

COMPARISON OF PERFLUORINATED COMPOUNDS CONCENTRATIONS IN MATERNAL SERUM AND AMNIOTIC FLUID

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Background and Aims: Some perfluorinated compounds (PFCs) are ubiquitous, environmental pollutants used to manufacture non-stick cookware and waterproof fabrics. PFCs are found in maternal and umbilical cord blood and breast milk. The extent to which PFCs are detectable in amniotic fluid is unknown. Using paired samples, we compared the concentration of perfluorooctanoate (PFOA), perfluorononanoate (PFNA), perfluorooctane sulfonate (PFOS), and perfluorohexane sulfonate (PFHxS) measured in maternal serum, the standard medium for assessing human exposure to PFCs, and amniotic fluid.

Methods: The Study of Advanced Reproductive Age and Environmental Health prospectively enrolled a cohort of pregnant women receiving amniocentesis for low-risk screening. We used paired samples from 28 women to examine the relationship between PFOA, PFNA, PFOS, and PFHxS concentrations measured in maternal serum and amniotic fluid using the Spearman correlation coefficient and graphical techniques.

Results: These four PFCs were detected in all serum samples. The number of amniotic samples with detectable concentrations differed by PFC (PFOA n=24; PFNA n=10; PFOS n=9; PFHxS n=4). The Spearman correlation coefficient, a measure of rank order, varied considerably by PFC (PFOA $\rho=0.64$, $p<0.001$; PFNA $\rho=0.05$, $p=0.9$; PFOS $\rho=0.76$, $p=0.01$; PFHxS $\rho=0.80$, $p=0.2$). Using graphical techniques, it appears that PFOA is commonly detected in amniotic fluid once the serum concentration reaches approximately 2 ng/mL, whereas PFOS is not commonly detected in amniotic fluid until the serum concentration reaches approximately 8 ng/mL.

Conclusions: PFCs are detectable in amniotic fluid at maternal serum concentrations below the national average. The ability to pass from maternal serum to amniotic fluid appears to differ by PFCs, independent of serum concentration. This disparate ability may be related to the chemical properties conferred by the charged functional moiety, such as the carboxylate in PFOA and PFNA as compared to the sulfonate in PFOS and PFHxS.