Clinical Chemistry

Obese Nondiabetic Pregnancies and High Maternal Glycated Hemoglobin at Delivery as an Indicator of Offspring and Maternal Postpartum Risks: The Prospective PEACHES Mother-Child Cohort

Article:
R. Ensenauer, et al.
Obese Nondiabetic Pregnancies and High Maternal Glycated Hemoglobin at Delivery as an Indicator of Offspring and Maternal Postpartum Risks: The Prospective PEACHES Mother-Child Cohort.
Clin Chem 2015;61:1381-1390.
http://www.clinchem.org/content/61/11/1381.abstract

Guest:
Dr. Regina Ensenauer is Professor of Experimental Pediatrics and Metabolism at the University Children's Hospital at the Heinrich-Heine University in Düsseldorf.

Bob Barrett: This is a podcast from *Clinical Chemistry,* sponsored by the Department of Laboratory Medicine at Boston Children's Hospital. I am Bob Barrett.

Gestational diabetes is a relatively common complication of pregnancy affecting about 4% of all pregnant women. A significantly higher proportion of obese rather than normal weight women develop metabolic abnormalities, including glucose intolerance, during pregnancy. These complications are associated with increased later life health risks in both mothers and their offspring.

The November 2015 issue of *Clinical Chemistry* published an investigation of obese pregnant women and their glycemic status and whether this impacts offspring and long-term maternal outcomes.

The lead author of that paper is Dr. Regina Ensenauer. She is University Professor of Experimental Pediatrics and Metabolism at the University Children's Hospital at the Heinrich-Heine University in Düsseldorf. Her background is in pediatric metabolism and nutritional medicine and she is our guest in today's podcast.

So Dr. Ensenauer, why did you measure hemoglobin A1c in mothers at delivery?

Dr. Regina Ensenauer: Well, we were wondering, actually, whether pregnant women who tested negative for gestational diabetes, which is usually tested at the end of the second trimester, whether those pregnant women still experience some kind of dysglycemia in the third trimester of pregnancy. And we wondered then whether this could in fact be picked up by measuring their hemoglobin A1c at delivery.

Bob Barrett: Your study characterizes the women with a high measured hemoglobin A1c. How did you define high hemoglobin A1c at delivery?

Dr. Regina Ensenauer: Well, when we checked there were no established cutoff values available in the literature, and therefore we had to define what is normal HbA1c at delivery.

So we defined a normal HbA1c at delivery as values above the 90th percentile in population of normal weight pregnant woman with absence of gestational diabetes.

And in fact, we found that 88%, so nearly 90% of the healthy normal weight women had an HbA1c level at delivery of less than 5.7%.

Bob Barrett: Why did your survey look at outcomes in obese women in particular?

Dr. Regina Ensenauer: Well, we know that maternal obesity per se is a strong risk factor for overweight in children later, even in the absence of gestational diabetes in these obese women. So we hypothesized that this might be mediated by some kind of sub-clinical dysglycemia in obese pregnancies in the absence of gestational diabetes. And, therefore, this is why we established the PEACHES Mother-Child Cohort, our study we did.

And this Mother-Child Cohort actually comprises predominantly obese mothers and their children, in which, to our knowledge at least, is the largest cohort on the determinance of long-term outcomes of obese pregnancies.

Bob Barrett: Why are you certain that the increased proportion of high hemoglobin A1c values in obese women at delivery is indicative of dysglycemia?

Dr. Regina Ensenauer: Well, we are quite certain about that because we also found higher C-peptide concentrations in serum of umbilical cord blood of offspring of obese mothers without gestational diabetes, but with a high HbA1c level at delivery.

So this finding actually suggests an exaggerated insulin response in the offspring, which must have been triggered by maternal hyperglycemia and is at least one mechanism leading to macrosomia in the offspring.

So in fact, we also found an increased rate of large for gestational age birth weight in offsprings of obese

mothers who had been negative for gestational diabetes, but had in fact a high HbA1c level at delivery.

Bob Barrett: Doctor, do high hemoglobin A1c values in obese mothers without gestational diabetes at delivery have any long-term effects?

Dr. Regina Ensenauer: Yes, we found some kind of long-term effects. In those obese women without gestational diabetes, the markers of abnormal glucose metabolism, such as fasting glucose levels and HbA1c were higher after to two to three years postpartum compared to those obese mothers who had been also gestational diabetes negative, but who had normal HbA1c values at delivery.

Additionally, there were higher markers of inflammation, as indicated by high sensitive CRP in fibrinogen concentrations after two to three years postpartum, in those obese women who had been negative for gestational diabetes but had a high hemoglobin A1c level at delivery.

Bob Barrett: Looking ahead doctor, where do you see the future directions of your research in this area proceeding?

Dr. Regina Ensenauer: Well, since mothers with high hemoglobin A1c levels at delivery also had higher fasting one hour and two hour glucose values at their oral glucose tolerance test earlier in pregnancy, meaning at the end of the second trimester, we wonder whether we find oral glucose tolerance test cutoff values may predict high HbA1c values at delivery and whether those can be established for obese women specifically.

Bob Barrett: Well, finally doctor, your background is in pediatrics and nutrition, so why did you want to have this study published in the journal *Clinical Chemistry?*

Dr. Regina Ensenauer: Well, our findings relate to maternal HbA1c at delivery as a potentially predictive biomarker of future health risks in mothers, but also in their offspring. So we are really interested in early predictive markers of later life offspring risks.

Bob Barrett: Dr. Regina Ensenauer is Professor of Experimental Pediatrics and Metabolism at the University Children's Hospital at the Heinrich-Heine University in Düsseldorf. She has been our guest in this podcast from *Clinical Chemistry* on gestational diabetes.

I am Bob Barrett. Thanks for listening!