

VIEWPOINT

# Obstetrics and Gynecological History

## A Missed Opportunity for Cardiovascular Risk Assessment



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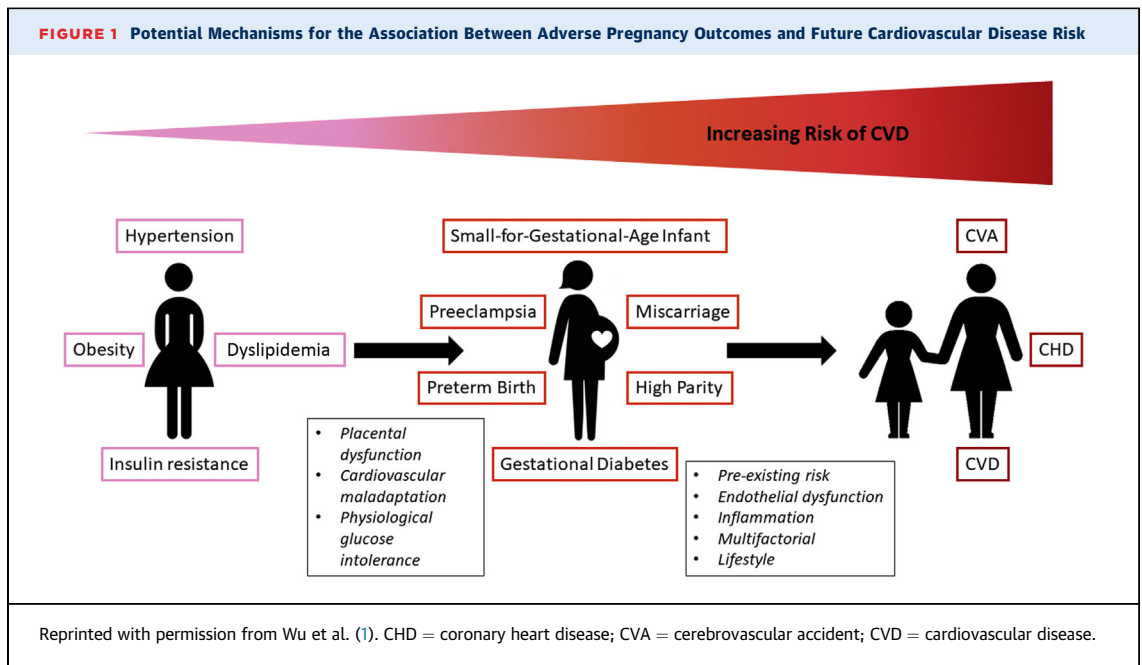
**A**therosclerotic cardiovascular disease (ASCVD) remains a significant cause of morbidity and mortality in women, with event rates rising particularly in young women. Women are disproportionately affected by traditional cardiovascular (CV) risk factors such as diabetes and hypertension compared with men. In addition to standard risk factors, many risk factors are either female predominant, such as autoimmune conditions and psychological stressors, or female specific, such as hormonal changes, throughout the course of a lifetime and pregnancy-related issues. Among the most important risk factors specific to women are conditions occurring during pregnancy and history related to fertility and gynecological conditions. The value of such history has become more apparent in recent literature; however, the translation of this knowledge to clinical practice has been poor. The importance of recognizing specific obstetric and gynecological (OB-GYN) conditions and the specific conditions to screen for are the focus of this editorial.

### OBSTETRICS HISTORY

Pregnancy is often referred to as a “stress test” in relation to the significant changes in cardiac output and associated heart rate/stroke volume that occur. Changes in metabolic regulation also occur that, when dysfunctional, can lead to adverse neonatal and maternal outcomes. These conditions associated with

long-term CV risk are collectively referred to as adverse pregnancy outcomes (APO) and are shown in **Figure 1 (1)**. APOs, including hypertensive disorders of pregnancy and gestational diabetes, have been associated with elevated risk of CV events, including myocardial infarction, heart failure, and stroke. Neonatal outcomes such as spontaneous pre-term birth and intrauterine growth restriction are associated not only with adverse infant outcomes but also with adverse long-term maternal CV outcomes. Whether the association between APO and ASCVD risk is due to underlying predisposition to ASCVD or whether pregnancy triggers the onset of vascular dysfunction is unknown (**Figure 1**). However, what has become more readily evident is that APO not only leads to peripartum neonatal and maternal adverse outcomes but also is associated with significant long-term ASCVD risk. In this case, it is of the utmost importance to recognize such history so that proper screening and potential risk modification can be implemented. In the United States, >80% of women experience at least 1 pregnancy. Documenting such history provides insight into risk, and the results of this “free” stress test can be obtained without cost by simply asking women about their obstetric history. Maternal recollection of events during pregnancy has been shown to be an accurate reflection of obstetric history. Recent multidisciplinary society guidelines have acknowledged the importance of recognizing APOs in evaluating, identifying, and potentially modifying ASCVD risk (2). American College of Obstetricians and Gynecologists (ACOG) guidelines recommend routine screening of body mass index, lipids, and blood pressure in all women with a history of APO (3). Newly released American Heart Association (AHA)/American College of Cardiology (ACC) guidelines on blood cholesterol now include APOs as potential “risk enhancers” in consideration of ASCVD risk. Even among women without APOs, parity in and

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of itself has been associated with ASCVD risk in that parous women compared with nulliparous women exhibit greater ASCVD risk, which increases proportionally to each live birth. Obtaining a cardio-obstetric history is critically important to accurately assessing ASCVD risk when women otherwise seem to be at low risk for ASCVD.

### INFERTILITY AND ASSISTED REPRODUCTIVE TECHNOLOGY

Discussion of reproductive history should include assessment of history of recurrent miscarriage, infertility conditions, and use of assisted reproductive technology (ART). Some evidence suggests that recurrent miscarriage (i.e., 3 consecutive miscarriages) is associated with ASCVD, and optimization of modifiable ASCVD risk factors in women with this history is recommended. Polycystic ovary syndrome (PCOS) is a common cause of infertility affecting 5% to 10% of women. PCOS is associated with increased risk of hypertension, dyslipidemia, gestational diabetes, and type 2 diabetes, thus allowing opportunities for risk screening and modification. Therefore, in women with PCOS, the European Society of Cardiology (ESC) and ACOG guidelines have recommended periodic screening for diabetes and ASCVD risk factors, respectively. ART, which includes intrauterine insemination and in vitro fertilization, has been associated with elevated risk of gestational hypertension, pre-eclampsia, and APOs. The mechanism

is unclear but may be mediated through excessive fluid shifts in the setting of ovarian activation (referred to as ovarian hyperstimulation syndrome) and/or hormone-related effects on endothelial function. Although a meta-analysis on this subject concluded that there was no significant association between ART and CVD risk, this analysis was composed of only 6 studies and could not make a definitive assessment of long-term venous thromboembolic risk; it also suggested an increased risk of stroke. Furthermore, failure to conceive after ovulation induction as part of ART has been associated with increased ASCVD risk. As such, care should be taken to inquire about ART history while further studies investigate this potential association.

### HORMONAL THERAPY

Several gynecological conditions that affect fertility and menopause have been associated with increased risk of ASCVD. The risk of ASCVD is known to increase after menopause. Similarly, surgical menopause and premature ovarian insufficiency (POI) are associated with increased risks of CVD. POI occurs in approximately 1% of the female population, and current AHA/ACC, ESC, and Dutch guidelines all recommend optimizing modifiable ASCVD risk factors in this high-risk group. Because hormone replacement therapy in post-menopausal women is linked to increased risks of stroke and venous thromboembolism, such therapy in women with surgical menopause and POI should

**TABLE 1 Recommended Adverse Pregnancy Outcomes and Gynecological Conditions for Cardiovascular Disease Risk Screening**

Pregnancy history
Hypertensive disorders of pregnancy
Gestational hypertension
Pre-eclampsia
Eclampsia
Chronic hypertension
Gestational diabetes
Pre-term birth (<37 weeks)
Intrauterine growth restriction/low birth weight/small for gestational age
Parity
Miscarriages
Assisted reproductive technology
Infertility
Gynecological history
Polycystic ovarian syndrome
Premature ovarian insufficiency
Use of oral contraceptives
Menopausal status
Use of hormone replacement therapy

continue only until the average age of menopause. Combined oral contraceptive pills that contain estrogen are associated with increased risk of venous thromboembolism and are contraindicated in women with ischemic heart disease, cyanotic heart disease, heart failure, or arrhythmia, and in those with pulmonary hypertension taking endothelin receptor antagonists. Contraceptive methods for women with cardiac disease is a delicate issue that deserves special consideration but is outside the scope of this editorial.

### FUTURE DIRECTIONS

As the value of screening for female-specific risk factors related to OB-GYN history becomes more widely recognized for better assessment of ASCVD

risk, the next question is which providers should be screening for such conditions. It is imperative that women with hypertensive disorders of pregnancy have close follow-up in the immediate postpartum period to assess adequate blood pressure control. Developing a system to transition such women to regular follow-up with a primary care physician or cardiologist is key to preventing gaps in care. A recommended list of OB-GYN conditions to screen for is given in **Table 1**. Automated referral systems post-delivery and facilitating visits at hospital discharge can alleviate attrition in postpartum follow-up. For the long term, many of these young women of childbearing age often do not have other chronic medical conditions, so they may not routinely seek primary care. However, a key opportunity for screening is within OB-GYN office visits. A significant number of women rely on the OB-GYN provider as their primary care provider. Such OB-GYN visits provide a valuable opportunity to screen women for ASCVD risk factors and to utilize OB-GYN history for either implementation of screening or risk reduction and/or referral to a primary care physician or cardiologist (2). Such an initiative was put forth through a partnership between the Society for Cardiovascular Angiography and Interventions-Women in Innovations (SCAI-WIN) and ACC in 2012, demonstrating proof of concept for improving risk assessment and referral. Education also needs to be highlighted within primary care specialties in which primary prevention can be implemented in young women. Such innovative approaches to bridging gaps in care are needed to capture women who are at risk.

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**KEY WORDS** atherosclerotic cardiovascular disease, hormonal changes, pregnancy