

Poster III-21

Fatty Acid Ethyl Esters: Quantitative Biomarkers for Maternal Alcohol Consumption

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Background: The effects of prenatal ethanol exposure are estimated to be present in 1% of all newborns. We sought to develop a laboratory marker to identify exposed infants.

Methods: Meconium was collected from 30 unexposed control infants from Jordan, and from 202 Cleveland study infants of varying exposure status enrolled in a two year longitudinal developmental study. Fatty acid ethyl esters (FAEE) were isolated from meconium and quantitated using gas chromatography/flame ionization detection. Detailed maternal alcohol histories were obtained within 1 month of delivery. Study subject from the Cleveland population were divided into two groups Cleveland non-abstainers and self reported abstainers. FAEE Mean values were compared between the studies groups. Maternal drinking was access in two category, binge like drinking (drinks/drinking day) and sustained drinking (drinks/week). A factor analysis to generate a linear combination of FAEE was conducted. Receiver Operator Curves (ROC) for FAEE in meconium were produced and their sensitivity and specificity were studied for the detection of long term prenatal alcohol exposure.

Results: Mean values of Ethyl Palmitate, Ethyl Oleate, Ethyl Linoleate, Ethyl Linoleneate in meconium collected from infants of Cleveland's non-abstainers population were statistically significantly higher than Jordanians and Cleveland Self reported abstainers. A principal component analysis revealed one factor representing 91% of the variance of all four FAEE. The area under the curve (AUC) of the ROC using one factor and 7 drink/drinking day (binge) as a cutoff point for the month prior to gestation and all three trimesters were 71%, 72%, 69% and 65% respectively. For sustained drinking using 5 drinks/week as a cutoff and one FAEE factor, the AUC were 67%, 63%, 50%, and 69% for all four prenatal periods.

Conclusions: A linear combination of Ethyl Palmitate, Ethyl Oleate, Ethyl Linoleate, and Ethyl Linoleneate in meconium can serve as a useful biological marker for moderate maternal ethanol use during pregnancy.