Preconception Counseling and Contraception After Gestational Diabetes

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Women with gestational diabetes mellitus (GDM) diagnosed in the period 1978–1984 were followed for on average 6 yr after the index pregnancy. Thirty percent had diabetes mellitus at the follow-up examination, and preliminary results indicate that at least another third will develop diabetes during a subsequent pregnancy. Therefore, family planning and contraceptive guidance should follow the lines for women with pregestational diabetes. When low-dose hormonal contraceptives containing ethinyl estradiol and levonorgestrel were given to women with previous GDM, glucose tolerance and lipoprotein levels remained unchanged during a 6-mo treatment. However, insulin response to oral glucose increased significantly after hormonal intake for 6 mo. A triphasic preparation resulted in a significantly lower insulin response than a low-dose monophasic preparation. However, the results indicate that low-dose oral-contraceptive compounds appear to be safe for women with previous GDM when administered for limited periods. At the follow-up examination, we found no increased risk of developing diabetes in women with previous GDM who used oral contraception. We consider the intrauterine contraceptives (IUD) a safe and effective alternative for women with previous GDM. Of 154 women with GDM, 33% chose IUD, 22% a combination-type oral contraceptive, and 16% barrier methods as their first choice of contraception 2 mo postpartum. We conclude that family planning and qualified contraceptive advice are important in women with previous GDM. *Diabetes* 40 (Suppl. 2):147–50, 1991

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Gestational diabetes mellitus (GDM), defined as carbohydrate intolerance of variable severity with onset or first recognition during pregnancy (1), is a risk factor during the current pregnancy and may be a clear signal of abnormal glucose metabolism in later life. Preconception counseling should therefore be provided for all women with previous GDM.

This article is an overview of family planning and contraceptive methods suitable for women with previous GDM based partly on experiences from our center in Copenhagen.

RESEARCH DESIGN AND METHODS

Over the 7-yr period 1978–1984, 370 women with GDM were treated at the Diabetes Center of the obstetric-gynecologic department. Diagnosis was made after a screening procedure in our outpatient clinic or in other hospitals referring patients to our department (2,3). GDM women are defined as women who had an abnormal 50-g oral glucose tolerance test (OGTT). The OGTT was considered abnormal if at least two values exceeded the mean + 3SD curve in a group of 46 nonpregnant women studied in the same way (4).

Our standard approach for diagnosis of GDM has been described in earlier publications (5,6), and so has the subclassification based on the treatment given during pregnancy (7). Briefly, we designate women treated with diet alone as class A, those treated with diet plus oral agent (tolbutamide or metformin) as A^+, and those who had to be treated with diet plus insulin to keep their average blood glucose level 7.0 mM as (A)B (8). The follow-up results presented here are based partly on recent studies from our center (9) and partly on previously published studies (7).

In 1976, an outpatient clinic was set up in our hospital for supervision of contraception and planning for future pregnancies in diabetic women. The purpose of the clinic was to

TABLE 1
Women with gestational diabetes diagnosed at Rigshospitalet, Copenhagen, 1978–1984

Severity of maternal diabetes*	Women at index pregnancy (*n*)	Women with diabetes 6 yr after index pregnancy	
		n	%
A	301	51	17
A^+	34	26	75
(A)B	35	35	100
Total	370	112	30

*Treatment classes: A, diet alone; A^+, diet plus oral agent; A(B), diet plus insulin.

improve the contraceptive guidance for all diabetic women in the area and particularly to secure optimal postpartum contraceptive advice to all diabetic women discharged from our obstetric-gynecologic department. As a routine procedure, all women with diabetes, GDM included, were offered a consultation 8 wk postpartum in the outpatient clinic. During the period 1983–1984, a consecutive series of 154 women with GDM was analyzed with respect to their response to this offer.

CLINICAL CONSIDERATIONS

Gestational diabetes is clinically represented by several categories of patients, and this inhomogeneity is exemplified in Table 1, which gives the number of women with GDM in our hospital from 1978 to 1984. Groups A^+ and (A)B together represent ~18% of the total number of women with GDM, and this figure is in accordance with the results of other studies (10,11). At follow-up on average 6 yr after the index pregnancy, 30% had diabetes according to the criteria of the World Health Organization (12). Unpublished data from our department indicate that at least another 35% will get GDM during a new pregnancy; therefore, it seems justified to follow the guidelines for women with pregestational diabetes in terms of family planning and contraceptive guidance (13). Theoretically, there is no difference in the contraceptive methods available to diabetic and nondiabetic women, but the state of the disease alters the risk-benefit ratio that is normally taken into consideration when contraceptive advice is given.

Barrier methods and sterilization. The barrier methods (i.e., condom, diaphragm, and spermicides) are medically ideal for women with previous GDM because they produce virtually no adverse local or systemic effect. However, they have unsatisfactorily high rates of both patient and method failure, resulting in a Pearl index of ~5 (13a). Still, patient failure can be reduced in women who are highly motivated and educated in the use of these contraceptives. Thus, the barrier methods may prove both acceptable and reliable contraceptive agents for some couples. Among couples who have completed their families, sterilization could be recommended as a safe and satisfactory method of fertility control.

Intrauterine devices (IUDs). For many women with previous GDM, the IUD is the only acceptable alternative contraceptive to hormonal compounds. The Pearl index is ~1.5 for the copper-releasing models. However, the potential general risk factors associated with IUD use cannot be ignored; pelvic inflammatory disease has been recorded to occur two to three times more frequently in users than in nonusers, and the risk for ectopic pregnancy is probably doubled (14). However, IUDs have been applied on a wide scale to women with diabetes because the method is metabolically less risky than oral contraceptives (OCs).

The efficacy of IUDs in diabetic women has been disputed, and a possible relationship between composition of the corrosion products and the efficacy has been suggested. Therefore, in the early 1980s, we investigated the clinical performance of a copper IUD model in 105 diabetic women and 119 nondiabetic control subjects (15). The events and overall efficacy rates were compared by life-table analysis, and no difference in accidental pregnancy rate, removal rate, or total continuation rate could be demonstrated. At our center in Copenhagen, the IUD method is therefore still considered a reliable and acceptable contraceptive agent in diabetic women and in those with previous GDM.

OCs. The most widely used contraceptive method is the combination-type OC containing an estrogen and a progesterone steroid. It is also recognized as the most effective, with a Pearl index of 0–1. During the last 20 yr, information concerning the risks and benefits of these hormonal compounds has accumulated rapidly and has revealed that OC intake influences a series of organ and metabolic systems apart from the main target, i.e., the pituitary/ovarian system. Initially, changes in glucose, lipid, and protein metabolism were demonstrated after ingestion of compounds containing ≥50 μg estrogen. However, many of the undesired metabolic effects may be reduced by lowering the dosage of estrogen and progesterone (16). Therefore, a distinction should be made between preparations containing ≥50 μg ethinyl estradiol and a high progestogen content and the newer low-dose preparations with ≤35 μg estrogen and a reduced amount of progesterone.

The relative effects of estrogens and progesterones on glucose metabolism have been debated, but the consensus is that progestogens are mainly responsible for the diabetogenic effect of the combined compounds (17), although the artificial estrogens may modulate this effect. A possible decreased insulin sensitivity at the cellular level in peripheral tissue has been suggested as the mechanism behind the altered glucose metabolism (18,19). However, even a discrete increase in basal insulin levels due to increased insulin resistance may promote development of coronary heart disease. This can be explained partly by proliferation of smooth muscle cells in small vessels and partly by the influence of hyperinsulinemia on lipid metabolism. The end result is lipid-filled lesions (fatty streaks) similar to those seen in early atherosclerosis (20).

Only a few studies have been published on the effect of low-dose OCs on glucose metabolism in women with previous GDM. We previously reported the effects of a monophasic preparation of 30 μg ethinyl estradiol and 150 μg levonorgestrel (21). In healthy nondiabetic women, no changes in fasting glucose, insulin, or glucagon levels or in glucose tolerance were observed after 2 and 6 mo. Women with previous GDM and normal body weight had significantly elevated glucose levels before treatment compared

with nondiabetic control subjects. After hormone intake for 6 mo, the insulin response to oral glucose increased significantly, but no deterioration of glucose tolerance was observed. The glucagon response was similar in women with previous GDM and control subjects.

The strategies used to reduce the metabolic side effects of OCs have included reduction of steroid dose, development of new steroids, and combinations of reduced steroid dosages and different administration regimens. The triphasic approach is a response to this view with the lowest possible dose of both hormones without a concomitant unacceptable uterine bleeding pattern (22). We examined the influence of such a triphasic compound containing ethinyl estradiol and levonorgestrel on glucose tolerance in healthy women and in women with previous GDM during a 6-mo treatment (23). Before treatment, women with previous GDM had significantly elevated fasting glucose levels and impaired OGTT compared with control subjects. In both groups, the glucose, insulin, and glucagon responses to oral glucose remained unchanged during the treatment. In women with previous GDM and control subjects, the triphasic preparation caused a significantly lower insulin response to oral glucose than the low-dose monophasic estradiol-levonorgestrel preparation.

Substantial evidence has confirmed that OCs may adversely influence lipid/lipoprotein metabolism (24,25). Hyperlipidemia characterized by increased low-density lipoprotein (LDL) and very-low-density lipoprotein (VLDL) and decreased high-density lipoprotein (HDL) has been demonstrated during intake of the combination-type OC, suggesting increased risk of atherosclerotic complications. Few studies have been published on the effects of OCs on lipid metabolism in women predisposed to diabetes, such as those with previous GDM.

We examined the effect of the triphasic ethinyl estradiol–levonorgestrel compound on plasma levels of triglycerides, free fatty acids (FFAs), and total, HDL, LDL, and VLDL cholesterol in women with previous GDM and control women (23). The only significant change seen during treatment was an increase in triglycerides in the control group. On the other hand, we found no difference before or during treatment in plasma FFA or total HDL, LDL, and VLDL cholesterol between women with previous GDM and the control women. This was also reflected in a constant ratio of HDL cholesterol to total cholesterol in both groups during the study. From a pharmacological viewpoint, however, OCs with the lowest hormonal content appear to be the most attractive, despite different biochemical configurations.

To our knowledge, no investigations have been published on the metabolic effect of a progestational-only preparation in women with previous GDM. In women with insulin-dependent diabetes mellitus (IDDM), we investigated a norethindrone-only preparation during 6 mo of treatment (26). Measurements were taken for blood pressure; body weight; 24-h insulin requirements; and fasting plasma glucose, HbA_{1c}, total plasma cholesterol, plasma FFA, plasma triglycerides, and lipoprotein concentrations. No difference in these variables were found.

Experience with combined OCs containing the new progestogens of gonane types, i.e., desogestrel, gestodene, and norgestimate, are limited, and no data have been published on the metabolic effects in women with previous GDM or IDDM. In healthy women, data on the influence on glucose metabolism have not indicated any risk of impairment of glucose tolerance, but there have been reports of hyperinsulinemic responses to oral glucose (27,28). Preliminary results obtained in our center from women with IDDM do not indicate any change in glycemic control during intake of a monophasic preparation of ethinyl estradiol and gestodene.

CONTRACEPTIVE CLINIC

No increase in the risk of developing clinical diabetes in women using OCs has been found in epidemiological studies (29), even in women who had used OCs for ≥10 yr (30). However, in women with previous GDM, an overall incidence of 44% of deterioration of glucose tolerance has been registered during intake of older high-dose OCs (31,32). Against this background, the results of our latest follow-up studies are of considerable interest (9). A series of 241 women with previous GDM were retested by OGTTs on average 6 yr after the index pregnancy. Twenty-four women were on low-dose OCs at the follow-up examination, and 217 did not use OCs. Seventeen percent in both groups had diabetes at the follow-up examination. These results confirm our impression that the new generation of low-dose OCs does not increase the risk of developing diabetes in women with previous GDM.

The contraceptive choices of women with previous GDM are shown in Table 2. Fifteen percent of 154 women with GDM did not reply to the survey from the contraceptive clinic. One third chose the IUD, whereas 22% preferred OCs, a result close to that seen in women with pregestational diabetes (13).

CONCLUSIONS

Several effective contraceptive methods are available for fertile women with previous GDM. However, the problems in contraceptive guidance as part of prepregnancy counseling in women with previous GDM are not well known among general practitioners and nonspecialized obstetric and gynecologic departments.

TABLE 2
First choice of contraception 2 mo postpartum in 154 women with gestational diabetes mellitus (GDM; Copenhagen series 1983–1984

Type of contraception	Women with previous GDM	
	n	%
Intrauterine device	51	33.1
Oral contraceptives		
Combination pill (n = 26)	34	22.0
Minipill (n = 8)		
Barrier methods	25	16.2
Sterilization	5	3.3
No need for contraception (want pregnancy, no partner, etc.)	12	7.8
Contraceptive advice of family doctor	4	2.6
Total	131	85.0
No response	23	15.0

Women with diabetes or women with previous GDM are generally well motivated for contraceptive advice, and thus, the barrier methods may prove both acceptable and reliable contraceptive agents to some of these women. However, when a high risk of patient failure can be predicted, intrauterine or hormonal contraception may be the only reversible alternative. According to our findings, IUDs can be recommended to women with previous GDM without reservations. In women with previous GDM, low-dose OCs may be administered without running a risk of new deterioration of glucose tolerance, but long-term results are lacking.

From our investigations, it also appears that short-term administration of the low-dose progestogen-only pill or of the combined low-dose OCs containing the traditional progestogens, e.g., norethindrone or levonorgestrel, or the new gonane progestogens, e.g., gestodene, is without any influence on glycemic control in women with previous GDM or IDDM. Similarly, these compounds result in no significant changes in lipid/lipoprotein levels during short-term treatment in these women. The overall results from our clinic appear promising for including OCs in the concept of individual preconceptional counseling and efficient spacing of pregnancies in women with previous GDM.

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