



SHORT COMMUNICATION

# Prevention and control of peripartum cardiomyopathy in Haiti

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Received 18 April 2006; accepted 28 April 2006

Available online 27 June 2006

## KEYWORDS

Peripartum  
cardiomyopathy;  
Heart failure;  
Haiti;  
Pregnancy

**Summary** Intensive study of peripartum cardiomyopathy in the Hôpital Albert Schweitzer district of Haiti has led to two possible prevention and control measures:

- (1) Promotion of family planning measures to assist women who wish to avoid the higher risk of disease and/or relapse seen with grand multiparity (defined as 5 or more pregnancies).
- (2) focused non-invasive cardiac ultrasound screening of higher risk women in the peripartum period to identify and treat asymptomatic left ventricular dysfunction.

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## Background

Peripartum cardiomyopathy (PPCM) is a rare disease in the developed world (estimated incidence of about 1 case per 3000 live births) [1], but is common in many poor nations. The highest reported incidence of PPCM in the world is found in rural Haiti, where the incidence in the Artibonite River Valley is approximately 1 case per 300 live births [2]. Study of PPCM in Haiti has also documented the prevalence (150 cases in a district with 300,000 population or 3.75 cases per 1000 women of reproductive age), mortality rate (15.3%), prob-

ability of 4-year survival (75%) and heart function recovery rate (28%) in this high-incidence region [2]. One of the leading causes of maternal mortality in Haiti is PPCM. The ratio of PPCM deaths in this district of Haiti has been shown to be 47.1 deaths per 100,000 live births [2], compared to the US ratio of 0.62 per 100,000 births [3].

## Aims

While the molecular pathogenesis of PPCM is unknown, it is important to identify strategies that could diminish the clinical consequences of PPCM including disease incidence, prevalence, morbidity and mortality in this high-incidence area. An intensive study by the PPCM Project during the

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years 2000–2006 in the Hôpital Albert Schweitzer (HAS) district has, as one of its goals, the identification of practical strategies for prevention and control of PPCM in a resource-limited setting. The continuing aim of this project is a long-term evaluation of the effectiveness of application of these strategies.

## Methods

Using the NIH workshop consensus definition of PPCM [1], a PPCM registry was initiated on 1 February 2000 for case identification. The 100th prospectively-identified PPCM patient included in this report was enrolled 25 January 2005, and the last data point collected for these patients was obtained 25 January 2006. Application of field epidemiology, diagnostic investigations including an essential diagnostic tool of focused echocardiography, and conventional evidence-based treatment protocols have been the foundation of efforts to ascertain potential strategies for prevention and control [4,5]. Signed informed consent has been obtained from each patient and the study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki, as approved by the Ethics Committee of the Hôpital Albert Schweitzer.

## Results

Two practical strategies for prevention and control have emerged: (1) family planning and (2) early diagnosis.

### Family planning to help highest risk women

Table 1 demonstrates that almost one-half of patients diagnosed with PPCM developed clinical disease with the 5th or higher pregnancy. Effective family planning may decrease the occurrence of grand multiparity (defined as 5 or more pregnancies) and in turn diminish the incidence and prevalence of PPCM. Cultural practices and high infant mortality encourage many Haitian women to have more than four pregnancies. This practice is gradually changing with improved medical care, availability of family planning measures, and preventive services such as provided by the Hôpital Albert Schweitzer programs.

Table 2 shows the family planning measures utilized by almost three-fourths of women with PPCM. This has demonstrated the interest of Haitian

**Table 1** Parity at diagnosis in 100 peripartum cardiomyopathy patients, Hôpital Albert Schweitzer District of Haiti, 2000–2005

Parity at diagnosis	Number (same as percent) of patients
1	21
2	11
3	9
4	13
5 and higher	46
Total	100

**Table 2** Family planning methods for 100 peripartum cardiomyopathy patients, Hôpital Albert Schweitzer District of Haiti, 2000–2006

Family planning method	Number (same as percent) of patients
Tubal ligation	10
Five-year implantable hormone	11
Every 3 months depot hormone injection	29
Oral contraceptive tablets	3
Barrier (condoms)	9
Died within 2 months of diagnosis, none	10
None used ever	28
Total	100

women in learning about and utilizing contraceptive techniques to assist them to avoid a subsequent pregnancy and the greater risks for developing pregnancy-associated cardiomyopathy or for relapse of disease in those who have not fully recovered heart function prior to a subsequent pregnancy.

### Early diagnosis of developing disease

In a pilot study, the PPCM Project has identified that screening women in the peripartum period with echocardiography will identify significant numbers of patients with asymptomatic left ventricular systolic dysfunction (ALVD) [6]. These women will benefit from afterload reduction treatment in order to better preserve functioning of recoverable cardiomyocytes and improve chances of full recovery and/or longer survival.

In addition, a potential screening tool to identify higher risk women has been identified; namely, the

plasma high sensitivity-C-Reactive Protein (hs-CRP) assay, a relatively inexpensive laboratory tool [6–9]. Early testing suggests that developing or established PPCM patients, in the first one to two months postpartum, have a plasma level of hs-CRP in excess of 10 mg/L, while normal Haitian women at the same stage postpartum have levels less than 10 mg/L [6,7]. This hypothesis will be field tested when funding becomes available. If shown to be valid, screening echocardiography could be limited to those asymptomatic women with an elevated plasma hs-CRP. Symptomatic women would in any case continue to receive an echocardiogram as part of diagnostic testing.

## Discussion

Is it practical in a limited-resource environment to apply screening echocardiography? This has been a sustainable technology in the HAS district since 1990, where accuracy and dependability of equipment have been clearly demonstrated. The latest generation high portability ECHO machines are the size of a laptop computer and cost about \$25,000. The screening echocardiogram for left ventricular dysfunction includes film/electronic documentation and computer-generated measure of ejection fraction, end-systolic dimension, end-diastolic dimension, and fractional shortening; requires only a small amount of time (approximately 10 min); and is affordable (patient cost \$2 USA, paid for by the PPCM Project).

Family planning measures are also important to help women with known PPCM to avoid worsening or relapse of heart failure with a subsequent pregnancy, the risk of which is very high [9,10]. In any situation, but particularly in a poverty milieu, it is also vital for the welfare of the children of PPCM mothers, that their mothers survive to provide the best care possible, and particularly during the dangerous first 5 years of life, when malnutrition increases the risk from infectious diseases.

## Conclusion

Intensive study of PPCM in the Hôpital Albert Schweitzer district of Haiti has led to two possible prevention and control measures: (1) promotion of family planning measures to assist women who wish to avoid the higher risk of disease and/or relapse seen with grand multiparity and (2) focused cardiac ultrasound screening of higher risk women in the peripartum period to identify and treat early disease.

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