Cardiovascular Risk Management After a Hypertensive Disorder of Pregnancy

Julia Spaan, Louis Peeters, Marc Spaanderman, Mark Brown

Awareness of cardiovascular disease in women is increasing and is currently a main topic of the heart associations and foundations worldwide. Although several guidelines underscore sex differences in clinical presentation, treatment, and prognosis, almost no attention is given to a unique risk marker in women: the obstetric history. Large epidemiological studies have confirmed the association between a hypertensive disorder of pregnancy and the risk of future cardiovascular disease. Despite this, physician’s awareness of a hypertensive disorder of pregnancy as a risk factor for cardiovascular disease is limited. There seems to be no structured follow-up of women after a hypertensive disorder of pregnancy, and guidelines on cardiovascular risk management after a hypertensive disorder of pregnancy are lacking. It is time to incorporate this easily identifiable risk marker into cardiovascular risk management in women.

The purpose of this review is to identify current barriers and opportunities for cardiovascular risk management after a hypertensive disorder of pregnancy and to suggest a practical approach for risk management.

Why Does Current Risk Prediction Fail in Young Women?

More women die of cardiovascular disease than of any other cause.1 During the last decade, the focus of primary prevention has widened from individuals with the highest risk and largest short-term benefit (usually older people with previous cardiovascular events) to include individuals at an earlier stage of disease to prevent target-organ damage. Young women have a low absolute risk of cardiovascular disease, and premenopausal women are in general protected. Few women <65 years of age will be considered high risk with traditional risk prediction models for cardiovascular disease, such as the Framingham risk score, the Systematic Coronary Risk Evaluation (SCORE), and the QRISK score.2,4 Still, women have a lifetime risk of cardiovascular disease of 30% to 40% at 50 years of age.5,6 Using a 30-year prediction model, women with multiple risk factors (unfavorable lipids, hypertension, and smoking) had a 12% predicted risk of cardiovascular disease at 25 years of age, increasing to 42% at 45 years of age.7 The obstetric history offers a unique risk marker to identify young women at risk for future cardiovascular disease.

What Is the Risk of Cardiovascular Disease After a Hypertensive Disorder of Pregnancy?

Preeclampsia occurs in 3% to 5% of all pregnancies,4 a figure comparable to the prevalence of diabetes mellitus at reproductive age, a well-accepted risk marker for cardiovascular disease.9 The prevalence of any hypertensive disorder of pregnancy is up to 5% to 10% of all pregnancies and rising with the epidemic of obesity.8 Women with a history of preeclampsia have a doubled risk of stroke, cardiac ischemia, or venous thrombosis within 10 to 20 years after pregnancy.10,11 Moreover, they have a 4-fold higher risk of chronic hypertension and a 3-fold higher risk of type 2 diabetes mellitus.10,12 These comorbidities are observed at a relatively young age in mostly premenopausal women. Comparable risk estimates are found in women with a history of gestational hypertension only.13–16 The risk of cardiovascular disease is further increased in combination with other risk factors of the obstetric history, such as preterm birth or fetal growth restriction. For example, preterm birth and preeclampsia are associated with an 8- to 10-fold higher cardiovascular mortality instead of a 2-fold higher cardiovascular mortality after term preeclampsia compared with term normotensive pregnancies.17–19

Which Cardiovascular Risk Factors Are Present Postpartum?

Risk factors that have been observed postpartum in women who had a hypertensive disorder of pregnancy show large overlap with traditional risk factors for cardiovascular disease. Consistent findings after a hypertensive disorder of pregnancy are the presence of an elevated blood pressure, body mass index, and insulin resistance.20–26 An unfavorable lipid profile is frequently observed postpartum; low high-density lipoprotein cholesterol (≤1.29 mmol/L) is present in ≈40% and high triglycerides (≥1.7 mmol/L) in ≈20% of all women with a history of early onset preeclampsia.27,28 Although lipid abnormalities are frequently present,20,29,30 several studies did
What Are Barriers to Include the Obstetric History in Cardiovascular Risk Counseling for Women?

Currently, it is unclear whether a hypertensive disorder of pregnancy is an independent risk factor for cardiovascular disease or whether this is all explained by traditional cardiovascular risk factors. Tools are lacking to give an individualized risk estimate of cardiovascular disease after a hypertensive disorder of pregnancy. A possible strategy to overcome the latter is not to use a classic risk prediction model but to calculate the risk as if the woman was 60 years of age or to use a 30-year or lifetime risk prediction model. However, this does not take the obstetric history into account. Most guidelines will use classic risk score models to identify high-risk women who need an intervention or treatment. We do not know whether criteria for treatment should be more strict for these women, as for those with diabetes mellitus. Despite these uncertainties (Table 1), the least we can do is to offer cardiovascular risk management in asymptomatic people in the postpartum period.

What Opportunities Does a Structured Postpartum Cardiovascular Screening Program Have to Offer?

A structured cardiovascular screening program, as proposed in Table 2, ensures adequate follow-up after a hypertensive disorder of pregnancy. It creates a moment to explain and discuss in detail the increased risk of cardiovascular disease. Such a screening will identify women with comorbidities, such as hypertension, obesity, type 2 diabetes mellitus, and hyperlipidemias. Moreover, it allows adequate referral of women with signs suggestive of underlying disease, such as persistent proteinuria or secondary hypertension. Most importantly, it gives the opportunity for primary prevention of cardiovascular disease by promoting a healthy lifestyle and offering tailored lifestyle interventions.

Motivational Factors for a Healthy Lifestyle

Several factors unique to this specific group of women are present to motivate them to adopt a healthy lifestyle (Table 3). Group interviews revealed that women are more aware of the importance of health after a complicated pregnancy and are motivated to adjust their lifestyle. A healthy lifestyle is not only beneficial for their own future health but may also...
improve the outcome of future pregnancies and the lifestyle of her partner and children. This is especially relevant as women with a hypertensive disorder of pregnancy give often birth to small for gestational age infants, who themselves have a higher risk of later cardiovascular disease.40,41 Women gain on average 2 kg of weight after each pregnancy, and this is even more after a hypertensive disorder of pregnancy.42,43 Interpregnancy weight gain is associated with a doubled risk of gestational hypertension, gestational diabetes mellitus, or preeclampsia during the next pregnancy.44 Therefore, the postpartum period should be an important target for weight management and lifestyle counseling.

What Is the Benefit of a Healthy Lifestyle?
Lifestyle interventions during reproductive age have potentially a large effect on future cardiovascular health. The benefit of a healthy lifestyle is evident from large epidemiological studies such as the INTERHEART study.45 The adverse effect of hypertension, smoking, and diabetes mellitus on cardiovascular disease was larger in women and young people than in men and elderly people.46-48 In a cohort of young women, a favorable cardiovascular risk profile (low blood pressure, low cholesterol, nonsmoking, and nondiabetic) was associated with 80% lower cardiovascular mortality than in women with >2 of these risk factors.49 The lifetime risk of cardiovascular disease at 50 years of age in women with optimal risk factors was only 8%, in contrast to a 50% risk in women with ≥2 risk factors based on long-term follow-up of the Framingham cohort.5

What Is the Effectiveness of Postpartum Lifestyle Interventions?
Several lifestyle intervention trials specifically designed for women with a history of a hypertensive disorder of pregnancy are currently listed in clinical trial registries. Some preliminary reports indicate that women after preeclampsia are willing to participate in such an intervention program and will have improved weight, lipid profile, and vascular function after 3 months.50 However, in general the effectiveness of lifestyle interventions is often disappointing. Even in structured programs with frequent contact moments for support, the effect on, for example, weight loss is usually modest and difficult to pursue in the long term. Lifestyle interventions in the postpartum period failed to show a positive effect in approximately one third of the trials reported in a meta-analysis.51 On the other hand, other lifestyle interventions have proven to be effective, especially for clinical outcome variables, such as blood pressure, glucose, or lipid control.52,53 Such outcomes can be used as motivational tools to convince and motivate women to adhere to their new lifestyle. The potential effect of lifestyle change on the next pregnancy is evident from a study in obese women who had bariatric surgery as intervention, showing impressive reductions in the recurrence of hypertensive disorders in pregnancy.54 Upcoming research should prove the (cost) effectiveness of postpartum lifestyle interventions in women with a history of a hypertensive disorder of pregnancy on the outcome of a subsequent pregnancy and long-term cardiovascular health.55
What Are Indications for Pharmacological Treatment?

Blood Pressure–Lowering Treatment

One in 4 women will develop chronic hypertension after a hypertensive disorder of pregnancy.60 Still, there is no consensus about the management of hypertension in the immediate postpartum period and as a consequence when to discontinue or pursue the adopted management.55,56 Long-term blood pressure–lowering aims to reduce the risk of cardiovascular disease, but this effect has not been unequivocally proven in young people. In the general population, systolic blood pressure lowering of 10 mm Hg reduces the risk of stroke by 40% and of coronary heart disease by 20% in both primary and secondary prevention.57 The European Society of Hypertension and the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommend the treatment of a blood pressure ≥140/90 mm Hg in adolescents.58,59 In line with this, after a hypertensive disorder of pregnancy, blood pressure–lowering treatment is recommended above this threshold. The possible benefit of treatment of high-normal blood pressures should first be evaluated in clinical research.60

Lipid-Lowering Treatment

According to the Third Adult Treatment Panel, pharmacological treatment is indicated in all women when low-density lipoprotein is >4.9 mmol/L, in women with ≥2 cardiovascular risk factors when low-density lipoprotein is >4.1 mmol/L, lowering this threshold in women with a 10-year cardiovascular disease risk >10% to low-density lipoprotein >3.4 mmol/L.61 Accordingly, <5% of all women with a history of early onset preeclampsia will fulfill the criteria for lipid-lowering medication.60 Meanwhile, the American Heart Association recommends treatment of low-density lipoprotein >4.1 mmol/L already when only 1 major cardiovascular risk factor is present, including a hypertensive disorder of pregnancy.1 In the general population, there remains debate about the efficacy of lipid-lowering treatment for primary prevention of cardiovascular disease.62,63 Hence, more research is necessary to decide on which cutoff level to use for treatment in this specific group of women. For now, lipid-lowering treatment can be considered after a hypertensive disorder of pregnancy if 1 of the above criteria is fulfilled.

Glucose Control

Approximately 1 in 7 women will develop type 2 diabetes mellitus in the years after a hypertensive disorder of pregnancy.64 Pharmacological treatment of overt type 2 diabetes mellitus is indicated. However, there is no consensus with respect to how prediabetes mellitus (impaired fasting glucose or glucose intolerance) is to be managed. A recent meta-analysis indicates that lifestyle interventions seem more effective than pharmacological interventions in preventing diabetes mellitus.65

What About Aspirin for Stroke Prevention?
The Women’s Health Study provided evidence for the efficacy of aspirin in the primary prevention of stroke in women, although the largest benefit was for women >65 years of age.66 Possible benefits of aspirin use should be carefully balanced against the increased risk of gastrointestinal bleeding. Future research should explore the possible benefit of aspirin for primary prevention in this specific group of women.

In summary, we recommend a postpartum cardiovascular risk assessment for all women with a hypertensive disorder of pregnancy to give these women the best possible long-term outcomes. We do realize that more research is needed to give definitive answers about the timing of screening, the markers to be tested, and the cost-effectiveness of such a program. Moreover, the development and implementation of effective lifestyle intervention programs in the postpartum period are crucial. For now, cardiovascular risk management after a hypertensive disorder of pregnancy should be on the basis of guidelines for cardiovascular risk assessment in asymptomatic people. Key points of this review are presented in Table 4. We hope that this review encourages obstetric units to develop a clearly defined local protocol concerning postpartum cardiovascular screening in conjunction with local general practices.

Disclosures

None.

References


Cardiovascular Risk Management After a Hypertensive Disorder of Pregnancy
Julia Spaan, Louis Peeters, Marc Spaanderman and Mark Brown

Hypertension. 2012;60:1368-1373; originally published online October 15, 2012;
doi: 10.1161/HYPERTENSIONAHA.112.198812
Hypertension is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2012 American Heart Association, Inc. All rights reserved.
Print ISSN: 0194-911X. Online ISSN: 1524-4563

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://hyper.ahajournals.org/content/60/6/1368

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Hypertension can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Hypertension is online at:
http://hyper.ahajournals.org//subscriptions/