

## COMMENTARY

# Importance of follow-up after delivery in women who experience hypertensive disorders during pregnancy

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Hypertensive pregnancy disorders, which include preeclampsia and gestational hypertension, are known to be associated with various adverse health outcomes for mothers and their children. Women with hypertensive pregnancy disorders have a high risk of cardiovascular disease later in life.<sup>1</sup> Their offspring have also been reported to be hypertensive at a younger age.<sup>2</sup>

Recently, the Japanese Hypertension Guidelines for Self-monitoring of Blood Pressure at home (HBPM)<sup>3</sup> were published. The recommendations in these guidelines are essentially identical to those of other guidelines, such as those of the European Society of Hypertension<sup>4</sup> and the American Heart Association.<sup>5</sup> There is a positive relationship between HBPM and accurate cardiovascular disease prognosis, which is the main reason why HBPM is recommended for patients with hypertension. There is much evidence demonstrating that HBPM is more predictive of hypertensive target-organ damage and provides a better prognosis of cardiovascular disease than blood pressure levels measured at a clinic, and that HBPM is nearly as accurate as ambulatory blood pressure monitoring. In pregnant women, several reports<sup>6–8</sup> have demonstrated that for detecting early changes in blood pressure during pregnancy, HBPM is superior to measuring blood pressure in a clinic. However, no studies have evaluated blood pressure in mothers with hypertensive pregnancy disorders and their offspring by using HBPM.

In this issue of the journal, Hosaka *et al.*<sup>9</sup> present the blood pressure levels for a mother

and her offspring 7 years after delivery and compare the blood pressure levels between HBPM and clinical measurements. The main conclusion from this study is that hypertensive pregnancy disorders are closely correlated to a mother's elevated blood pressure later in life but have no influence on her offspring at 7 years of age.

Until now, a variety of findings on gestational hypertension and preeclampsia have been reported as hypertensive pregnancy disorders, although these two conditions are quite distinct. Preeclampsia is defined as newly elevated blood pressure (>140/90 mm Hg) and proteinuria (0.3 g per 24 h) after 20 weeks of gestation. Gestational hypertension is defined as newly elevated blood pressure after 20 weeks of gestation but without proteinuria. Therefore, it has been suggested that the mechanisms underlying the association of preeclampsia or gestational hypertension with the offspring's blood pressure may differ between these disorders. Blood pressure elevation in the children of women with preeclampsia is mediated by low birth weight and preterm delivery, although the association between preeclampsia and blood pressure elevation in the offspring does not simply reflect an association between preeclampsia and fetal growth or preterm birth.<sup>10,11</sup> Moreover, some authors<sup>10,12</sup> have reported that after adjusting for differences in offspring birthweight and gestational age, the differences in blood pressure are still observed. In contrast, gestational hypertension has not been associated with these factors. In the article by Hosaka *et al.*<sup>9</sup>, a large proportion of the women with hypertensive pregnancy disorders had gestational hypertension. There were no significant differences in birth weight and gestational age between women with gestational

hypertension and non-hypertensive pregnancy disorders. According to a meta-analysis by Ferreira *et al.*<sup>2</sup> the differences in blood pressure between the offspring of women with preeclamptic and normotensive pregnancies were 2.3 mm Hg for systolic blood pressure (95% confidential interval (CI): 1.6–3.0) and 1.7 mm Hg for diastolic blood pressure (95% CI: 0.9–2.4). However, the pooled mean difference in systolic blood pressures was not affected by heterogeneity. Heterogeneity may have affected the mean difference in diastolic blood pressure. In addition, women with hypertensive pregnancy disorders demonstrated high blood pressure at an average of 10 years after pregnancy. For example, Øglaend *et al.*<sup>13</sup> demonstrated that women with a past history of preeclampsia had elevated blood pressures 11–12 years after pregnancy. They also reported that the differences in blood pressure between the offspring of women with preeclampsia and normotensive pregnancies were exacerbated by their mothers' higher blood pressures. From Øglaend *et al.*'s data, there is a possibility that elevated blood pressure in the offspring of women with preeclampsia reflects merely a familial aggregation. Compared with preeclampsia, gestational hypertension is more related to essential hypertension. In this study, the proportion of hypertension-positive family histories was significantly higher in women with gestational hypertension than in those with non-gestational hypertension (39 vs 68%). This also relates to elevated blood pressure in women with a past history of gestational hypertension, although there was very little difference in systolic blood pressure between the women who experienced gestational hypertension and those who did not. Östlund *et al.*<sup>14</sup> reported an interesting observation

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that there was normalization of endothelial function 11 years after delivery, indicating that cardiovascular risk factors might be present before pregnancy. Combining these findings with previously reported results, whether preeclampsia causes blood pressure elevation in both the mother and her offspring remains controversial. Therefore, further exploration of the association between hypertensive pregnancy disorders and offspring blood pressure is needed.

In summary, the work of Hosaka *et al.* represents a good example of the use of HBPM for the early detection of blood pressure elevation later in life in women with hypertensive pregnancy disorders and their offspring after delivery.

### CONFLICT OF INTEREST

The author declares no conflict of interest.

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