Maternal blood pressure throughout gestation and the risk of delivering a small-for-gestational-age neonate

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Objective

To determine the relationship between maternal blood pressure (BP) throughout pregnancy and the risk of delivering a small-for-gestational-age (SGA) neonate.

Methods

Secondary analysis of women who were prospectively enrolled at 9-14 weeks and had serial BP measurements after enrollment. SGA prevalence was related to maternal BP at enrollment, average BP during each trimester and BP trends throughout pregnancy. BP was categorized as normotension, pre-hypertension (Pre-HTN) and hypertension (HTN) using the Joint National Committee on Hypertension-7 (JNC-7) classification. Non-parametric, χ^2 and Fisher's exact tests were used, with $p < 0.05$ considered significant.

Results

877 women had 8660 BP measurements (average 9. 9, range 2-20) and 87 (9. 9%) delivered an SGA neonate. 54/544 (9. 9%) of normotensive women at enrollment and 33/333 (9. 9%) women with enrollment pre-HTN or HTN delivered an SGA neonate. Irrespective of the BP category at enrollment, average blood pressures in the HTN range for each trimester were associated with a 2-3. 5 increased rate of SGA ($p<0.0001$). Women with enrollment pre-HTN or HTN did not have an increased SGA rate if their blood pressures normalized or improved throughout pregnancy (7. 9%-13. 3%, $p=0.43$). However, increasing or persistently elevated BP was associated with 2. 2-4 fold increase in early preeclampsia. Logistic regression identified enrollment uterine artery Doppler, PAPP-A MoM, ethnicity and third trimester blood pressures as the primary determinants of SGA.

Conclusion

Women with elevated first trimester blood pressure are not at increased risk of delivering an SGA neonate if their blood pressures become lower later in pregnancy. Conversely, maintaining abnormal blood pressure increases the risk for pre-eclampsia. These observations challenge the concept that treating maternal blood pressure to below hypertension range jeopardizes fetal growth, and suggest that early initiation of blood pressure management may indeed be important to prevent preeclampsia.