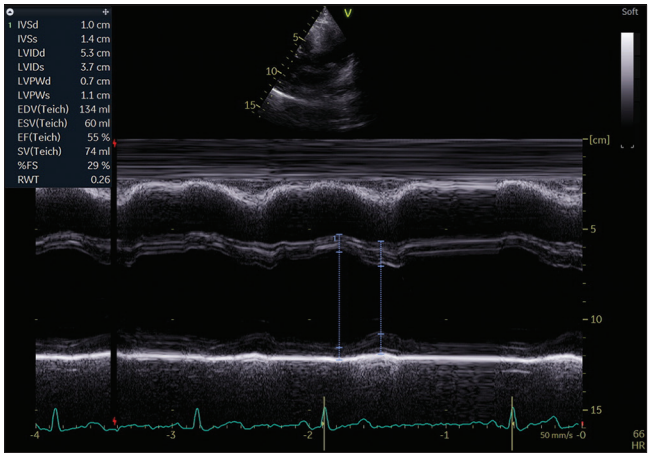


Figure 3: Transesophageal echocardiography – M-mode showing improvement of the left ventricular systolic function

3 months after discharge, another echocardiography was made with the finding of preserved LV dimension and function and no PAH. The patient continued receiving antihypertensive medication.

Discussion

PPCM is an idiopathic cardiomyopathy [3]. Various pathogenetic mechanisms are proposed. Although delivery of the fetus and the placenta triggers the resolution of symptoms and recovery to the nonpregnant state of various organisms, the contrary

happens with blood pressure. Women who suffer from GH tend to have their peak blood pressure 3–6 days after delivery [4]. Hypertension medication must not be immediately terminated, especially in the early postpartum period. Prolonged tocolytic therapy is a risk factor for PPCM; side effects of these agents are tachycardia, shortness of breath, chest pain, pulmonary edema, hypokalemia, and hyperglycemia [5]. They cause decreased baroreflex sensitivity that leads to dysregulation of vagal heart rate and increased blood pressure variation. In addition, their beta agonistic effect is potentially cardiotoxic [6].

Conclusion

PPCM is a rare condition with high morbidity and mortality. An LVEF <30%, marked LV dilatation, LV end-diastolic diameter >6.0 cm, and RV involvement are associated with adverse outcomes. Substantial morbidity continues beyond the peripartum period, with venous thromboembolism and recurrent heart failure hospitalizations being the most common complications. Patients with risk factors should be closely monitored for eventual cardiac complications. Prompt diagnosis is mandatory, and treatment according to the ESC guidelines for heart failure is recommended in patients presenting with this condition after delivery.

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