Peripartum Cardiomyopathy

Uri Elkayam, MD[a,b,*], Sawan Jalnapurkar, MD[a,b], Mohamad Barakat, MD[a,b]

KEYWORDS

• Pregnancy • Peripartum cardiomyopathy • Bromocriptine • Pentoxifylline • BNP • Heart failure • Cardiac transplantation

KEY POINTS

- Peripartum cardiomyopathy (PPCM) has a higher incidence in women older than 30 years, in patients with a history of hypertension and preeclampsia, in multifetal pregnancies, and in African American women in the United States.
- PPCM can be associated with severe complications, including pulmonary edema, cardiogenic shock, arrhythmias, thromboembolic events, and mortality.
- Treatment of heart failure in patients with PPCM should follow recent guideline recommendations; drug therapy may need to be changed during pregnancy and lactation to prevent side effects to the fetus or lactating infant.
- In patients who are diagnosed during pregnancy and can be stabilized with therapy, continuation of pregnancy to allow fetal maturity may be possible under close monitoring. Termination of pregnancy often results in improvement of both symptoms and cardiac function and should be considered in patients with deteriorating symptoms or cardiac function.

DEFINITION

In 1971, Demakis and colleagues[1] established the term peripartum cardiomyopathy (PPCM) and defined it by the following criteria based on the clinical profile of their patients:

1. Development of heart failure (HF) in the last month of pregnancy or within 5 months of delivery
2. Absence of a determinable cause for HF
3. Absence of demonstrable heart disease before the last month of pregnancy
4. Left ventricular (LV) systolic dysfunction demonstrated by echocardiography with LV ejection fraction (EF) less than 45%, fractional shortening less than 30% or both is an additional criterion added in 1997 by a National Heart, Lung, and Blood Institute workshop on PPCM[2]; the criterion had been previously proposed by Hibbard and colleagues.[3]

Realizing that these criteria are arbitrary and that PPCM often presents earlier in pregnancy,[4–6] the definition of PPCM has been recently updated by a working group on PPCM of the European Society of Cardiology: "idiopathic cardiomyopathy presenting with HF secondary to LV systolic dysfunction toward the end of pregnancy or in the months following delivery where no other cause of HF is found. The left ventricle (LV) may not be dilated but the ejection fraction (EF) is nearly always reduced below 45%".[7]

INCIDENCE

The incidence of PPCM in the United States has ranged in different publications between 1:1149 and 1:4350 live births,[8–11] with an average of 1:3186. A significantly higher incidence[12,13] has been reported in South Africa (1:1000) and Haiti

[a] Division of Cardiology, Department of Medicine, University of Southern California Keck School of Medicine, Los Angeles, CA, USA; [b] Department of Obstetrics and Gynecology, University of Southern California Keck School of Medicine, Los Angeles, CA, USA
* Corresponding author. LAC/USC Medical Center, 2020 Zonal Avenue, Los Angeles, CA 90033.
E-mail address: elkayam@usc.edu

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(1:300). No information is available regarding the incidence of this condition in Europe.

CAUSE

The cause of PPCM is still unknown and many potential theories have been proposed and discussed in details in a recent review.[14] The most recent hypothesis is based on experimental work that has demonstrated the development of PPCM in female mice with a cardiomyocyte-specific deletion of signal transducer and activator of transcription 3.[15] This study suggested that an unprotected increase in oxidative stress leads to increased expression and proteolytic activity of cardiac cathepsin D, which results in conversion of the nursing hormone prolactin into an antiangiogenic and proapoptotic 16-kDa form with a detrimental effect on coronary microvasculature resulting in a myocardial insult caused by hypoxemia and apoptosis.

RISK FACTORS

The incidence of PPCM has been found to be higher in women older than 30 years, in patients with a history of hypertension and preeclampsia, multifetal pregnancies, and in African American women in the United States.[4] In addition, recent studies have demonstrated a high incidence of PPCM in families with dilated cardiomyopathies[16,17] suggesting that in a proportion of patients, PPCM may have a genetic cause.[6]

CLINICAL PRESENTATION

Many of the signs and symptoms of PPCM are similar to those of HF caused by other factors. Because normal pregnancy is often associated with signs and symptoms that can mimic those of HF, the diagnosis of PPCM is often missed or delayed.[18]

Biomarkers

B-type natriuretic peptide (BNP) levels remain grossly unchanged during normal pregnancy and are only mildly elevated in women with preeclampsia.[19] Similar to other forms of HF, BNP levels increase significantly in symptomatic patients with PPCM.[20] Troponin can be slightly elevated, especially in patients with a substantial myocardial insult at the time of the diagnosis.[21]

Laboratory Evaluation

An electrocardiogram usually shows sinus tachycardia and nonspecific ST-segment and T-wave changes. LV hypertrophy and conduction abnormalities can also be seen. A chest radiograph commonly demonstrates cardiomegaly, pulmonary venous congestion, and occasionally pulmonary edema and pleural effusion. An echocardiogram shows a dilated LV size in most patients but can also be within normal range; dilation of the other cardiac chambers is also commonly found. LV systolic dysfunction is the rule, with moderate to severe depression of LVEF and a small pericardial effusion. Doppler evaluation usually shows moderate to sever mitral and tricuspid valve regurgitation, mild to moderate pulmonic regurgitation, and pulmonary hypertension.[4,7]

PROGNOSIS

PPCM can be associated with severe complications, including pulmonary edema, cardiogenic shock, arrhythmias, thromboembolic events, and mortality.[18]

Mortality

PPCM continues to be an important cause of pregnancy-related death in the United States and other countries.[22,23] The rate of mortality, however, seems to vary geographically and is considerably higher in South Africa (28%–40%), Haiti (15%–30%), and Turkey (30%) compared with the United States where the reported mortality rate from PPCM has been lower than from other forms of cardiomyopathies and has varied between 0% and 19%.[9–11,24–30] The risk of death increases with older age, severe myocardial insult (LVEF <25%), multiparity, African American ethnicity, and when the diagnosis is delayed.[18,22]

Recovery of Cardiac Function

The most recent publications in the United States have demonstrated improvement of LV function in at least 50% of patients with PPCM, mostly occurring within 2 to 6 months after the diagnosis.[5,28,31] An exception to these findings was reported in 1 US study[30] that found recovery of LV function in only 35% of 40 indigent, mostly African Americans women, with a median time to recovery of 54 months. These data are similar to a low recovery rate of 21% to 43% reported in South Africa, Haiti, and Turkey[7] and suggest that race, ethnicity, and environmental differences as well as access to medical care may be responsible for poorer outcomes.

Outcome of Subsequent Pregnancy

A retrospective study published in 2001 reported on the outcome of 60 subsequent pregnancies in 44 women, 28 with normal LV function (group 1) and 16 with persistent LV dysfunction (group 2).[32]