Background Hypertensive disorders of pregnancy (HDP) which include preeclampsia, gestational hypertension, chronic hypertension, and preeclampsia superimposed on chronic hypertension are associated not only with increased risk of hypertension and stroke in the mothers but also in their offspring. The pathophysiological mechanisms for this association are poorly understood. It has been postulated that microvascular alterations that precede cardiovascular events by decades could play a role. We have recently shown that low birth weight (LBW) infants born at term or pre-term to normotensive mothers have a significantly higher capillary density at birth and then undergo a process of accelerated capillary remodeling in the first 3 months life associated with an increase in systolic BP which may provide a strong evidence for the role of CR in the causation of hypertension.

Methods We studied 112 infants born to HDP mothers (90 were born at term (T-HDP) and 22 were born pre-term (PT-HDP) and compared them to 278 normal birth weight infants born at term (T-NTN) and 68 pre-term infants (PT-NTN) born to normotensive mothers. We used intravital capillary microscopy to measure basal i.e. functional (BCD) and maximal i.e. structural (MCD) capillary densities, and blood pressure (BP) using the Welch Allyn VSM 300TM monitor, at birth, 3 months, 6 months and 12 months.

Results At birth, PT-HDP and T-NTN infants had a significantly higher BCD and MCD compared to term infants. Only PT-HDP had a lower capillary reserve than the other groups. T-HDP infants had a significantly higher BCD but not MCD compared to T-NTN infants. Pre-term infants exhibited accelerated capillary remodelling so much so that by 12 months there were no significant differences in BCD and MCD between the 4 cohorts. Infants born to HDP mothers had a significantly higher systolic BP at birth and at one year compared to NTN infants. The change in BCD and MCD predicted the change in systolic BP at 3 months, and there was a negative correlation between systolic BP and both BCD and MCD at 12 months.

Conclusions Pre-term infants of both hypertensive and normotensive mothers had a significantly higher basal and maximal capillary densities at birth compared to term infants. A process of accelerated capillary remodeling occurred mostly in the first 3 months life that corrected the higher capillary densities in these infants. Only pre-term infants of HDP exhibited reduced capillary reserve at birth. Further follow-up studies of these infants are required to investigate the crucial role of the microcirculatory abnormalities in the pathogenesis of hypertension.

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Conflict of Interest None