Clinical Investigations

# Differences in Clinical Profile of African-American Women With Peripartum Cardiomyopathy in the United States

SOREL GOLAND, MD,[1] KALGI MODI, MD,[2] PARTA HATAMIZADEH, MD,[3] AND URI ELKAYAM, MD[3]

*Rehovot, Israel; Shreveport, Louisiana; and Los Angeles, California*

**ABSTRACT**

**Background:** Peripartum cardiomyopathy (PPCM) is a rare and heterogeneous disease with a higher prevalence in African Americans (AAs) in the USA. The clinical features and prognosis of PPCM in AAs have not been sufficiently characterized.

**Methods:** We studied 52 AA patients with PPCM and compared clinical characteristics and outcome with those of 104 white patients.

**Results:** AA patients were significantly younger (26 ± 7 vs 30 ± 6 years; $P < .001$), had a higher prevalence of gestational hypertension (61% vs 41%; $P = .03$), and were diagnosed more commonly postpartum rather then antepartum (83% vs 64%; $P = .03$). The rate of left ventricular (LV) recovery (LV ejection fraction [LVEF] ≥50%) was significantly lower in AAs (40% vs 61%; $P = .02$). AA women also had a larger LV end-diastolic diameter (57 ± 10 vs 51 ± 6 mm; $P = .004$) as well as lower LVEF (40% ± 16.7% vs 46% ± 14%; $P = .002$) at the last follow-up. Moreover, AA patients had a significantly higher incidence of the combined end points of mortality and cardiac transplantation ($P = .03$) and showed a strong trend ($P = .09$) for increased mortality.

**Conclusions:** AA patients with PPCM in the USA have a different clinical profile and worse prognosis compared with white patients. Further research to evaluate potentially correctable causes for these differences is warranted. (*J Cardiac Fail 2013;19:214−218*)

**Key Words:** Peripartum cardiomyopathy, racial differences, African American.

Peripartum cardiomyopathy (PPCM) is a relatively rare form of cardiac failure associated with pregnancy; it can lead to severe and lasting morbidity and is an important cause of maternal mortality.[1−3] This disease shows a rising incidence and is estimated to affect ∼1,300 new cases annually in the USA.[1,4] Although PPCM can involve women of different ethnic backgrounds,[3,5,6] the prevalence among African American (AA) patients has been reported to be considerably higher compared with other ethnic groups in the USA.[3,5−7] In addition, preliminary data have suggested differences in presentation as well as outcome between AA patients and women of other ethnic groups.[2,3,8,9] Better definition of such differences may be of great importance and can serve to improve diagnostic as well as therapeutic strategies for this patient population.

The purpose of the present study was, therefore, to compare the clinical profile of AA patients with PPCM and that of white patients, in an attempt to identify differences in clinical characteristics of PPCM in AA women in the USA.

## Methods

This is a retrospective analysis of data obtained in 187 patients diagnosed with PPCM. One hundred fifty-three patients were part of the database established at the University of Southern California from 1994 to 2007, and 34 patients were diagnosed and cared for at the Louisiana State University Health Science Center, Shreveport, Louisiana (1993−2000). Relevant information was collected through review of records as well as interviews of some of the patients and/or their referring physicians. The study was conducted with approval of the respective Institutional Review Boards.

*From the [1]Department of Cardiology, Kaplan Medical Center, Rehovot, Israel; [2]Louisiana State University Health Science Center, Shreveport, Louisiana and [3]Heart Failure Program, Division of Cardiovascular Medicine, Keck School of Medicine, University of Southern California, Los Angeles, California.*

Manuscript received December 15, 2012; revised manuscript received March 5, 2013; revised manuscript accepted March 6, 2013.

Reprint requests: Uri Elkayam, MD, LAC/USC Medical Center, 2020 Zonal Avenue, Los Angeles, CA 90033. E-mail: elkayam@usc.edu

See page 217 for disclosure information.

1071-9164/$ - see front matter



http://dx.doi.org/10.1016/j.cardfail.2013.03.004

The diagnosis of PPCM was based on recommended criteria by a workshop convened by the National Heart Lung and Blood Institute and the Office of Rare Diseases of the National Institutes of Health[11]: 1) development of congestive heart failure during pregnancy or the first 5 months after delivery; 2) absence of an identifiable cause for cardiac failure; 3) absence of recognizable heart disease before pregnancy; and 4) left ventricular (LV) systolic dysfunction with ejection fraction (EF) <45%.[10,11] Patient with preexisting cardiac disease or LVEF >45% were excluded.

### Statistical Analysis

This was a retrospective analysis designed to describe differences between AA and white patients with PPCM in clinical characteristics, as well as outcome criteria, including LV recovery, a number of major adverse events as well as death and a combined rate of death and heart transplantation. Variables used for the statistical analysis included the mean age, mean index pregnancy, twin pregnancy, history of hypertension during pregnancy, use of tocolytic therapy, the occurrence of symptoms of heart failure before delivery (antepartum) and after delivery (postpartum), New York Heart Association (NYHA) functional class, rate of cesarean section, mean LV end-diastolic dimension (LVEDD), and mean LVEF as measured by echocardiography. In addition, the rate of complications including death, transplantation, circulatory support, cardiopulmonary arrest, thromboembolic events, and serious brady- or tachyarrhythmias requiring pacemaker and automatic implanted cardiac defibrillator (AICD) were also included.

Summary statistics for numeric variables were presented as mean ± SD. Summary statistics for categoric variables were presented as n (%).

Two-group differences on continuous outcome measures were assessed by the *t* test or Mann-Whitney test, as appropriate. Two-group differences on categoric outcomes were assessed by the Fisher exact test. Survival curves were estimated by the Kaplan-Meier method. Group differences in survival were assessed by the log-rank test. A *P* value of <.05 was regarded to be statistically significant. Statistical calculations were performed using the statistical software package SPSS version 11.5 statistical software.

## Results

### Clinical Characteristics of All PPCM Patients

One hundred four of the patients were white, 52 AA, 23 Hispanic, and 8 Asian. Because of the small numbers, Hispanic and Asian patients were excluded from the analysis. The mean age for the entire patient population (156 patients) was 29 ± 7 years. Mean index pregnancy was 1.9 ± 1.7, and 16% of patients had twin pregnancies. History of hypertension during pregnancy was obtained in 46% of the patients, and use of tocolytic therapy was reported in 20%. The occurrence of symptoms before delivery was reported in 32%.

Mean LVEDD, as measured by echocardiography, was 58 ± 7 mm at time of diagnosis, and mean LVEF was 28 ± 10%. LVEF increased to 43 ± 16% at the last follow-up (136 surviving patients with an echocardiogram ≥3 months after diagnosis, mean 14 ± 13 months) and recovery of LV function (EF ≥50%) was observed in 55% of patients.

### Differences in Baseline Clinical Characteristics Between AA and White Patients With PPCM

The baseline clinical characteristics of both groups are presented in Table 1. AA patients were significantly younger as represented by a lower mean age (26 ± 7% vs 30 ± 6 years; $P < .001$) as well as by a larger number of patients older than 30 years (29% vs 55%; $P = .002$). The development of symptoms and time of diagnosis occurred after the delivery in the great majority of AA patients (83%) compared with 64% of white patients ($P = .03$). In addition, the number of patients with severe symptoms at the time of diagnosis was higher in AAs, with 72% presenting with NYHA functional class III and IV compared with 42% of whites ($P = .008$; Fig. 1). There were no significant differences in other characteristics, including index pregnancy, prevalence of twin pregnancy, use of tocolytic therapy, and rate of cesarean section.

### Differences in Left Ventricular Function and Size

Degree of LV systolic dysfunction was similar at the time of diagnosis between AA and white patients (Table 1, Fig. 1) as reflected by the group mean LVEF values (2.83 ± 10.5% vs 27.8 ± 10.0%; $P = .8$.) and the proportion of patients with LVEF <25% (54% vs 47%; $P = .5$). However, AAs had significantly larger LV size (60 ± 6 mm vs 56 ± 7 mm; $P = .001$). Improvement of LV function occurred in both groups over time, but to a lesser degree in AAs (Fig. 1). At the last follow-up (13.0 ± 10.4 months for whites and 14.9 ± 13.7 months for AAs), LVEF was significantly lower (39 ± 17% vs 46 ± 14%; $P = .002$) and LVEDD was significantly larger (57 ± 10 mm vs 51 ± 6 mm; $P = .004$) in AAs. In addition, AA patients had a significantly lower rate of complete recovery of LV function (LVEF >50%): only 40% compared with 61% of

**Table 1.** Comparison Between Clinical Characteristics of African-American (AA) and White PPCM Patients

| | White (n = 104) | AA (n = 52) | *P* Value |
|---|---|---|---|
| Age (y) | 30 ± 6 | 26 ± 7 | <.001 |
| Age >30 y | 55% | 29% | .002 |
| Gestational hypertension | 41% | 61% | .03 |
| Twin pregnancy | 19% | 13% | .5 |
| Index pregnancy | 2.0 ± 1.7 | 1.8 ± 1.6 | .2 |
| Multiparous | 51% | 40% | .3 |
| Tocolysis | 18% | 25% | .4 |
| Cesarian delivery | 44% | 40% | .7 |
| Symptoms postpartum | 64% | 83% | .03 |
| NYHA III–IV | 44% | 72% | .008 |
| LVEF baseline (%) | 28.3±10.5 | 27.8 ± 10.0 | .8 |
| LVEF ≤25% | 47% | 53% | .5 |
| LVEDD baseline (mm) | 56 ± 6 | 60 ± 8 | .001 |

PPCM, peripartum cardiomyopathy; NYHA, New York Heart Association functional class; LVEF, left ventricular ejection fraction; LVDD, left ventricular end-diastolic diameter.

Data are presented as mean ± SD or %.