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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





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no disclosure

Cardiovascular risk factors in women



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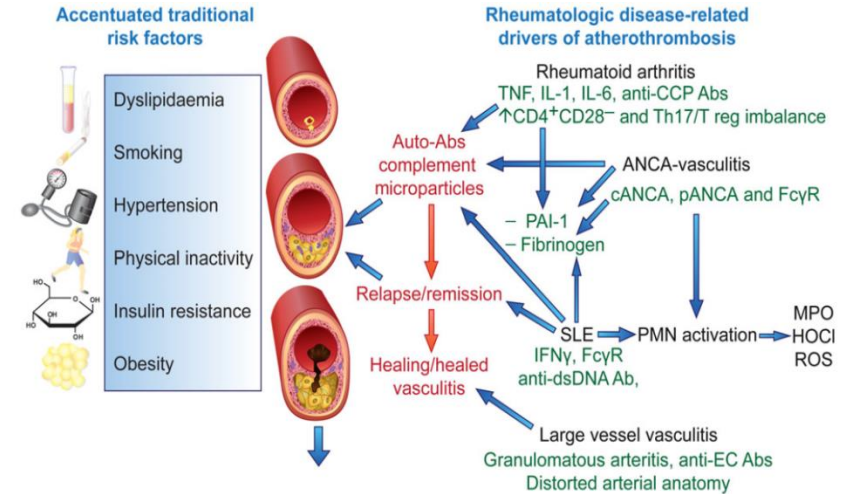
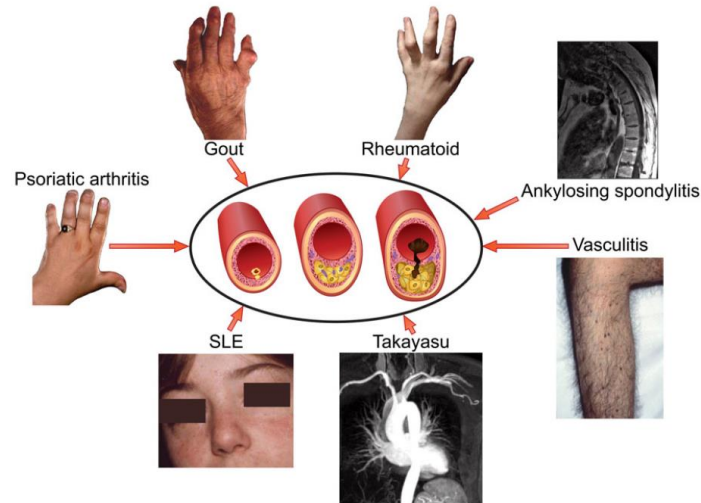
- Hypertension
- Dyslipidemia (high LDL and/or low HDL)
- Diabetes mellitus
- Smoking
- Age

Risk Factor	Percent of Women
High Blood Pressure	30-45%
Abnormal Lipids	40-55%
Overweight	60-75%
High Glucose	5-25%
Physical Inactivity	35-60%
Tobacco Use	~20%

Rheumatologic diseases



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Cardiovascular risk factors in women



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- ☐ 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

Risk factors unique to women

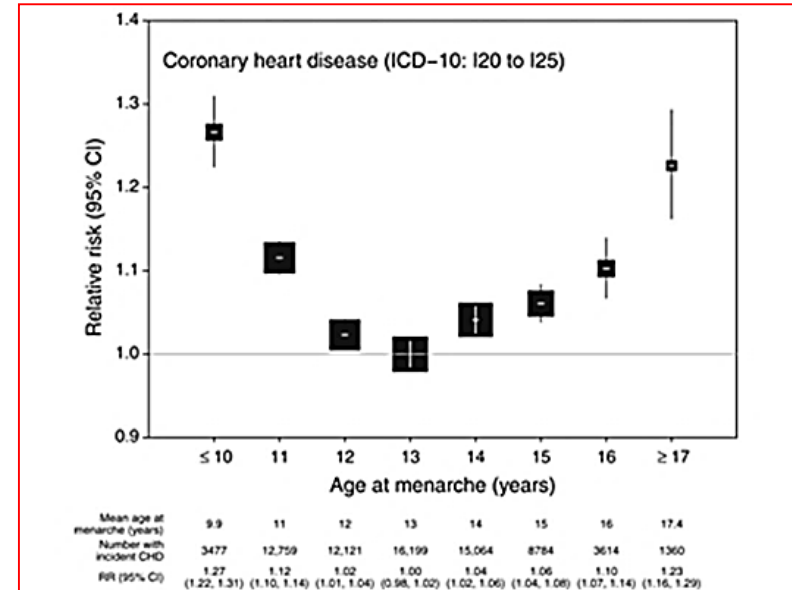


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Menarche

- ❑ 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).

Relative Risk by age of menarche



Menopause



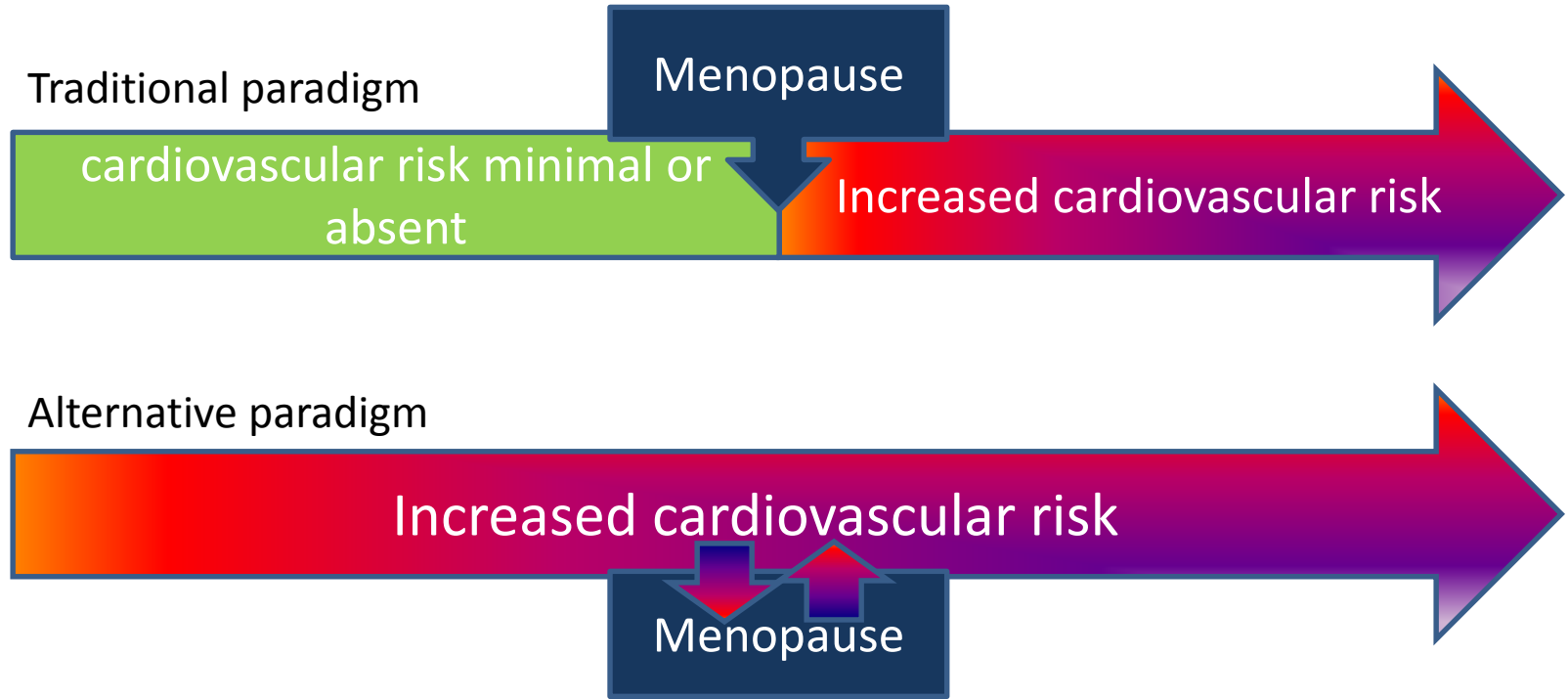
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- ❑ CVD is unusual in premenopausal women
- ❑ Postmenopausal state is recognized at the ACC/AHA Guidelines as a risk factor for CVD, with same weight as male sex
- ❑ Early natural menopause (≤ 44 years of age) has been associated with an increase in 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



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Premenstrual syndrome



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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).



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Original Contribution

Premenstrual Syndrome and Subsequent Risk of Hypertension in a Prospective Study

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The prevalence of hypertension is increasing among younger women, and new strategies are needed to identify high-risk women who should be targets for early intervention. Several mechanisms underlying hypertension might also contribute to premenstrual syndrome (PMS), but whether women with PMS have a higher risk of subsequently developing hypertension has not been assessed. We prospectively evaluated this possibility in a substudy of the Nurses' Health Study II. Participants were 1,257 women with clinically significant PMS (1991–2005) and 2,463 age-matched comparison women with few menstrual symptoms. Participants were followed for incident hypertension until 2011. Over 6–20 years, hypertension was reported by 342 women with PMS and 541 women without. After adjustment for age, smoking, body mass index, and other risk factors for hypertension, women with PMS had a hazard ratio for hypertension of 1.4 (95% confidence interval: 1.2, 1.6) compared with women without PMS. Risk was highest for hypertension that occurred before 40 years of age (hazard ratio = 3.3; 95% confidence interval: 1.7, 6.5; P for interaction = 0.0002). The risk associated with PMS was not modified by use of oral contraceptives or antidepressants but was attenuated among women with high intakes of thiamine and riboflavin ($P < 0.05$). These results suggest that PMS might be associated with future development of hypertension and that this risk may be modifiable.

cohort studies; diet; hypertension; premenstrual syndrome

Pregnancy complications



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- ❑ **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

Hypertension during pregnancy



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Pre-Eclampsia and Future Cardiovascular Risk Among Women

A Review

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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 placentally 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

Hypertension and diabetes during pregnancy



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Table 2. Predictors of Heart Failure, Intracranial Hemorrhage, Stroke/TIA, Coronary Heart Disease, Deep Vein Thrombosis, Type 1 Diabetes, and Type 2 Diabetes in the Year Following Delivery in New York City, New York, 1995–2004

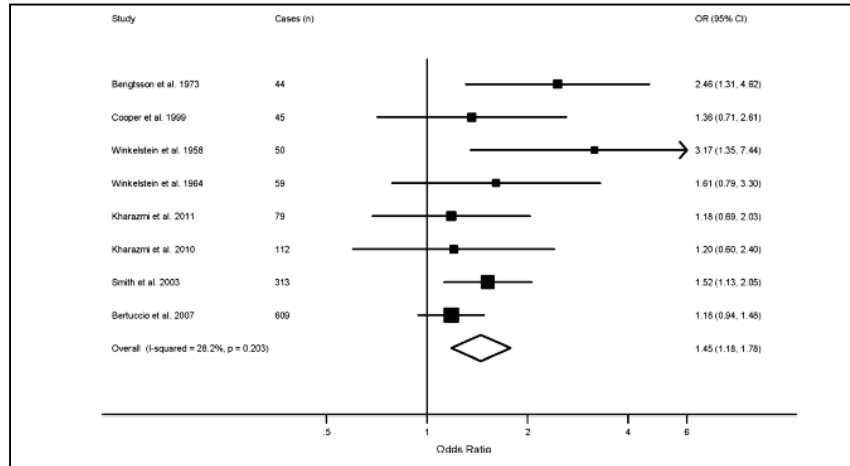
Predictor	Heart Failure (n = 259)		Intracranial Hemorrhage (n = 68)		Stroke/TIA (n = 126)		Coronary Heart Disease (n = 81)		Deep Vein Thrombosis (n = 198)		Type 1 Diabetes (n = 71)		Type 2 Diabetes (n = 212)	
	OR ^a	95% CI	OR ^a	95% CI	OR ^a	95% CI	OR ^a	95% CI	OR ^a	95% CI	OR ^a	95% CI	OR ^a	95% CI
Parity														
0	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent
1	0.6	0.4, 0.9	1.1	0.6, 2.0	1.0	0.6, 1.6	1.4	0.7, 2.6	0.8	0.6, 1.2	0.7	0.4, 1.2	1.0	0.7, 1.4
2	0.9	0.6, 1.4	1.3	0.6, 2.8	1.1	0.6, 1.9	1.9	1.0, 3.9	1.5	1.0, 2.3	0.4	0.1, 1.0	1.1	0.8, 1.7
≥3	1.3	0.9, 1.9	1.7	0.8, 3.7	1.9	1.1, 3.2	2.2	1.1, 4.4	2.2	1.4, 3.4	1.3	0.6, 2.6	1.3	0.8, 2.0
Gestational hypertension ^b														
No	1.0	Referent			1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent
Yes	2.6	1.5, 4.5			1.2	3 cases ^c	2.1	3 cases ^c	1.5	0.6, 3.7	1.0	2 cases ^c	1.6	0.8, 3.1
Preeclampsia														
No	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent
Yes	4.1	2.9, 5.8	2.8	1.3, 6.2	2.8	1.6, 5.0	3.1	1.6, 6.3	2.6	1.6, 4.2	1.8	0.8, 3.8	2.0	1.3, 3.2
Gestational diabetes														
No	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent
Yes	1.5	1.0, 2.2	1.5	0.7, 3.4	1.2	0.7, 2.3	1.5	0.7, 3.1	1.0	0.6, 1.8	40.4	23.8, 68.5	22.6	16.9, 30.4
Multiple gestation ^d														
No	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent	1.0	Referent
Yes	4.5	2.7, 7.4	5.3	2.1, 13.2	2.3	0.8, 6.2 ^e	4.5	1.8, 11.0	1.8	0.8, 4.4	3.1	1.0, 9.7 ^e	1.0	0.3, 3.2 ^e

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

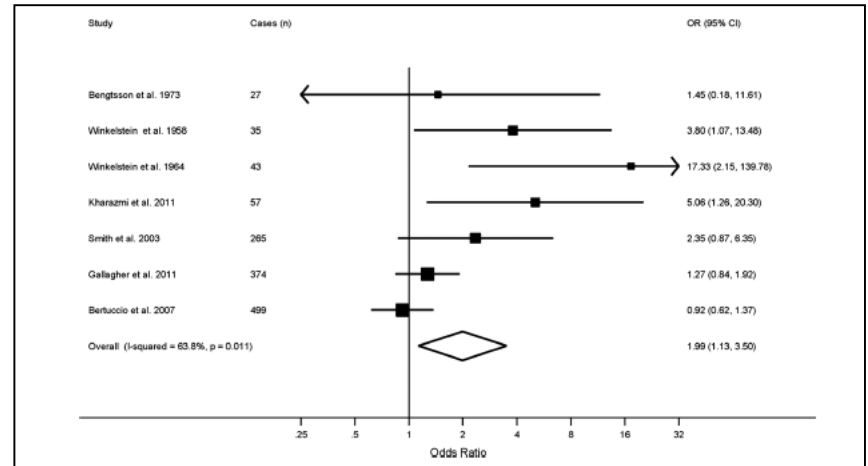
Miscarriage and future maternal cardiovascular disease: a systematic review and meta-analysis

Clare Teresa Oliver-Williams,¹ Emma E Heydon,¹ Gordon C S Smith,²
Angela M Wood¹

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).

SMFM PAPERS

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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 (5.5% 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

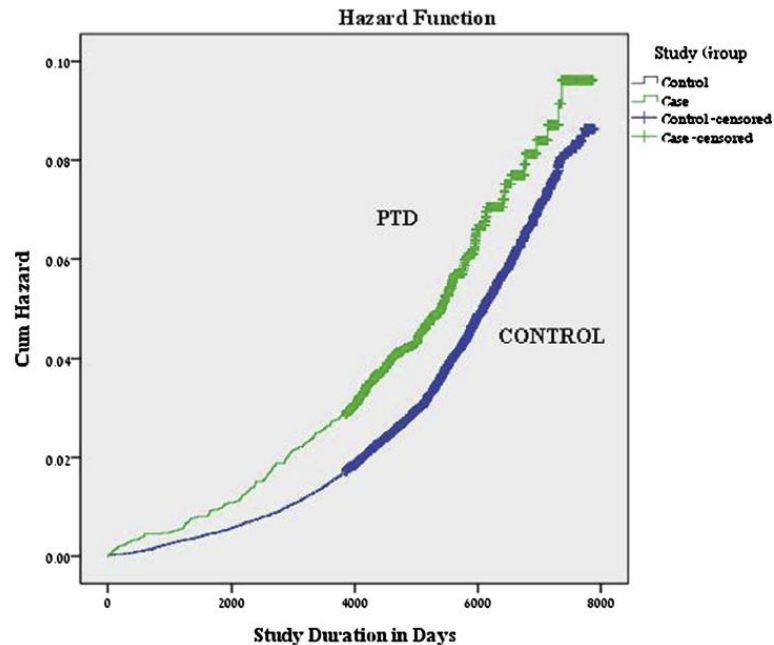
Cite this article as: Kessous R, Shoham-Vardi I, Pariente G, et al. An association between preterm delivery and long-term maternal cardiovascular morbidity. *Am J Obstet Gynecol* 2013;209:368.e1-8.

Preterm birth



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



Kessous, R. Am J Obstet Gynecol 2013.

Other pregnancy related complications



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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



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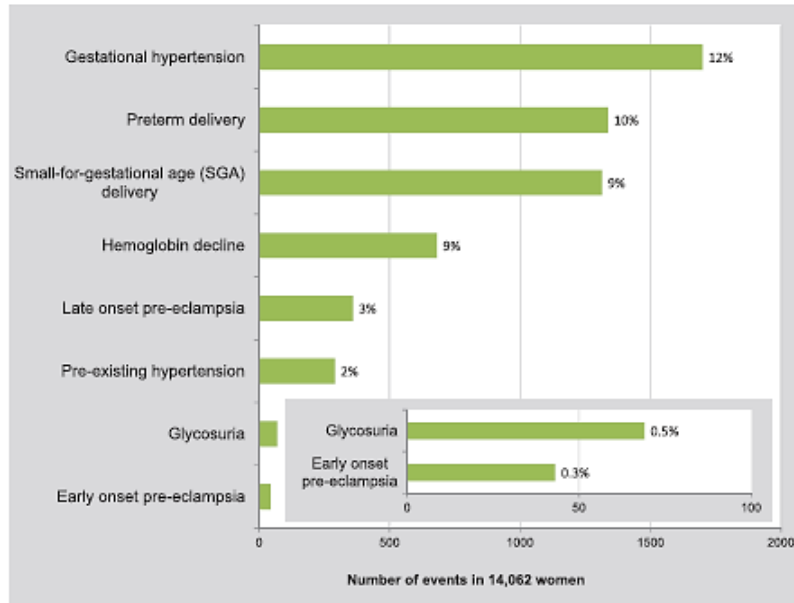


Table 1. Associations of Pregnancy Complications With CVD Death

	Unadjusted			Adjusted for Covariates*		
	HR†	95% CI		HR	95% CI	
		Lower	Upper		Lower	Upper
Associated						
Early-onset preeclampsia‡	6.7	2.74	16.20	3.6	1.04	12.19
Preexisting hypertension	4.6	3.32	6.41	3.5	2.35	5.07
Glycosuria	4.3	1.62	11.61	4.2	1.33	13.10
Late-onset preeclampsia	2.5	1.36	3.87	2.0	1.18	3.46
Preterm delivery‡	2.5	1.82	3.47	2.1	1.40	3.01
Hemoglobin decline§	1.8	1.19	2.80	1.7	1.12	2.70
SGA delivery‡	1.8	1.24	2.55	1.6	1.02	2.42
Gestational hypertension						
Black	1.7	1.10	2.65	1.8	1.09	2.82
Non-black	0.9	0.63	1.36	1.0	0.68	1.52
Not associated						
Hemorrhage	1.4	0.91	2.30	1.4	0.85	2.42
Irregular menses/PCOS¶	1.0	0.76	1.41	1.1	0.80	1.51



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