

Hypertensive Disorders of Pregnancy as a Risk Factor for Heart Disease in Women

Blair Uhlig, RN, MSN
Columbia University School of Nursing- Midwifery
New York, NY

Objectives

The objectives of this presentation are:

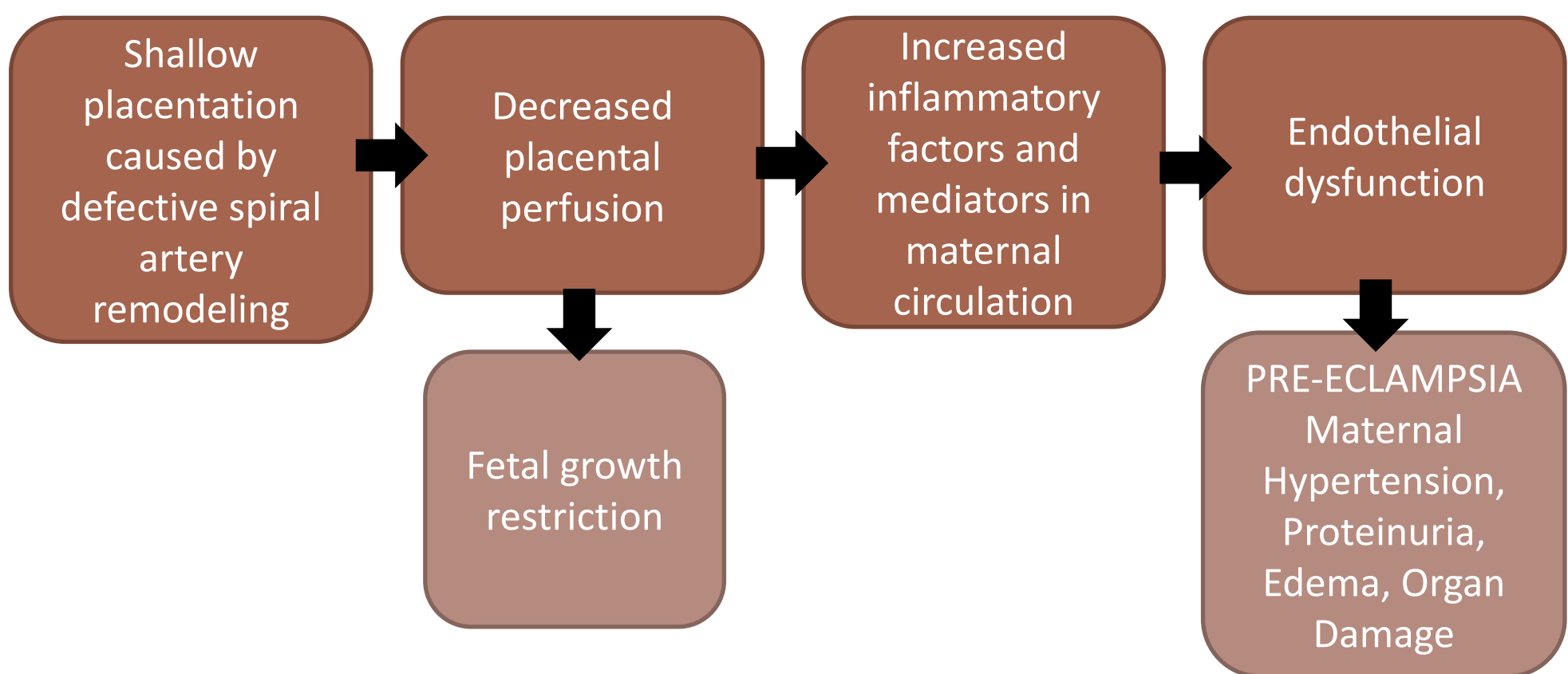
1. Support the proposed connection between hypertensive disorders of pregnancy with development of HD and CVA later in life using recent studies
2. Present possible theories to understand the pathophysiology of this connection
3. Discuss guidelines for incorporating an understanding of this connection into practice, and avenues for future research

Methods

- Literature review of published studies from 2015-2020
 - Population based cohort studies
 - Expert opinions
 - Systemic Reviews and Meta-Analyses
 - None of the population-based cohort studies were included in systemic reviews discussed in this presentation

Background

- Pre-eclampsia is associated with significant maternal and fetal morbidity and mortality¹⁴
 - Affects 4-5% of pregnancies worldwide
 - Caused by reduced placentation



- HD is the leading cause of death for both men and women worldwide
- Risk of HD and CVA is consistently under-diagnosed in women⁹
- Risk factors specific to women that are not well known and not incorporated into practice⁹

Traditional Risk Factors	Pregnancy-specific
Hypertension Diabetes Smoking Dyslipidemia Obesity	Gestational Hypertension Pre-eclampsia Preterm Birth Gestational Diabetes

Results

A review of literature over the last five years (from 2015 to 2020) shows at least six quality studies that confirm the existing connection between hypertensive disorders of pregnancy and developing HD and CVA later in life. A detailed breakdown of study factors, outcomes measures, and conclusions are presented below.

Study	Year	Study Design	Setting	Outcomes Measured	Conclusions
Behrens et al ²	2017	Retrospective Cohort Study	Denmark	Hypertension (HTN) 10 years after hypertensive disorders of pregnancy	HTN rates were three- to ten-fold higher, and persisted for 20 or more years postpartum
Bokslag et al ⁴	2017	Prospective Observational Study	Netherlands	CVD risk factors in women in their 50s who experienced early onset pre-eclampsia	Women who had early-onset pre-eclampsia were significantly more likely to have HTN, higher BMI, and dyslipidemia compared to women without pre-eclampsia
Brouwers et al ⁵	2018	Systemic Review and Meta-analysis	International	Hypertension (HTN) and CVD in women with multiple pregnancies complicated by pre-eclampsia compared to women with a single pregnancy complicated by pre-eclampsia	Recurrent pregnancies complicated by pre-eclampsia had higher risk ratios of HTN, ischemic heart disease, heart failure, CVA, and hospitalization due to cardiovascular disease
Chen et al ⁷	2018	Retrospective Cohort Study	Taiwan	Incidence of heart failure (HF) in women who experienced pre-eclampsia	The incidence of developing HF in later life is approximately eight times higher for women who experienced pre-eclampsia
Riise et al ¹⁵	2017	Prospective Cohort Study	Norway	Incidence of coronary events and cardiovascular mortality in women with pre-eclampsia, pre-term birth (PTB), and small for gestational age (SGA) infants	The incidence of coronary events was higher in women with a pregnancy complicated by pre-eclampsia, and was even higher when also complicated by PTB and/or SGA infants
White et al ¹⁸	2016	Retrospective Cohort Study	Olmstead County, Missouri, USA	Coronary artery calcification (CAC) three decades after pregnancy	Those who experienced pre-eclampsia were three times more likely to develop CAC compared to women who did not experience complications
Wu et al ¹⁹	2017	Systemic Review and Meta-analysis	International	Future risk of cardiovascular disease outcomes	Pre-eclampsia is independently associated with a greater risk of HF, coronary heart disease, coronary mortality, and CVA

Implications for Providers

- Improve risk identification in women
 - Development and implementation of gender specific risk calculators¹¹
 - Incorporating full obstetric history by cardiologists and general practitioners¹¹
 - Involves increasing awareness in these professions
- Identify classic risk factors earlier
 - Women who had hypertensive disorders of pregnancy are more likely to develop hypertension and diabetes mellitus at age 35 than women who did not during pregnancy¹
- Continue to focus on modifiable risk factors¹⁴
 - Smoking, obesity, and physical inactivity are classic risk factors that can be modified to reduce risk of HD and CVA



Implications for Research

- Future research on pregnancy-related risk factors
 - Continue to explore the relationship between hypertensive disorders of pregnancy and HD and CVA later in life¹¹
 - Explore other related factors
 - PTB¹⁵
 - SGA¹⁵
 - Reoccurrence of pre-eclampsia⁵
 - Connect hypertensive disorders of pregnancy with the unique symptomology of HD and CVA in women
 - Their may be pre-existing pathology at baseline that causes both hypertensive disorders of pregnancy and HD/CVA¹⁹
- Women and HD
 - Women must be included in research on the development, symptoms, and treatment of HD
 - Must account for obstetric history, even when compared to men¹⁹

Contact

Blair Uhlig, RN, MSN
DNP Midwifery Candidate 2021, Columbia University
Email: blair.uhlig@gmail.com
Phone: 551-206-4574

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