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Case Report

Pregnancy and the Long-Acting Insulin Analogue: a Case Study

Silvana Caronna, Federico Cioni, Elisabetta Dall'Aglio, Leone Arsenio
Diabetology and Metabolic Disorders Unit, University of Parma, Italy

Abstract. R.S. is a 22 years old Caucasian woman suffering from obesity, hypertension and Type I Diabetes Mellitus since the age of 6 years. Type I DM treatment includes 3 insulin injections at meal time and one glargine injection at bedtime. The insulin therapy regimen was prolonged during pregnancy and continued after childbirth. Optimal glycemic compensations were monitored throughout the pregnancy using HbA1c variations and other standard controls included in the OBG routine protocols, all within normal values. The pregnancy ended at the 38th week of gestation with a caesarean birth, during which a 3,54 Kg healthy boy with an APGAR of 9 was born. Both the mother and the newborn resulted in perfect health conditions confirming that the possibility of using glargine insulin profiles during pregnancy in selected cases with close monitoring may exist. (www.actabiomedica.it)

Key words: Type I diabetes, pregnancy, glargine insulin, glycemic compensation

Introduction

Glargine insulin is an analogue of long-acting insulin which does not determinate high peaks of activity, therefore reproducing the ideal conditions of regular insulin profiles. Created through DNA recombination technology, glargine differs from human insulin due to two additions of arginine residues in the B chain and an asparagine residue substitution with a glycine found in the A chain (1). Due to these modifications, the glargine insulin pH drops to physiological levels after cutaneous injection, forming a deposit from which insulin is slowly and gradually absorbed (2). To date, clinical use of glargine insulin during pregnancy is very limited (3, 4). Contraindications of using this method include the risks of teratogenicity – which has yet to be confirmed from experimental studies on rats and rabbits – and mitogenicity, this too unconfirmed at present (5). The immunogenic effect appears inferior to that of the intermediate insulin, whereas trans-placental passage and the risk of complications for the mother appear to be doubtful. However, from this last point of view, the cinematic profile of glargine allows better glycemic control, reducing both the risk of hypoglycaemia and "Sunset phenomenon" (6).

On this basis, we believe that the choice of using glargine during pregnancy, especially in women with good metabolic compensation that used this therapy prior to child conception, constitutes an acceptable clinical decision, even in the absence of indications (7), as long as it results from an exchange between the patient and gynaecological team. This should especially occur in unexpected pregnancies, during which glargine insulin is usually substituted a few weeks after conception. This substitution increases the hypothetical risk of teratogenicity linked to the metabolic decompensation phase frequently connected to the therapeutic profile modification.

In this work, we describe a recent case study that may help to elucidate the general implications of this approach.

Case description

Here we report the case of R.S., a Caucasian woman, 22 years old at her second pregnancy, obese (height 155 cm, weight 81 Kg, BMI 34,0), suffering from hypertension and afflicted with Type 1 Diabetes since the age of 6 years. The first child was a 3,800 Kg boy, born in 2002 (caesarean birth at the 38th week of gestation).

The patient's general history outlines the presence of essential hypertension treated with Enalapril 5, that was interrupted when diagnosed as pregnant. Even after suspending the drug her blood pressure remained within normal (mean of 120/70 mmHg), without any peaks, thus not requiring an alternative pharmacological therapy.

From a diabetic point of view, at the moment of conception, the patient was treated with 4 daily insulin injections (regular insulin at all 3 meals of the day and glargine insulin at bedtime). We came to know about the pregnancy at the 14th week of gestation and the shared decision at that moment was to pursue the already established insulin profile: this regimen remained the same throughout the entire pregnancy with minimal dosage adjustments which reached overall 31 UI at the 12th week (7 UI of regular insulin at 8.00, 12.00 and 19.00 and 10 UI of glargine at 21.00 hrs). The insulin dosage variations and the level of metabolic compensation are shown in figure 1 and table 1. Body weight increase, which was relatively contained throughout the pregnancy, was 9 Kg, with a weight of 90 Kg at the end of gestation. This demonstrates the good compliance of the mother to the diet indications given to her after pregnancy was diagnosed. Microalbumin controls were negative at the 3rd and 6th month, whereas simultaneous ophthalmologic controls highli-

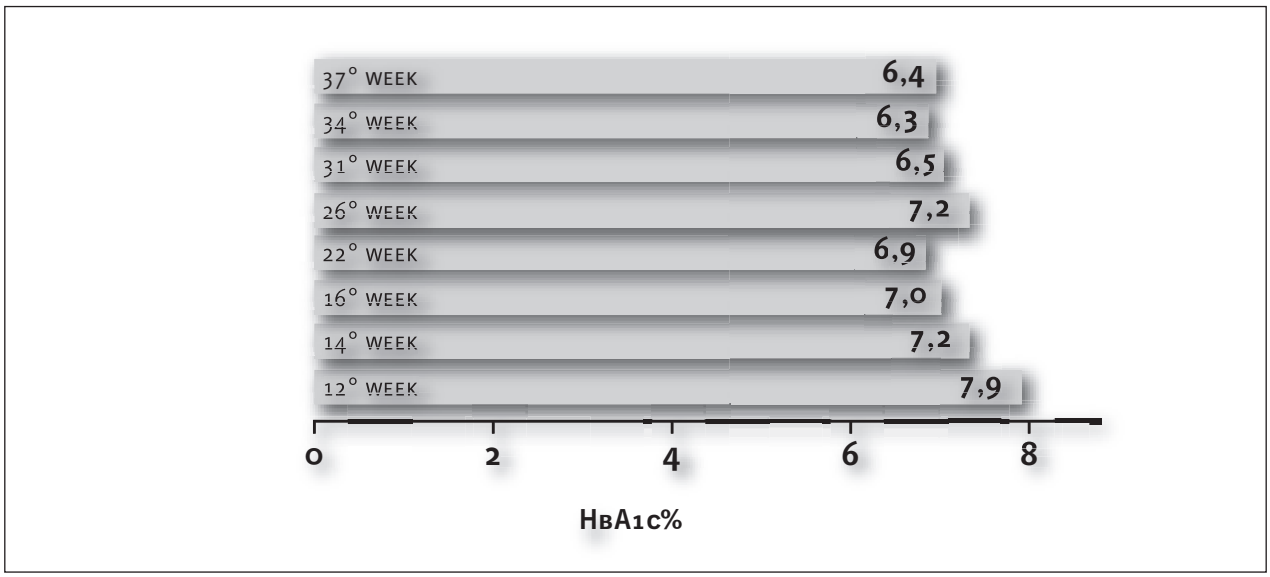

Figure 1. Glycemic compensation monitored throughout the pregnancy using HbA1c variations

Table 1- Variation of the insulin therapy profile during pregnancy

	Dos	Pre	14°	**16°**	22°	**26°**	**34°**	Post
h 8 Regular I. **penfill** HM	UI	**10**	7	10	9	9	7	6
h 12 Regular I. **penfill** HM	UI	**10**	7	5	5	5	4	4
h 19 Regular I. **penfill** HM	UI	**8**	7	5	5	3	3	3
h 22 Glargine I.	UI	**12**	**5**	2	4	4	5	3

ghted a low level non-proliferating diabetic retinopathy, that was already present prior to conception.

From an OBG point of view, screening controls during the first trimester showed normal Tri-test (alpha fetoprotein, free estriol, and HCG) and ultrasound reports. The 2nd trimester screening included a normal morphological ultrasound at the 19th week in addition to the weekly cardiotocography exam after the 34th week. Gestation ended with a planned caesarean birth at the 38th week during which a healthy 3,450 Kg boy with an APGAR of 9 was born.

The newborn's glycemic compensation remained optimal during the first 48 hours after birth.

Discussion and conclusions

The pregnancy ended without complications and with an excellent health status of the mother and newborn. The mother's glycemic compensation remained within normal limits throughout the pregnancy and post-partum, which increased the patient's confidence in the therapy profile and thus reduced the risk of abandoning the protocol.

Despite our limited experience, we nonetheless conclude, as above mentioned, that in selected cases of Type I Diabetes, the previously established glargine insulin therapeutic profiles may continue throughout the pregnancy without running any particular risks but rather guaranteeing optimal compliance and good glycemic compensation.

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Correspondence: Leone Arsenio, MD
Diabetology and Metabolic Disorders Unit
University of Parma - Italy
Via A. Gramsci 14
43100 Parma