Plasma renin concentration throughout healthy and hypertensive pregnancy: a systematic review and meta-analysis

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Objective. Pregnancy is characterized by profound circulatory changes and compensatory adjustments in the renin-angiotensin-aldosterone system (RAAS). Differences in the regulatory response of the RAAS may antedate or accompany vascular complicated pregnancy. Therefore, we aim to delineate the trajectory of active plasma renin concentration (APRC) in healthy and complicated pregnancies.

Materials and Methods. We performed a systematic review and meta-analysis on APRC during normotensive and hypertensive pregnancies, for which we searched PubMed (NCBI) and Embase (Ovid) databases. We included only studies reporting measurements during pregnancy together with a nonpregnant reference group measurement. Risk of bias was assessed with QUIPS. Ratio of the mean (ROM) and 95% confidence intervals (CI) of APRC values between pregnant and nonpregnant women were estimated for predefined intervals of gestational age using a random-effects model. A meta-regression analysis was used to analyse APRC over time.

Results. In total, we included eighteen studies which provided APRC values of 465 healthy pregnancies, 244 complicated pregnancies and 410 nonpregnancies. As compared to nonpregnancy, APRC significantly increased as early as the first weeks of healthy pregnancy and stayed consistently increased throughout the whole pregnancy (ROM 2.77; 95%CI 2.26-3.39). In contrast, APRC in hypertensive complicated pregnancy was not significantly different from nonpregnancy (ROM 1.30; 95%CI 0.96-1.76).

Conclusions. Our findings show that healthy vascular adaptation in pregnancy is accompanied with an increase in APRC levels. In hypertensive pregnancies this increase in APRC is not observed, which might suggest that renin released is suppressed by the high blood pressure in these pregnancies.