Assessment of the implication of MODY on procreation and pregnancy

MD Paulina Pachniak Department of Clinical Genetics Medical University of Lodz
paulina.pachniak@stud.umed.lodz.pl

Introduction

Maturity Onset Diabetes of the Young (MODY) is a monogenic diabetes that accounts for approximately 6.5% of all diabetes cases. The presence of mutations in the glucokinase (GCK) gene accounts for 60-80% of monogenic diabetes cases and 2-6% of all cases of gestational diabetes. The treatment approaches for the different types of MODY diabetes are now mostly well understood, but due to the rare occurrence of these mutations in the population, standards for the clinical management of pregnancies complicated by MODY 2 diabetes have still not been developed.

Many pregnant women with GCK-MODY are misdiagnosed and treated as type 1 or type 2 diabetes, which may increase obstetric complications or involve an inappropriate therapeutic approach. There also remains an unknown effect on the incidence of congenital malformations, pregnancy complications and the course of pregnancy, as well as the development of the newborn.

It is therefore necessary to develop standards that allow earlier diagnosis of patients in order to minimise the possible side-effects of diabetes on the fetus and the mother, and to increase the effectiveness of patient treatment.

The aim of this study is to evaluate the impact of GCK- MODY on procreation, pregnancy and fetal development.

Metodology

The medical records of 64 patients from the Clinical Genetics Department of the Medical University of Lodz and the Pediatric Diabetology Clinic of the Medical University of Silesia in Katowice were qualified for the analysis. Consent to participate in the study and answers to the questions included in the survey have been obtained so far from 32 patients.

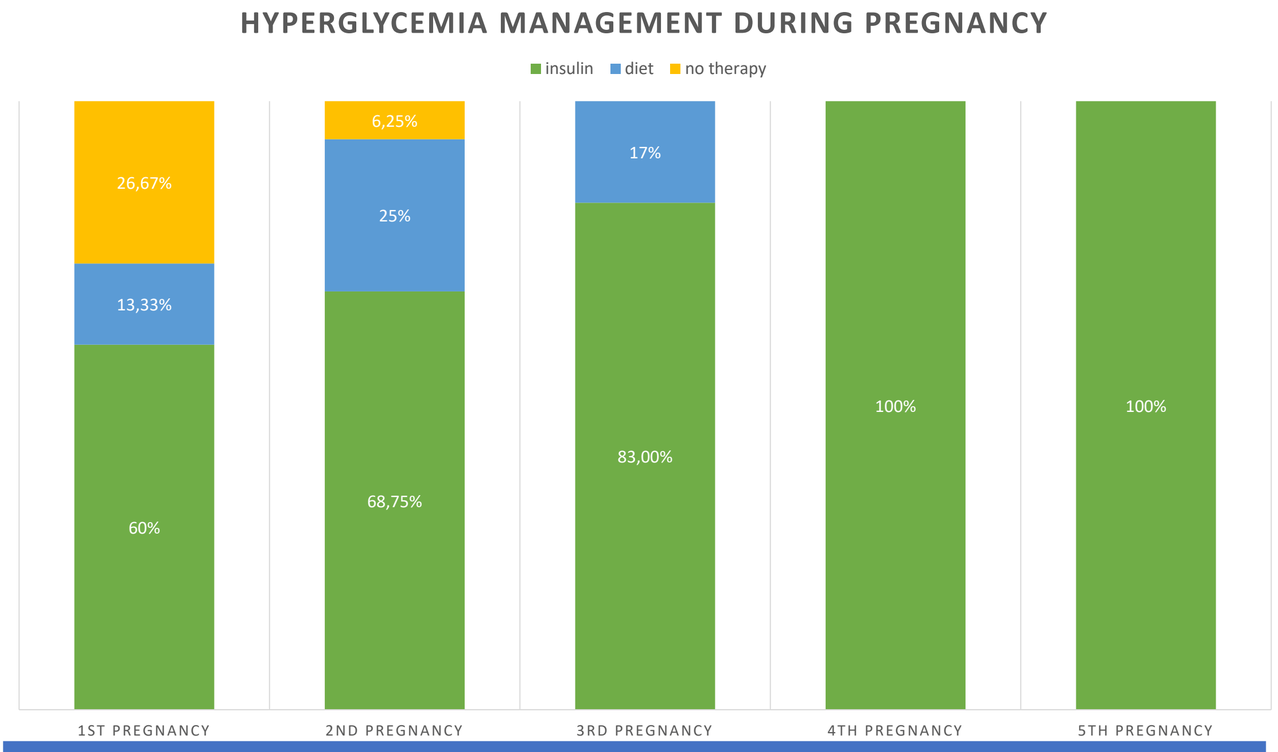
In addition, the inclusion and collection of data from patients qualified to the control group has begun. Currently, the control group consists of 36 patients. The control group will ultimately equal the number of patients in the study group.

Questionnaire

The questionnaire collects information on:
fertility- time to pregnancy, use of assisted reproduction techniques, obstetric problems such as the occurrence of miscarriages, glycemic control in pregnancy, the presence of pregnancy complications, type of delivery, the health of the newborn after birth, the child's development, the result of a genetic test for MODY diabetes in the child.

Results

Patient data	
Respondents	32
Pregnancies	74
Average number of pregnancies	2.5 (range 1–5)
Hyperglycemia diagnosed before pregnancy	4 (12,5%)
GCK- MODY (before pregnancy)	1 (+ 1 suspected MODY)
Gestational diabetes (before pregnancy)	first pregnancy- 15 (53,13%), second pregnancy- 17 (62,96%) third pregnancy- 5 (55,56%) fourth and fifth- 3 each (66,67%)
Type 1 diabetes (before pregnancy)	2 (6,25%)
The most common disease co-occurring with diabetes	Hypothyroidism in the course of Hashimoto's disease supplemented with levothyroxine- 5 (15,63%)



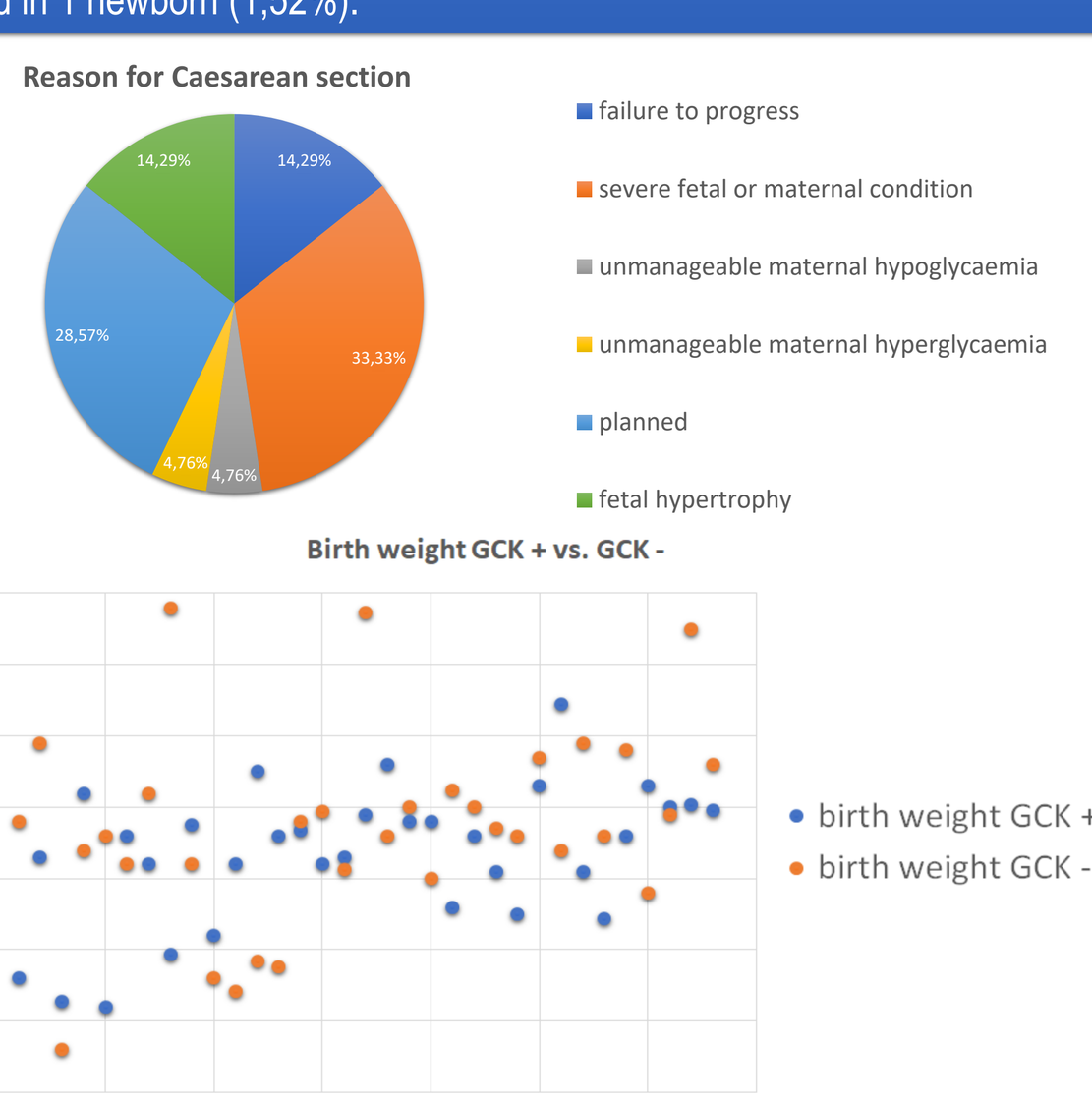
Insulin doses and glycaemic control:

Among the 14 patients who administered insulin doses, there was a wide range of doses from 2 to 20 units of fast-acting bolus insulin and 0 to 23 units of basal insulin.

The mean glycated hemoglobin concentration during pregnancy was- 5,77% range- 5,4- 6,8% (information obtained from 12 patients).

Newborn

Average gestational week at which delivery occurred- 37. The average birth weight of the newborn was 3260,299 (range 1800- 4900) grams. The average length of the newborn was 54,012 (range 46- 62) cm. The mean number of points obtained on the APGAR scale in the first minute after birth- 9,175. The most common postnatal complication in children was respiratory distress 8 (12,12%) and postnatal jaundice 6 (9,09%). Postnatal hypoglycaemia was observed in 1 newborn (1,52%).



Conclusions

GCK-MODY is a unique subtype of monogenic diabetes that, despite its mild clinical phenotype, has important implications for pregnancy. Understanding the maternal-fetal interactions of the GCK genotype is essential for appropriate diagnostic and therapeutic management before and during pregnancy.

References:
1. Dickens LT, Naylor RN. Clinical Management of Women with Monogenic Diabetes During Pregnancy. Curr Diab Rep. 2018;18(3):12. Published 2018 Feb 15. doi:10.1007/s11892-018-0982-8
2. Dickens LT, Letourneau LR, Sanyoura M, Greeley SAW, Philipson LH, Naylor RN. Management and pregnancy outcomes of women with GCK-MODY enrolled in the US Monogenic Diabetes Registry. Acta Diabetol. 2019;56(4):405-411. doi:10.1007/s00592-018-1267-
3. Calcaterra V, Zanfardino A, Zuccotti GV, Iafusco D. Maternal or Paternal Diabetes and Its Crucial Role in Offspring Birth Weight and MODY Diagnosis. Metabolites. 2020 Sep 28;10(10):387. doi: 10.3390/metabo10100387.
4. Monsonego S., Clark H., Karovitch A., O'Meara P., Shaw T., Malcolm J. Management and Outcomes of Maturity- Onset Diabestes of the Young in Prenancy. Can J Diabetes. 2019 Dec; 43)8):647-654 doi: 10.1016/j.jcjd.2019.07.004. Epub 2019 Aug 2.
5. ChakeraA. J, Spyer G., Vincent N., Ellard S., Hattersley A. T , Dunne F. P The 0.1% of the population with glucokinase monogenic diabetes can be recognized by clinical characteristics in pregnancy: the Atlantic Diabetes in Pregnancy cohort. Diabetes Care 2014;37(5):1230-6. doi: 10.2337/dc13-2248. Epub 2014 Feb 18.