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Management of diabetes in pregnancy: Antenatal follow-up and decisions concerning timing and mode of delivery

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Pregnancy in women with diabetes remains complicated despite improvements in glucose control. This seems mainly due to the fact that normoglycemia is still outside of reach. Congenital malformations are already significantly increased in the case of HbA1c values of 2–4SD above the mean, and fetal macrosomia is increasing in incidence. The latter may be due to an increase in maternal body mass index (BMI), absence of cardiovascular complications, better placentation, and increased weight gain during pregnancy. Severe maternal hypoglycemia is a frequent complication during the first trimester of pregnancy. The outcome is generally poorer in the case of type-2 diabetes as compared to type-1, which is likely to be due to a higher incidence of maternal metabolic syndrome. In this article, preconceptional and antenatal management and the mode and timing of delivery are discussed, both for women with preexisting diabetes and for those with gestational diabetes mellitus.

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Introduction

Pregnancies of women with diabetes continue to be at an increased risk of maternal and fetal complications. This mainly holds for type-1 and type-2 diabetes, but gestational diabetes mellitus (GDM) is also associated with an increased risk of complications. As GDM is a disease of the second half of gestation only, this is discussed separately.

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In this article, the preconceptional and antenatal management of pregnancies are discussed as well as labor-related issues. Unfortunately, most of the items discussed are authority based and not evidence based, given the absence of proper randomized controlled trials in which different management strategies were compared.

Type-1 and type-2 diabetes: prepregnancy care and antenatal management

Care for women with preexisting diabetes should start before pregnancy. The lack of prepregnancy care is independently associated with an adverse outcome of pregnancy, but such care sometimes only reaches about 25% of the population, despite regional programs [1–3]. Glucose should be regulated as strictly as possible and folic acid should be started before conception. Poor glucose control is associated with an increased risk of abortion and congenital malformations. The latter risk continues to increase with near-optimal glucose values (glycosylated hemoglobin (HbA1c) 2–4 standard deviation (SD) above the mean), and most population studies continue to show increased incidences of fetal malformations, to two to four times that in nondiabetic populations [1–11]. In most cases, it is impossible to achieve real normoglycemia. Women should be counseled accordingly and informed about the possibility of an ultrasound diagnosis of morphological abnormalities in the first and second trimester of pregnancy. There is no scientific evidence regarding the dose of folic acid, but most authors advise a dose of 3–5 mg per day, given the increased risk of fetal neural tube defects in these women.

Retinal examination is advised in the case of longer-existing diabetes, and any form of retinopathy with retinal ischemia should be treated before pregnancy. With improved diabetes care, microvascular complications in these relatively young women become infrequent, but it is mandatory to check for (micro) albuminuria, among others, to differentiate between preeclampsia and preexisting renal problems in the case of hypertension in the course of pregnancy. Hypertension, mainly in obese women with type-2 diabetes, should be treated adequately; angiotensin-converting enzyme (ACE) inhibitors should be avoided as are angiotensin receptor blockers. Weight reduction before pregnancy in the case of maternal obesity should be discussed, although weight loss may be difficult. The BMI before pregnancy is related to the incidence of fetal macrosomia and in childhood and later obesity in their offspring [12]. Table 1 summarizes all prepregnancy and antenatal care issues.

Care for pregnant women with preexisting diabetes should preferably be given by a dedicated team of an endocrinologist, obstetrician, diabetes nurse, and dietician, preferably at one location.

The most important aspect of care during pregnancy is the establishment and maintenance of adequate glucose control. In early pregnancy, the largest risk concerns severe maternal hypoglycemia, which may occur in up to 40% of women with type-1 diabetes and hypoglycemic coma in about 20% of them, with maternal death in about 1 in 500 [13,14]. Women with hypoglycemic events before

Table 1
Prepregnancy and antenatal care in women with preexisting diabetes.

Prepregnancy:	– folic acid, 3–5 mg per day
	– Optimalization of glucose control
	– Retinal examination
	– Examination of urine for (micro) albuminuria
	– Blood pressure control and medication in case of hypertension
	– Counseling regarding increased incidence of fetal morphological malformations and regarding increased risk of (severe) hypoglycemic events during the first trimester
Pregnancy:	– Adequate glucose control throughout pregnancy
	– Counseling as to optimal weight gain during pregnancy, based on the maternal body mass index (BMI)
	– Ultrasound examination for fetal malformations at 12–14 weeks and around 20 weeks of gestation
	– Fetal growth assessment (abdominal and head circumference) every 4 weeks from 20 weeks onwards and every 2 weeks after 28 weeks. Assessment of the amount of amniotic fluid volume
	– Assessment of the incidence of fetal movements (as observed by the mother)
	– Determining the timing and mode of delivery based on gestational age, glucose control, and estimated fetal weight

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