

ETHYLENE OXIDE HEMOGLOBIN ADDUCTS AND BIRTH WEIGHT. THE NEWGENERIS EUROPEAN STUDY

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Background and aims: A general exposure to ethylene oxide in the population originates from endogenously produced ethylene, metabolised to ethylene oxide. Cigarette smoke is also a source of exposure and give rise to elevated ethylene oxide hemoglobin adduct levels. There is limited epidemiologic evidence that exposure to ethylene oxide may be associated with an increased risk of spontaneous abortions and preterm births. We determined whether ethylene oxide hemoglobin adducts measured in cord blood are associated with birth weight.

Methods: Singleton births (n=1069) from Greece, Norway, Spain, Denmark and the United Kingdom were included in the study. Cord blood adducts were determined by the "adduct FIRE procedure" using liquid chromatography–tandem mass spectrometry (LC–MS/MS).

Results: A significant association between ethylene oxide hemoglobin adducts and self-reported maternal smoking status during pregnancy was observed, with higher levels among newborns born by smokers (22.8 (3.8-120.7) vs. non-smokers 8.8 (2.8-40.5) pmol/g Hb, median (min-max); $p < 0.001$). In the full study population, in which 152 smokers were included, a 10 pmol/g Hb increase in hemoglobin adducts from ethylene oxide were associated with a significant decrease in birth weight (adjusted \square : 30 grams; S.E.: 10, $p = 0.002$). The difference in mean birth weight for infants in the highest quartile compared to those in the lowest quartile was -68 grams (SE: -37; $p = 0.07$, $n = 1069$), while the difference in infants of non-smokers was -17 grams (SE: -39, $p = 0.7$, $n = 917$). Similar decreases in birth weight were observed when maternal age, pre-pregnancy BMI, gender, parity and season of birth were included as additional covariates but associations were non-significant.

Conclusions: These results indicate that reduced birth weight and ethylene oxide hemoglobin adduct levels are associated. The association was not significant when the study population was restricted to self-reported non-smokers. Further results on other birth outcomes will be presented.