

Care for Pregnant Patients: Cardiovascular Considerations: An American Heart Association Scientific Declaration

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Abstract

The management of cardiovascular disease during pregnancy necessitates a team approach, and cardio-obstetrics has emerged as an important multidisciplinary field. Myocardial infarction, cardiomyopathies, arrhythmias, valvular disease, thromboembolic disease, aortic disease, and cerebrovascular diseases are among the cardiac conditions that can occur during pregnancy. Pregnancy-related mortality in the United States is primarily attributed to cardiovascular disease. Rates of maternal mortality have risen as a result of rising maternal age and preexisting comorbid conditions. Women with preexisting cardiac conditions or a history of preeclampsia must receive preconception counseling from the multidisciplinary cardio-obstetrics team. It is essential to involve the cardio-obstetrics team as soon as possible to avoid maternal morbidity and mortality throughout the pregnancy and the first year after delivery. All cardiovascular and primary care clinicians should have a fundamental understanding of cardiovascular disease during pregnancy. An overview of the diagnosis and treatment of cardiovascular disease during pregnancy is provided in this scientific statement.

Keywords: Arrhythmia • Cardio-obstetrics • Hypertensive disorders of pregnancy • Ischemic heart disease • Pregnancy

Introduction

Racial and ethnic disparities in pregnancy-related mortality are significant, peaking among black non-Hispanic women, followed by American Indian/Alaskan Native non-Hispanic women, Asian/Pacific Islander non-Hispanic women, white non-Hispanic women, and Hispanic women. The rise in maternal mortality has been attributed to the increasing number of women undertaking pregnancy at advanced maternal age [1].

Methodology

It is essential to provide specialized multidisciplinary care early in the antepartum, peripartum, and postpartum periods to improve cardiovascular outcomes and reduce maternal mortality up to the first year after birth. A comprehensive analysis of maternal cardiovascular risk, obstetric risk, and fetal risk and outcomes ought to be provided by the cardio-obstetrics team, which is also referred to as the pregnancy heart team. Pregnancy counseling and expectant management on cardiac medication safety throughout pregnancy and lactation are included. Most of the time, the cardio-obstetrics team is made up of obstetricians, cardiologists, anesthesiologists, specialists in maternal fetal medicine, geneticists, neurologists, nurses, and pharmacists. Together, they create a comprehensive plan for managing cardiovascular disease (CVD) during pregnancy, delivery, and after delivery. Aside from congenital heart disease and sudden cardiac arrest, which are addressed in recent American Heart Association (AHA) scientific statements on these specific topics, this scientific statement emphasizes the necessity of a cardio-obstetrics team for

the management of CVD in women during a high-risk pregnancy. This scientific statement provides an overview of CVD during pregnancy. The activation of the renin-angiotensin-aldosterone system and hormonal fluctuations contribute to the increase in plasma volume, rise in cardiac output, and decline in systemic vascular resistance during pregnancy. Physiological Changes during Pregnancy Predictable and expected hemodynamic and structural changes occur during pregnancy. Perinatal blood pressure can fluctuate, rising before delivery and then falling within a week due to significant fluid shifts [1,2].

Discussion

Before Getting Pregnant Because cardiovascular disease (CVD) is the leading indirect cause of maternal mortality, pregnant women with CVD should get counseling about the risks to themselves and their unborn children before getting pregnant. Preconception counseling is important to ensure that estimates of individual risk are taken into consideration when women begin family planning. A specialized cardio-obstetrics team with experience managing high-risk women with CVD during pregnancy should care for these women. Through this counseling, the high-risk cardio-obstetrics team is able to include the patient in shared decision-making, provide an overview of anticipated or potential pregnancy events, as well as treatment options for each stage of the process. All medications should be reviewed during preconception planning to ensure their safety during pregnancy. For instance, teratogen angiotensin-converting enzyme inhibitors and angiotensin receptor blockers should be substituted with medications that are known to have a better safety profile during pregnancy. Before conceiving, a woman should have her nutritional status and the need for additional folic acid reviewed in a comprehensive clinical review [2].

In women with cardiovascular disease who are considering pregnancy, the modified World Health Organization (WHO) classification is frequently the preferred method for estimating individual maternal cardiovascular risk. Although a number of risk models that estimate maternal cardiovascular risk have been evaluated, the WHO classification remains the only prospectively validated method for risk assessment. Nevertheless, the majority of models have included a number of factors that are known to increase maternal cardiovascular risk, such as a history of cardiovascular disease (CVD), arrhythmia, heart failure, poor functional class, resting cyanosis, anticoagulant use, and the presence of a mechanical valve. Several conditions are considered to be of high or prohibitive risk to continue with pregnancy in the majority of

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models of maternal cardiovascular risk estimation. These conditions include pulmonary arterial hypertension, severe ventricular dysfunction, severe left-sided heart obstruction, and significant aortic dilatation with underlying connective tissue disease³. However, it is not uncommon for women to present pregnant, and the high-risk cardio-obstetrics team must collaborate to determine the most effective approach to reducing maternal cardiovascular, obstetric, and foetal risk going forward [3].

Hypertensive disorders in pregnancy

Hypertensive disorders of pregnancy (HDP) account for 912 out of every 10,000 delivery hospitalizations in the United States. The American College of Obstetricians and Gynecologists (ACOG) divides HDP into four categories, preeclampsia/eclampsia, gestational hypertension, chronic hypertension, and chronic hypertension with superimposed preeclampsia. Preeclampsia is characterized by proteinuria and hypertension (systolic blood pressure 140 mm Hg or diastolic blood pressure 90 mm Hg in women who were previously normotensive after 20 weeks of pregnancy). A recent joint presidential advisory from the ACOG and AHA highlighted the need for a multidisciplinary management strategy incorporating lifestyle and behavioral modifications, including diet, exercise, and smoking cessation, as well as electronic medical record-based standardized algorithms targeting cardiovascular risk factors. Several studies have proposed that regular exercise during pregnancy may improve vascular function and prevent preeclampsia. Moderate exercise has been studied to evaluate the prevention of preeclampsia. Preeclampsia is important Low-dose aspirin may be considered and should be started in the late first trimester for women with high-risk conditions (chronic hypertension, previous preterm preeclampsia, preterm birth at 34 weeks of gestation, diabetes mellitus). However, large randomized controlled trials evaluating the potential reversal of endothelial dysfunction leading to improved outcomes have not yet been conducted [4].

To guide patient care, including the timing of delivery, maternal risk stratification is necessary and may aid in improving cardiovascular outcomes. The Preeclampsia Integrated Estimate of Risk (fullPIERS) model is one of these models. It was created to find predictors of adverse maternal outcomes in women who were admitted with preeclampsia or developed it after being admitted. Age at conception, symptoms of chest pain or dyspnea, oxygen saturation levels, platelet count, and concentrations of serum creatinine and aspartate transaminase were all considered to be predictors. Blood pressure did not independently predict adverse maternal outcomes in this multivariate model, and it was generally thought to be the only factor for which an easy intervention is possible [5].

Pregnancy hypercholesterolemia

The levels of total cholesterol, triglycerides, and low-density lipoproteins rise steadily throughout pregnancy and reach their highest levels just before birth. Notwithstanding, neither fatty oils nor all out cholesterol surpasses 250 mg/dL in ordinary pregnancies. After conveyance, significant lipoprotein levels decline throughout the following 3 months to approach prepregnancy levels. As per the 2018 multisociety rule on the administration of blood cholesterol, assessment of atherosclerotic CVD hazard and documentation of pattern low-thickness lipoproteins with a lipid board are suggested for grown-ups who are ≥20 years old and not on lipid-bringing down therapy. Anyway given the variety in lipids during pregnancy, it is desirable over screen for dyslipidemia before pregnancy as per the Public Lipid Affiliation's proposals for patient-focused administration of dyslipidemia [6].

Pregnancy Ischemic heart disease is a rare but potentially fatal condition that affects pregnant women. Pregnant women are three to four times more likely than non-pregnant women to suffer from acute myocardial infarction (MI). Although atherosclerosis accounts for less than half of patients, pregnancy-related spontaneous coronary artery dissection and MI with non-obstructive coronary arteries are the most common causes of acute MI in pregnancy. The highest risk periods are the third trimester and the postpartum period [7].

Cardiomyopathies

During Pregnancy It can be difficult to diagnose and treat cardiomyopathy

during pregnancy because both dilated cardiomyopathy and peripartum cardiomyopathy (PPCM) may be caused by the same pathophysiology. PPCM is defined as new-onset cardiomyopathy with systolic dysfunction (LV ejection fraction 45%) without a reversible cause presenting near the end of pregnancy or in the postpartum period in a woman without known heart disease. The prognosis for women with PPCM is strongly linked to LV ejection fraction at presentation. Therefore, it is important to exclude reversible causes of left ventricular dysfunction (eg, myocarditis, during the first year after giving birth, the IPAC study (Investigations of Pregnancy Associated Cardiomyopathy) followed 100 women with PPCM with echocardiography. They found that recovery of LV function occurred almost exclusively within the first six months, with little change after that. Deep Venous Thrombosis and Pulmonary Embolism in Pregnancy Venous thromboembolism (VTE), also known as deep venous thrombosis (DVT) and pulmonary embolism (PE), is four to five times more common during pregnancy. Major cardiovascular events, such as heart transplant, LV assist device, or death, occurred almost exclusively in women with an ejection fraction of less than 30%. However, the absolute risk of VTE during pregnancy remains low at 0.3% for PE and 1.2% for DVT, with the majority (70%) occurring postpartum. As a result, low rates of pregnancy-related PE have been reported in evaluations conducted in emergency departments. DVT typically presents with pain or swelling in the extremities and is diagnosed using compression ultrasonography. However, DVT in pregnancy is typically left-sided and proximal (iliac or iliofemoral). Therefore, serial ultrasonography measurements every 3 to 7 days or magnetic resonance imaging of the pelvis should be considered if ultrasonography is negative and clinical suspicion remain high [8].

Pregnancy and cerebrovascular disease

Specific cerebrovascular risk factors that are uncommon in otherwise healthy young adult females are introduced during pregnancy. Cerebrovascular gamble is most noteworthy in the third trimester and in no less than about a month and a half post pregnancy (puerperium) and incorporates ischemic stroke, cerebral venous apoplexy (CVT), intracerebral discharge, reversible cerebral vasoconstriction condition (RCVS), and back reversible encephalopathy disorder (PRES). A combined risk of ischemic and hemorrhagic stroke is estimated to occur in 30 out of every 100,000 pregnancies in the United States [9].

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Conclusion

CVD is the essential causative condition connected with the maternal mortality in the US. Progressing maternal age and prior comorbid conditions (counting inherent coronary illness) have added to the expanded paces of maternal mortality. In order to provide a comprehensive review of the risks that pregnancy poses to both the mother and the fetus, counseling prior to conception and early involvement by the multidisciplinary cardio-obstetrics team are required. A cardio-obstetrics team is necessary to prevent maternal morbidity and mortality throughout the pregnancy and after delivery for pregnant women at high risk.

Acknowledgement

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Conflict of Interest

None.

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