

Detection of preterm birth by maternal urinary volatile organic compound analysis: a prospective cohort study

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Abstract

Objective: Prediction of preterm birth is currently not feasible, resulting in maternal and fetal overexposure to prenatal corticosteroids and unnecessary hospital admittance. Novel biomarkers seem to hold potential for predictive applicability, including non-invasive volatile organic compounds. In this study, we aimed to assess the potential of urinary volatile organic compound profiles (VOCs) in the identification of pregnant women at risk for preterm birth. **Design, setting, population:** We prospectively collected urine of women admitted for imminent preterm birth ([?] 24+0 weeks until 36+6 weeks), collected data on maternal characteristics, including urine cultures, time between admission and delivery and mode of delivery. **Methods and main outcome measures:** Urine samples were analyzed using gas chromatography coupled to an ion mobility spectrometer (GC-IMS). VOCs of women delivering preterm and term were compared. **Results:** Urinary VOCs differed between women delivering between 28+0 until 36+6 weeks compared to women admitted for imminent preterm birth but delivering at term (area under the curve: 0.70). We identified women with either chorioamnionitis (area under the curve: 0.72) and positive bacterial cultures (area under the curve: 0.97) based on their urinary VOCs. **Conclusions:** Urinary VOCs hold potential for non-invasive prediction of preterm birth. Furthermore, they may allow for detection of chorioamnionitis and urinary tract infections in the investigated population. These observations need to be validated in a larger population prior to clinical implementation. **Funding:** This study was funded by the Department of Obstetrics and Prenatal diagnosis. **Keywords:** preterm birth, premature delivery, volatile organic compounds, chorioamnionitis, urinary tract infection, infection

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