GLYPHOSATE IN 1ST TRIMESTER OF PREGNANCY: HERBICIDES IN THE WOMB?

1Winchester, Paul; 1Reiter, Jill L; 1Proctor, Cathy; 2Gerona, Roy R; 1Avery, Kayleigh D; 1Bromm, Jennifer R; 1Elsahy, Deena A; 1Hadley, Emily A; 1McGraw, Sara N; 1Jones, Dana D.
1Indiana University School of Medicine, Indianapolis Indiana; 2University of California San Francisco, San Francisco California

ABSTRACT

Most pregnancies (in Indiana) now have detectable Glyphosate (GLY) levels in the first trimester regardless of race/ethnicity? Are GLY levels associated with birth weight percentiles? GLY levels varied from <LOD to 10.31 ng/mL with geometric mean 3.26 ng/mL. Mean maternal age was 30, with 69% white, 4.2% Hispanic, 12% Black, 3.7% Asian and 0.3% other "other". GLY levels of >6 ng/mL was associated with significantly lower birth weight percentile of 29.2 vs 56.1 (p=.005) and 52.1 (p=.015) in women with >3 ng/mL (Figure 5).

BACKGROUND

Our previous study demonstrated that >90% of 71 pregnant Midwest women had detectable glyphosate (GLY) levels in their prenatal urine. That study found that most glyphosate exposure occurs through food and certain beverages but not through drinking water. Short pregnancies, rural addresses and urbanized beverages were associated with higher GLY levels. The current study was needed to confirm high rates of GLY detection in a racially more diverse high risk population.

MATERIALS and METHODS

Prospective observational study randomly collected 187 discarded first trimester urines from a high risk University Obstetric Clinic. Samples were frozen -20°C and stored. Study population consisted of 187 mother-baby pairs. Medical charts were reviewed and all pregnancy and neonatal outcomes were abstracted and analyzed. Urine samples were analyzed for Glycine (N-phosphonomethylglycine) using LC-MS/MS with an LOD of 0.1 ng/mL. Primary independent variable, urinary GLY levels, was compared to pregnancy and neonatal outcomes using bivariate analysis.

GLYPHOSATE VS. RACE, GESTATION, & MONTH/YEAR OF COLLECTION

- GLY was detected in 96% (n=187) pregnancies. Levels varied from <LOD to 10.31 ng/mL with geometric mean 3.26 ng/mL.
- Mean maternal age was 30, with 69% white, 4.2% Hispanic, 12% Black, 3.7% Asian and 0.3% other "other".
- GLY levels of >6 ng/mL was associated with significantly lower birth weight percentile of 29.2 vs 56.1 (p=.005) and 52.1 (p=.015) in women with >3 ng/mL (Figure 5).

SUMMARY & CONCLUSION

1) Most pregnancies (in Indiana) now have detectable glyphosate levels.
2) GLY levels in pregnancy are increasing.
3) GLY levels peak in environmentally "peak" pesticide months but are likely sustained by food and beverage contamination.
4) Elevated GLY levels are correlated with diminished fetal growth (especially males).
5) Women with opioid use (as defined by NAS in offspring) had significantly higher levels of GLY in the first trimester.

Conclusion: Ubiquitous exposure to Glyphosate in pregnancy may be linked to epigenomic-mediated Transgenerational Toxicology in humans as is seen in Glyphosate exposed pregnant rodents (2).

REFERENCE


Figure 1 Maternal Race/Ethnicity

Figure 2 GLY vs. Gestation at Collection (Singleton/Gemeprome)

Figure 3 GLY vs. Year of Collection

Figure 4 GLY Levels vs. Month of Collection

Figure 5 Birth Weight Percentile vs. GLY

Figure 6 GLY vs. Alcohol Use

Figure 7 GLY vs. Marital Status

Figure 8 GLY vs Employment