Novel Collaborative Cardiology and Maternal Fetal Medicine Practice – Continued Experience at the Heart and Pregnancy Program

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ABSTRACT

Objective: Care of pregnant women with cardiac conditions requires expertise regarding the unique physiology of pregnancy. In order to streamline the care of these patients, the Heart and Pregnancy Program (HPP) was created. Within this multidisciplinary practice, pregnant women are seen simultaneously by cardiology and maternal fetal medicine (MFM) for consultation and management. The objective of our study is to describe the continued experience at this unique multidisciplinary program.

Methods: Retrospective record review of women managed at HPP between March 2010 and December 2014. Univariate and multivariate statistical analyses were performed for group comparisons.

Results: 173 women were seen during the time period: 169 were pregnant, 1 was postpartum and 3 presented for preconception counseling. Average maternal age was 29.6 ± 5.7 years (17 - 47 years). Most patients were Caucasian (n=140, 80.9%) and had private insurance (n=121, 69.9%). Referral indications included cardiac complaints without history of cardiac disease (n=49, 28.3%), known cardiac disease (structural/congenital, structural/acquired, or functional disease; n=96, 55.5%) and other high risk conditions (obesity, abnormal electrocardiogram; n=28, 16.2%). 26 women had undergone cardiac surgery (16.2%). Most women underwent echocardiography as part of their evaluation (n=123, 79.4%); eleven women underwent cardiac magnetic resonance imaging (6.4%). For the 140 women who delivered at our hospital, average gestational age at delivery was 38.8 ± 1.7 weeks (31.3 – 41.6 weeks) and the cesarean rate was 41.4% (n=58). Average neonatal birthweight was 3390.8 grams ± 482.7 (1690 – 5165). No significant adverse perinatal outcomes were noted.

Conclusion: In our collaborative cardiology and MFM practice, most pregnant women had known cardiac disease and imaging by echocardiography was common. The cesarean delivery rate was slightly higher than the baseline rate in the United States. No significant adverse perinatal outcomes were noted. Our experience provides support for creating a joint model of care for pregnant women with cardiac disease.

Introduction

Care of pregnant women with cardiac conditions requires expertise regarding the unique physiology of pregnancy. The Heart and Pregnancy Program was developed at Lehigh Valley Health Network in an effort to coordinate and improve the antepartum care of women with either preexisting or new onset cardiac issues during pregnancy. Lehigh Valley Health Network comprises of 5 hospital campuses with over 1160 acute care beds. At HPP, either pregnant women or women seeking to conceive are seen simultaneously by cardiology (Dr. Ahnert) and maternal fetal medicine (MFM Dr. Quiñones) for consultation and management. The program's initial patient care experience was reported two years ago at the Cardiac Problems in Pregnancy meeting in Venice, Italy. The objective of this follow-up study is to describe the continued experience at this unique multidisciplinary program.

Methods

Retrospective record review was performed for women managed at HPP between March 2010 and December 2014. Electronic medical records from outpatient visits and inpatient stays were reviewed. Univariate and multivariate statistical analyses were performed for group comparisons.

Results

173 women were either self-referred or sent to the program by their obstetrician or perinatologist: 169 were pregnant, 1 was postpartum and 3 presented for preconception counseling. Average maternal age was 29.6 ± 5.7 years (17 - 47 years). Most patients were Caucasian (n=140, 80.9%) and had private insurance (n=121, 69.9%).

Indications for referral to the Heart and Pregnancy Program were as follows:

- Cardiac complaints without history of cardiac disease
  - Palpitations, near syncope, dizziness, chest pain/pressure
- Known cardiac disease
  - Structural – acquired
    - Congenital heart disease
    - Valvular disease
    - Coarctation of the aorta
  - Structural – congenital
    - Rheumatic heart disease
    - Mechanical valve
  - Functional
    - Hypertension
    - Arrhythmia
    - Cardiomyopathy
- At high risk of cardiac disease during pregnancy. Examples include:
  - Obesity
  - Abnormal electrocardiogram
  - Marfan syndrome
  - Mother undergoing transplacental therapy for fetal tachyarrhythmia

Table 1. Baseline Characteristics of the Women Seen at the Heart and Pregnancy Program by Disease Category

Baseline Characteristics by Disease Category	Symptoms Without History of Cardiac Disease (n=49)	History of Either Structural (Congenital or Acquired) or Functional Cardiac Disease (n=96)	High Risk of Cardiac Disease (n=28)	p value
Maternal age (years ± SD)	28.9 ± 5.8	29.8 ± 5.7	30.5 ± 5.8	0.77
Caucasian race (%)	41 (83.7)	80 (83.3)	23 (82.1)	0.78
Married (%)	31 (68.9)	62 (68.9)	19 (67.9)	0.99
Private insurance (%)	35 (71.4)	61 (63.5)	25 (89.3)	0.20
Pre-pregnancy BMI (kg/m2)	27.0 ± 6.0	28.2 ± 7.5	34.8 ± 9.7	<0.0001
Nulliparous (%)	16 (32.7)	51 (53.1)	7 (25.0)	0.007
Tobacco use (%)	6 (12.2)	13 (14.1)	1 (3.6)	0.32
Gestational age at time of CHP evaluation (weeks ± SD)	23.1 ± 6.4	22.0 ± 6.7	22.0 ± 6.1	0.45
Imaging by echocardiogram (%)	35 (75.5)	65 (67.7)	21 (75.0)	0.55
Gestational age at delivery (weeks ± SD)	39.2 ± 1.5	38.6 ± 1.7	38.9 ± 1.7	0.12
Cesarean delivery at LVHN (%)	13/49 (30.2)	33/96 (34.4)	12/28 (42.9)	0.20
Intrapartum complications (%)	4/43 (9.3)	10/72 (13.9)	3/25 (12.0)	0.77
Neonatal birthweight (grams ± SD)	3441.2 ± 427.0	3313.2 ± 479.8	3447.4 ± 610.5	0.28

26 women had undergone cardiac surgery (16.2%). Most women underwent echocardiography as part of their evaluation (n=123, 79.4%); eleven women underwent cardiac magnetic resonance imaging (6.4%). For the 140 women who delivered at our hospital, average gestational age at delivery was 38.8 ± 1.7 weeks (31.3 – 41.6 weeks) and the cesarean rate was 41.4% (n=58). Average neonatal birthweight was 3390.8 grams ± 482.7 (1690 – 5165). No significant adverse perinatal outcomes were noted.

Table 1 describes the baseline characteristics of the women seen at HPP by disease category. Most women with a history of either structural (congenital or acquired) or functional cardiac disease were nulliparous when compared to the other groups (53.1%, p=0.007) and most women at high risk of cardiac disease had an increased BMI as high BMI was included as part of the definition of this category (p<0.0001).

Conclusion

In our collaborative cardiology/MFM practice, most pregnant women had known cardiac disease. Imaging by echocardiography was common. The cesarean rate was slightly higher than the baseline rate in the United States. No significant adverse outcomes were noted.

The Heart and Pregnancy Program was developed at Lehigh Valley Health Network in an effort to coordinate and improve the antepartum care of women with either preexisting or new onset cardiac issues during pregnancy. During the office visits, physicians are able to discuss the care plans directly and provide interdisciplinary education to the patient. This level of communication builds trust and is necessary for the most effective treatment in such a high risk population.

Our experience provides support for creating a joint model of care for pregnant women with cardiac disease where women can be seen and counseled jointly by specialists in cardiology and maternal fetal medicine. Future quality improvement studies will address the types of joint counseling used, the level of patient satisfaction, the level of satisfaction among referring providers and maternal/neonatal outcomes.