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Title: Effect of air pollution exposure during pregnancy on the steroid profile of newborns

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Body: Prenatal air pollution exposure has adverse effects on the infant's respiratory system. One pathway involved might be via oxidative stress, possibly leading to a modified pattern of steroid production. We thus examined a possible association of air pollution exposure during pregnancy and steroid metabolites excreted in the newborn's urine. In a prospective birth cohort of 207 healthy term born neonates (BILD cohort), we assessed exposure to air pollution during pregnancy using proximity to roads, particulate matter (PM₁₀) and nitrogen dioxide (NO₂) from a fixed air quality monitoring station. We analysed steroid profiles in 172 urines, sampled at one month of age, using mass spectrometry/gas chromatography. We adjusted the multivariable regression for maternal atopy, socio-economic factors and gender, and tested for potential confounding due to infections and drug intake during pregnancy, perinatal stress and season of birth. Prenatal exposure to NO₂ (per each 10mg/m³ increase) was associated with 117% increase of 6bOHcortisol (95%CI 10-320%) and 118% increase of 6bOHcortisol/cortisol ratio (95%CI 10-330%). A comparable association was observed after subpartal stress with pathological cardiotocogram. Interestingly, prenatal exposure to PM₁₀ was associated with increased cortisone metabolites: 44% increase of tetrahydrocortisone (95%CI 2-103%) and 28% increase of a-cortolone (95%CI 10-50%) per 10mg/m³PM₁₀. Our results suggest that air pollution exposure during pregnancy is associated with alterations of the steroid profiles in newborns' urine, comparable to those found in infants exposed to subpartal stress.