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GLOBAL EXPERTS, LOCAL LEARNING
Women's Heart Health: Risk, Diagnosis and Management Differences

Traditional and non-traditional atherosclerotic risk factors in women

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Delegada SAC Consejo de la Mujer SIAC - SSC
no disclosure
Cardiovascular risk factors in women

- Hypertension
- Dyslipidemia (high LDL and/or low HDL)
- Diabetes mellitus
- Smoking
- Age
- Personal history of CHD or other vascular disease
- Family history of premature CHD
- Metabolic syndrome
- Chronic kidney disease
- Psychological stress
- Inflammatory/rheumatic diseases
- Menarche
- Post-menopausal status
- Pregnancy related complications

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Percent of Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Blood Pressure</td>
<td>30-45%</td>
</tr>
<tr>
<td>Abnormal Lipids</td>
<td>40-55%</td>
</tr>
<tr>
<td>Overweight</td>
<td>60-75%</td>
</tr>
<tr>
<td>High Glucose</td>
<td>5-25%</td>
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<tr>
<td>Physical Inactivity</td>
<td>35-60%</td>
</tr>
<tr>
<td>Tobacco Use</td>
<td>~20%</td>
</tr>
</tbody>
</table>
Rheumatologic diseases
Cardiovascular risk factors in women

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- Pregnancy related complications
Risk factors unique to women

Menarche

- Early menarche is associated with future CHD (and CVD) risk
- 1.2 million women (mean age 56 years) without known CVD at baseline
- The most common self-reported age of menarche was 13 years of age (25 %)
- 4 % reporting early menarche at 10 years of age or younger
- Women who experienced menarche at 10 years of age or younger have a significantly increased risk of developing CHD (RR 1.27; 95% CI 1.22-1.31).

Canoy et al, Circulation. 2015 Jan;131(3):237-44
Menopause

- CVD is unusual in premenopausal women
- Postmenopausal state is recognized at the ACC/AHA Guidelines as a risk factor for CVD, with same weight as male sex
- Early natural menopause (≤44 years of age) has been associated with an increase in the risk of cardiovascular.
  - Data are conflicting on whether the type of menopause (surgical or natural) affects cardiovascular risk.
- Observations do not prove that menopause itself is causal for developing CVD.
  - Postmenopausal women who develop CVD have an increased burden of risk factors compared with those who do not.
- Consistent with this hypothesis that menopause may not be directly responsible for the increase in CVD risk after menopause is the lack of benefit from hormone replacement therapy in the Women's Health Initiative (WHI), mostly of primary prevention, and in the HERS trials of secondary prevention.
Menopause

Traditional paradigm
- Cardiovascular risk minimal or absent

Alternative paradigm
- Increased cardiovascular risk
Premenstrual syndrome

Physical and emotional symptoms that typically occurs in the days prior to the onset of menses, may be associated with a future risk of developing hypertension.

- Women with PMS were significantly more likely to develop hypertension (adjusted HR 1.4; 95% CI 1.2-1.6)

- Among women who developed hypertension prior to age 40 years, PMS was associated with a tripling of the risk (adjusted HR 3.3; 95% CI 1.7-6.5).
Pregnancy complications

- Hypertension and diabetes that develop during pregnancy
- Spontaneous pregnancy loss
- Preterm birth
- Other pregnancy related complications
  - pre-existing hypertension
  - glycosuria
  - preeclampsia after 34 weeks
  - dropping hemoglobin during the second and third trimesters
Pre-Eclampsia and Future Cardiovascular Risk Among Women
A Review
Raheel Ahmed,* Joseph Dunford,* Roxana Mehran, MD,† Stephen Robson, MBBS, MD,‡§
Vijay Kunadian, MBBS, MD¶¶
Newcastle upon Tyne, United Kingdom; and New York, New York

Cardiovascular disease continues to be the leading cause of death in the western world. Due to advancements in diagnosis, prevention, and treatment, cardiovascular mortality has fallen in recent years. Previous studies have evaluated the impact of traditional risk factors such as hypercholesterolemia and smoking. However, limited studies have been conducted to evaluate sex discrepancies among patients with cardiovascular disease. Pre-eclampsia is a multisystem placentaly mediated disease, which usually arises after 32 weeks of gestation and classically presents with hypertension and proteinuria. Pre-eclampsia affects 2% to 8% of all pregnancies worldwide and is often complicated by fetal growth restriction. Women with a history of pre-eclampsia are at increased risk of future cardiovascular complications. Therefore, this topic is of significance to the cardiovascular health of over 300 million women worldwide. The goal of this review is to determine the association of pre-eclampsia and future cardiovascular risk and to explore the potential management options for these high-risk women. (J Am Coll Cardiol 2014;63:1815–22) © 2014 by the American College of Cardiology Foundation
The absolute frequency of the outcomes was low, as expected for a 1-year follow-up period of women of reproductive age, with cumulative incidence rates (per 100,000 livebirths) of: 30 for heart failure, 25.0 for type 2 diabetes, 23.3 for deep vein thrombosis, 14.8 for stroke/transient ischemic attack, 9.5 for coronary heart disease, 8.4 for type 1 diabetes, and 8.0 for intracranial hemorrhage.
association between miscarriage and coronary heart disease

association between recurrent miscarriage and coronary heart disease
Risk of myocardial infarction in postmenopausal women with prior pregnancy loss

11,518 women (mean follow-up 10.8 years)

- any history of miscarriage (adjusted HR 1.42, 95% CI 1.14-1.78 compared with no pregnancy loss)
- stillbirth (adjusted HR 2.65, 95% CI 1.37-5.12)
- recurrent miscarriages (more than three) were at the highest risk of myocardial infarction (adjusted HR 8.90, 95% CI 3.18-24.90).
An association between preterm delivery and long-term maternal cardiovascular morbidity

Roy Kessous, MD; Ilana Shoham-Vardi, PhD; Gali Pariente, MD; Gershon Holcberg, MD; Eyal Sheiner, MD, PhD

OBJECTIVE: The purpose of this study was to investigate whether a history of preterm delivery (PTD) poses a risk for subsequent maternal long-term cardiovascular morbidity.

STUDY DESIGN: A population-based study compared the incidence of cardiovascular morbidity in a cohort of women who delivered preterm (<37 weeks' gestation) and those who gave birth at term at the same period. Deliveries occurred during the years 1988-1999 with follow up until 2010. Kaplan-Meier survival curves were used to estimate cumulative incidence of cardiovascular hospitalizations. Cox proportional hazards models were used to estimate the adjusted hazard ratios for cardiovascular hospitalizations.

RESULTS: During the study period 47,908 women met the inclusion criteria; 12.5% of the patients (n = 5992) delivered preterm. During a follow-up period of >10 years, patients with PTD had higher rates of simple and complex cardiovascular events and higher rates of total cardiovascular-related hospitalizations. A linear association was found between the number of previous PTD and future risk for cardiovascular hospitalizations (6.9% for ≥2 PTDs; 5.0% for 1 PTD vs 3.5% in the comparison group; P < .001). The association remained significant for spontaneous vs induced PTD and for early (<34 weeks) and late (34 weeks to 36 weeks 6 days' gestation) PTD. In a Cox proportional hazards model that adjusted for pregnancy confounders such as labor induction, diabetes mellitus, preeclampsia, and obesity, PTD was associated independently with cardiovascular hospitalizations (adjusted hazard ratio, 1.4; 95% confidence interval, 1.2–1.6).

CONCLUSION: PTD is an independent risk factor for long-term cardiovascular morbidity in a follow-up period of more than a decade.

Key words: cardiovascular morbidity, hospitalization, long term, pregnancy, preterm delivery

Preterm birth

Kaplan-Meier hazard function curve for cardiovascular-associated hospitalization of patients with and without a history of PTD

Epidemiology and Prevention

Pregnancy Complications and Cardiovascular Disease Death
50-Year Follow-Up of the Child Health and Development Studies
Pregnancy Cohort

Piera M. Cirillo, MPH; Barbara A. Cohn, PhD

Background—Few studies have investigated the combination of pregnancy complications that predict risk for cardiovascular disease (CVD) death and how risk changes with age. This report presents a comprehensive investigation of the relation of the occurrence of multiple pregnancy complications to CVD death over 5 decades in a large pregnancy cohort.

Methods and Results—We examined pregnancy events (1959–1967) and CVD death through 2011 in 14,062 women from the Child Health and Development Studies. CVD death was determined by linkage to California Vital Statistics and National Death Index. Women were a median age of 26 years at enrollment and 66 years in 2011. Preexisting hypertension (hazard ratio, 3.5; 95% confidence interval, 2.4–5.1); glycosuria (hazard ratio, 4.2; confidence interval, 1.3–13.1); late-onset preeclampsia (after week 34, hazard ratio, 2.0; confidence interval, 1.2–3.5); and hemoglobin decline over the second and third trimesters (hazard ratio, 1.7; confidence interval, 1.2–2.7) predicted CVD death. Delivery of a small-for-gestation or preterm infant and early-onset preeclampsia (by week 34) significantly predicted premature CVD death ($P<0.05$ for age dependence). Preterm birth combined with hemorrhage, gestational hypertension, or preexisting hypertension identified women with a 4- to 7-fold increased risk of CVD death. Preeclampsia in combination with preexisting hypertension conferred a significant nearly 6-fold risk in comparison with a 4-fold risk for preexisting hypertension alone.

Conclusions—We observed combinations of pregnancy complications that predict high risk of death and 2 new risk markers, glycosuria and hemoglobin decline. Obstetricians serve as primary care physicians for many young women and can readily use these complications to identify high-risk women to implement early prevention. (Circulation. 2015;132:1234-1242. DOI: 10.1161/CIRCULATIONAHA.113.003901.)
Other pregnancy related complications

- Gestational hypertension: 12%
- Preterm delivery: 3%
- Small-for-gestational age (SGA) delivery: 4%
- Hemoglobin decline: 9%
- Late onset pre-eclampsia: 3%
- Pre-existing hypertension: 2%
- Glycosuria: 0.5%
- Early onset pre-eclampsia: 0.3%

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Table 1. Associations of Pregnancy Complications With CVD Death

<table>
<thead>
<tr>
<th>Complication</th>
<th>Unadjusted</th>
<th>Adjusted for Covariates*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HR</td>
<td>95% CI</td>
</tr>
<tr>
<td>Early-onset pre-eclampsia‡</td>
<td>6.7</td>
<td>2.7, 14.2</td>
</tr>
<tr>
<td>Preexisting hypertension</td>
<td>4.6</td>
<td>3.3, 6.4</td>
</tr>
<tr>
<td>Glycosuria</td>
<td>4.3</td>
<td>3.0, 6.6</td>
</tr>
<tr>
<td>Late-onset pre-eclampsia</td>
<td>2.5</td>
<td>1.9, 3.4</td>
</tr>
<tr>
<td>Preterm delivery†</td>
<td>2.5</td>
<td>1.8, 3.3</td>
</tr>
<tr>
<td>Hemoglobin decline</td>
<td>1.8</td>
<td>1.1, 2.8</td>
</tr>
<tr>
<td>SGA delivery‡</td>
<td>1.8</td>
<td>1.3, 2.5</td>
</tr>
<tr>
<td>Gestational hypertension</td>
<td>1.7</td>
<td>1.1, 2.6</td>
</tr>
<tr>
<td>Black</td>
<td>0.9</td>
<td>0.6, 1.4</td>
</tr>
<tr>
<td>Non-black</td>
<td>0.9</td>
<td>0.6, 1.3</td>
</tr>
<tr>
<td>Not associated</td>
<td>1.4</td>
<td>0.9, 2.3</td>
</tr>
</tbody>
</table>

Cirillo and Cohn; Circulation Sep 29, 2015
Conclusiones

- Traditional risk factors are associated with increased CVD both in men and women.
- Unique risk factors for women related to hormonal status and reproductive history have only recently been considered as potentially important.
Muchas gracias