Effects of Lifestyle Intervention of Maternal Gestational Diabetes Mellitus on Offspring Growth Pattern Before Two Years of Age

Diabetes Care 2021;44:e42–e44 | https://doi.org/10.2337/dc20-2750

Our group conducted a population-based randomized controlled trial (RCT) in Tianjin, China, which tested the effectiveness of intensive care (IC) versus usual care (UC) on adverse pregnancy outcomes among women with gestational diabetes mellitus (GDM), and found that with IC of GDM during pregnancy a 98-g birth weight reduction and a 34% risk reduction in macrosomia were achieved (1). We further followed offspring born to women enrolled in the RCT from 1 month to 2 years after delivery to test whether IC of GDM during pregnancy modified early-life growth of offspring born to Chinese women with GDM.

The study settings, population, and design have been previously described (1). Briefly, a total of 19,847 pregnant women were screened for GDM with a glucose challenge test between the 24th and 28th weeks of pregnancy, and 2,921 women (clinical trial reg. no. NCT01565564) underwent the standard oral glucose tolerance test. Of them, 1,440 women with GDM were identified based on the International Association of Diabetes and Pregnancy Study Group (IADPSG) criteria (2) and 706 eligible women were randomized to either IC or UC group and completed the trial. The UC included one group diabetes education session at diagnosis of GDM, while the IC included additional two individualized diabetes education sessions at the 30th and 34th gestational weeks and three group diabetes education sessions at the 27th, 29th, and 33rd gestational weeks. The detailed intervention measures have been previously published (1).

Postpartum, 706 children born to the 706 women (IC 344 vs. UC 362) were invited to participate in the follow-up study, and 671 children (IC 324 vs. UC 347) turned up at least once for the follow-up study (an overall follow-up rate of 95%) from 1–24 months of age. Ethics of this study were approved by the Clinical Ethics Committee of Tianjin Women and Children’s Health Center, and informed written consent was obtained from all of the women (ClinicalTrials.gov, clinical trial reg. no. NCT01565564).

Statistical analysis was performed with SAS release 9.4 (SAS Institute, Cary, NC). BMI-for-age and -sex at 1, 3, 4, 6, 7, 9, 10, 12, 13–18, and 19–24 months of age. Overweight was defined as BMI-for-age and -sex ≥85th percentiles according to the World Health Organization age- and sex-specific growth references (3). Overweight at one time point within 1 year of age was defined as BMI-for-age and -sex ≥85th percentiles at any one time point of 1–3, 4–6, 7–9, and 10–12 months of age, while overweight at one time point at 1–2 years of age was defined as BMI-for-age and -sex ≥85th percentiles at 13–18 and 19–24 months of age.

There were no differences in clinical characteristics of women at enrollment between the IC group (N = 324) and the UC group (N = 347) (P > 0.10). Although children born to the women in the IC group were more likely to be male than children born to the women in the UC group, BMI-for-age and -sex and Z score for BMI-for-age and -sex at 1–3, 4–6, 7–9, 10–12, and 19–24 months of age were similar between children born to the women in the IC group and children born to the women in the UC group (P > 0.10) (Table 1). BMI-for-age and -sex and Z score for BMI-for-age and -sex at 13–18 months were borderline lower...
in the children whose mother received IC than in those born to the mothers with UC. Nevertheless, overweight rates at 1–3, 4–6, 7–9, 10–12, 13–18, and 19–24 months of age were all similar in the two groups (P > 0.20). Overweight rates within 1 year of age and 1–2 years of age were also comparable in the two groups (51.9% vs. 50.6%, P = 0.75, and 35.7% vs. 34.0%, P = 0.63). In addition, in the subgroup analysis by maternal BMI < 24 kg/m² and 24 kg/m² at pregnancy, overweight rates within 1 year of age and 1–2 years of age were also similar in the two groups.

GDM predisposes the offspring to a high risk of macrosomia at birth and obesity during early and late childhood. Several RCTs demonstrated that intensive management of GDM had benefits for perinatal outcomes but did not have long-term effects on childhood obesity (4,5). Consistently, our RCT found that IC significantly reduced macrosomia but did not modify the growth of offspring born to Chinese women with GDM from 1 to 24 months of age. In conclusion, IC of GDM does not modify early-life growth in offspring of mothers with GDM. However, its long-term benefits remain to be tested in future studies.

Acknowledgments. The authors thank all of the health professionals of Tianjin Antenatal Network (Tianjin, China) for their involvement in and contribution to the study.

Funding. This project was supported by the National Key Research and Development Program of China (grants 2018YFC1313900, 2018YFC1313903) and BRIDGES (grant LT09-227). BRIDGES is an International Diabetes Federation program supported by an educational grant from Lilly Diabetes.

The study sponsor/funder was not involved in the design of the study, the collection, analysis, and interpretation of data, or writing the manuscript and did not impose any restrictions regarding the publication of the report.

Duality of Interest. No potential conflicts of interest relevant to this article were reported.

Author Contributions. X.Y., Z.Y., G.H., and J.C.N.C. substantially contributed to the conception and design of the work. C.Z., G.L., J.L., L.W., and W.L. substantially contributed to acquisition of the data. J.L. and X.Y. analyzed the data and drafted the manuscript. J.Liu, C.Z., G.L., J.L., L.W., W.L., Z.Y., G.H., and J.C.N.C. revised the manuscript critically for important intellectual content. All authors agreed to submit and publish this manuscript. X.Y. is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Data and Resource Availability. The data sets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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