Postpartum and contraception in women after gestational diabetes

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Abstract

Women who have had gestational diabetes mellitus must be monitored in the immediate postpartum period to ensure that blood glucose levels return to normal without further treatment. In the few studies performed specifically in these women, those that breastfed did not have a different metabolic profile, at least during the period of breastfeeding; the metabolic profiles of children born to women that had gestational diabetes and that breastfed also did not differ from those that were not breastfed.

The choice of contraception must mainly take into consideration the associated risk factors. The studies, even if few have specifically focused on women with a history of gestational diabetes, have not demonstrated a significant disturbance of glucose metabolism while using hormonal contraception, whether combined oral oestrogen/progestogen or progestogen-only contraception. However, the presence of obesity, hypertension, or dyslipidaemia must direct the choice of contraception towards one without cardiovascular consequences. In these cases, the intrauterine device is an excellent choice.

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Keywords: gestational diabetes, postpartum, contraception, breastfeeding, review

1. Introduction

Women who have had gestational diabetes require special monitoring in the immediate postpartum period, first to ensure that the diabetes was truly related only to the pregnancy and to be certain that it thus resolves following delivery. In addition, they often have vascular risk factors which expose them to complications and which have to be considered in the immediate postpartum period and with regard to the prescription of a contraceptive method.

The aim of this article is to report on the present knowledge of women who have had gestational diabetes with regard to the postpartum period, especially concerning breastfeeding, as well as suitable contraceptive methods.

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2. Material and methods

The literature search was done for the period of 1995-2010 on articles published in French and English. The keywords used were: gestational diabetes, breastfeeding, contraception, oral contraception, postnatal, postpartum, after pregnancy, combined oral contraceptive pill, intrauterine contraceptive device, glucose tolerance, progestin. Other articles were found upon reading the initial bibliography.

The Medline search found 113 articles on gestational diabetes and breastfeeding. The Cochrane database did not provide any references. There were no trials found on the NIH Clinical Trial website.

The PubMed search found 70 articles on contraception and gestational diabetes. None of the articles were found in the Cochrane database. None of the trials were found on the NIH Clinical Trial website.

2.1. Postpartum

This period extends from delivery to the first menstrual period after pregnancy.

2.2. Data about breastfeeding in patients that have had gestational diabetes

Three questions have been raised concerning:

- The prevalence of breastfeeding in women that have had gestational diabetes
- Breastfeeding and glucose tolerance in the mother during and after breastfeeding
- Breastfeeding and the risk of type 2 diabetes in the child.

Studies focusing specifically on women with gestational diabetes are fairly rare. Most of them mix type 2 and gestational diabetes, and even type 1 and type 2 and gestational diabetes. The studies do not specify the duration of breastfeeding, nor whether it is exclusive. In addition, the definition of gestational diabetes has not been standardised. Finally, studies on Pima Indians and Latino women, populations in which there are a very high prevalence of diabetes, are not easily extrapolated to the rest of the population.

The most complete review is that of Taylor et al. from 2005, which reported on the literature associating breastfeeding and type 2 and gestational diabetes [1].

2.3. Prevalence of breastfeeding in women that have had gestational diabetes

No studies have been done specifically on the prevalence of breastfeeding in women that have had gestational diabetes. Two similar populations were studied: diabetic women and obese women.

Diabetic women breastfeed their children less often than non-diabetic mothers. In a series reported in 1998 by Cordero et al. on 530 children born to 332 women with gestational diabetes and 177 women with type 1 diabetes, breastfeeding was more common in women with diabetes controlled by diet alone than in diabetics with complications (43% versus 22%, \( P \) not specified) (EL3) [2].

In the London maternity hospital registry of 287,213 women, a correlation was shown between the body mass index (BMI) of the mother and the incidence of gestational diabetes. In this study, breastfeeding was also less common in obese women: the odds ratio (OR) was 0.86 (0.84-0.88) for a BMI between 25 and 30 and the OR was 0.58 (0.56-0.60) when the BMI was greater than 30 (EL3) [3].

2.4. Breastfeeding and subsequent risk of diabetes in the mother (Table 1)

Studies limited only to gestational diabetes in women are fairly rare. In addition, they only focus on women who are still breastfeeding.

In non-diabetic women, two studies done on small sample cohorts investigated glucose metabolism in breastfeeding and non-breastfeeding postpartum women. One found lower glucose and insulin levels in the breastfeeding women [4], while the other showed no difference between the two groups with regard to blood glucose level 3 hours post-oral glucose tolerance test (OGTT) [5]. The investigations were done in all cases while the women were still breastfeeding.

Kjos et al. performed an OGTT 4 to 8 weeks after delivery in 809 women of Latino origin who had had gestational diabetes. Fifty-five percent of the women were breastfeeding at the time of the test. The non-breastfeeding women had two-times more diabetes at this stage than the breastfeeding women (9.4% versus 4.2%; \( P < 0.01 \)). These results were maintained after adjustment for the body mass index, age and the use of insulin during pregnancy [6].

To assess the risk of recurrence of gestational diabetes mellitus, Mac Neill et al. retrospectively studied a cohort of 651 women who had had gestational diabetes with a previous pregnancy. The authors found no difference in the rate of recurrence between the women who breastfed and those who bottle-fed their children [7].

In a prospective cohort study with the primary aim of studying the association between methods of contraception and the occurrence of type 2 diabetes, Kjos et al. investigated whether the breastfeeding was an independent risk factor for developing type 2 diabetes. They found no differences relative to whether the women breastfed or not (RR 0.90 CI [0.56-1.46]) [8].

A single study investigated whether women with gestational diabetes had themselves been bottle-fed more often than they had been breastfed. One hundred thirty-eight women with gestational diabetes were compared to 100 women with normal glucose tolerance. There was no significant difference between
sex, parental diabetes and birth weight; this held true across all age groups. Type 2 diabetes was 59% less frequent in the breastfed population of this study.

Continuing with the Pima Indian population, Pettitt et al. compared the rate of diabetes in the new generation according to breastfeeding in the group of 21 women who had had gestational diabetes compared to women who had not had diabetes [13]. The authors found a lower rate of diabetes in the breastfed children, regardless of whether they came from the non-diabetic population (6.9% versus 11.9%) or from the population presenting with gestational diabetes (30% versus 43.6%). These results in Pima Indians are interesting but cannot be extrapolated to other populations without complementary studies.

In a Canadian case controlled study in type 2 diabetic patients under the age of 18 years compared to 92 non-diabetics, breastfeeding for at least one year was a positive independent predictive factor of lower risk for subsequent diabetes in children (OR: 0.24; CI 0.07-0.84). Breastfeeding for at least six months was also associated with a lower risk (OR: 0.3; CI 0.13-0.99) [14].

Plageman et al. were interested in the risk of glucose intolerance and overweight in the children of diabetic mothers (83 type 1 diabetics and 29 women with gestational diabetes) who were breastfed according to the milk received: that of their diabetic mother or that of a non-diabetic woman (banked donor breast milk) [15]. In this study, the risk of overweight at the age of two years was greater in children receiving milk from the diabetic mother (OR: 2.47; CI [1.25-4.87]) and the

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**Table 1**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Type of study</th>
<th>Population</th>
<th>Parameters</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job 1976 [5]</td>
<td>Cohort study</td>
<td>98 non-diabetic women without risk factors, including 52 breastfeeding</td>
<td>OGTT Day 5</td>
<td>No difference between breastfeeding and non-breastfeeding</td>
</tr>
<tr>
<td>Kjos 1993 [6]</td>
<td>Cohort study</td>
<td>809 women of Latino origin with gestational diabetes, including 50% breastfeeding</td>
<td>OGTT between 4 and 12 weeks</td>
<td>Lower glucose level in breastfeeding, p &lt; 0.01</td>
</tr>
<tr>
<td>MacNeill 2001 [7]</td>
<td>Retrospective</td>
<td>651 women with history of gestational diabetes</td>
<td>Recurrence of gestational diabetes</td>
<td>No difference if breastfeeding or not</td>
</tr>
<tr>
<td>Kjos 1998 [8]</td>
<td>Prospective over 7.5 years</td>
<td>371 women of Latino origin with history of gestational diabetes, who chose a non-hormonal method of contraception</td>
<td>Appearance of type 2 diabetes after 16 weeks postpartum according to breastfeeding</td>
<td>No difference. Relative risk = 0.9 (0.56 - 1.46) in breastfeeding women</td>
</tr>
<tr>
<td>Knights 1999 [9]</td>
<td>Retrospective case controlled</td>
<td>138 women presenting gestational diabetes versus 100 women controls</td>
<td>Percentage of women that had received breast milk</td>
<td>No difference. P = 0.333</td>
</tr>
</tbody>
</table>

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**In summary, according to an analysis of the literature, some studies showed a lower risk of the mother subsequently developing type 2 diabetes if she had breastfed; others however showed no difference.**

Effect of breastfeeding on the risk of diabetes in children (Table 2).

There is a known positive association between bottle-fed children and obesity [11]. No studies published before 1997 on the prevalence of type 2 diabetes in breastfed children compared to non-breastfed children have been done.

In a population of Pima Indians in Arizona, which is a group with a high prevalence of type 2 diabetes, Pettitt et al. were the first to study the association between the practice of breastfeeding and type 2 diabetes in children [12]. Their first retrospective cohort study was based on 720 offspring aged 10 to 29 years old. The children that had been fed exclusively on breast milk for a minimum of 2 months had a significantly lower rate of type 2 diabetes after adjustment for age, sex, parental diabetes and birth weight; this held true across all age groups. Type 2 diabetes was 59% less frequent in the breastfed population of this study.

Continuing with the Pima Indian population, Pettitt et al. compared the rate of diabetes in the new generation according to breastfeeding in the group of 21 women who had had gestational diabetes compared to women who had not had diabetes [13]. The authors found a lower rate of diabetes in the breastfed children, regardless of whether they came from the non-diabetic population (6.9% versus 11.9%) or from the population presenting with gestational diabetes (30% versus 43.6%). These results in Pima Indians are interesting but cannot be extrapolated to other populations without complementary studies.

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Plageman et al. were interested in the risk of glucose intolerance and overweight in the children of diabetic mothers (83 type 1 diabetics and 29 women with gestational diabetes) who were breastfed according to the milk received: that of their diabetic mother or that of a non-diabetic woman (banked donor breast milk) [15]. In this study, the risk of overweight at the age of two years was greater in children receiving milk from the diabetic mother (OR: 2.47; CI [1.25-4.87]) and the
risk of glucose intolerance decreased with the quantity of milk ingested from the non-diabetic mother (OR: 0.19; CI [0.05-0.7]). This was the only study that found an increased risk associated with the breast milk of diabetic women.

The weight evolution of children born to mothers that had gestational diabetes during pregnancy was also studied in 324 children with a mean age of 5.4 years ± 1.6 years. Overweight affected more non-breastfed children than those breastfed for less than 3 months and those breastfed for more than 3 months (37.3%, 32.5% and 22%, respectively; p = 0.008) [16]. The difference was maintained in the children of obese women with a BMI greater than 30 kg/m: 56% overweight in the groups not breastfeeding and breastfeeding less than 3 months, and 31% in the group breastfeeding over 3 months (p = 0.042).

Even though this last study showed a positive association between prolonged breastfeeding and lower risk of overweight, the relationship between breastfeeding and metabolic changes in children of women that had gestational diabetes still needs clarification. The few published studies that exist do not specify the duration of breastfeeding or whether it was done exclusively. In addition, the definition of gestational diabetes has not been standardised. The studies with Pima Indians and Latino women cannot be easily extrapolated to the rest of the population.

Lastly, no long-term epidemiological study has been done.

### 2.4.1. Patient information

It is essential that patients be informed of the risk that they have of developing gestational diabetes with other pregnancies, subsequent type 2 diabetes (see above Subsequent maternal prognosis) and also the risk for their children of overweight and subsequent diabetes (see Burguet, A. Long-term consequences of foetal exposure to gestational diabetes).

### 2.4.2. Dietary, physical activity and weight monitoring recommendations

(see above Subsequent maternal prognosis)

### 2.4.3. In the immediate postpartum period, monitoring of glucose levels and diabetes treatment

When insulin therapy is used, it is recommended that it be stopped in gestational diabetes once the delivery occurs ([17] and Jacqueminet S, Jannot-Lamotte MF. Therapeutic management of gestational diabetes).

The patient should be monitored for a return to normal glycaemic values so that undetected type 2 diabetes does

<table>
<thead>
<tr>
<th>Study Type</th>
<th>Population</th>
<th>Prevalence of type 2 diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pettitt 1997 [12]</td>
<td>Retrospective Pima Indians of Arizona 720 persons aged 10 to 39 years</td>
<td>0-19 years: 0% versus 3.6% 20-29 years: 8% versus 14.7% 30-39 years: 20% versus 29.6% OR = 0.41 (0.18-0.93) in women breastfeeding exclusively for at least 2 months after adjustment (age, sex, parental diabetes, birth weight)</td>
</tr>
<tr>
<td>Pettitt 1998 [13]</td>
<td>Cohort retrospective Pima Indians 572 women, including 21 with gestational diabetes</td>
<td>In non-diabetic women: 6.9% in breastfed children versus 11.9% in non-breastfed In diabetic women: 30% versus 43.6%</td>
</tr>
<tr>
<td>Young 2002 [14]</td>
<td>Case controlled Canadians 46 children under age 18 years, type 2 diabetic versus 92 children under age 18 years, non-diabetic</td>
<td>OR in children breastfed for at least one year: 0.25 (0.07 - .84) Breastfed for at least six months: 0.36 (0.13 - 0.99)</td>
</tr>
<tr>
<td>Plagemann 2002 [15]</td>
<td>Cohort prospective From Berlin 83 women with type 1 diabetes and 29 women with gestational diabetes Children fed either milk from their mother or with banked breast milk from non-diabetic mothers</td>
<td>Risk of glucose intolerance at 2 years: OR = 0.19 (0.05 - 0.7) if fed milk from a non-diabetic woman versus milk from their diabetic mother Risk of overweight in children at 2 years: OR = 2.47 (1.25–4.87) if fed milk from their diabetic mother versus non-diabetic women.</td>
</tr>
<tr>
<td>Schaefer 2006 [16]</td>
<td>324 children from mothers that had had gestational diabetes</td>
<td>Risk of overweight at 5.4 ± 1.6 years 37.3% if non-breastfed, 32.5% if breastfed less than 3 months 22% if breastfed more than 3 months</td>
</tr>
</tbody>
</table>

In conclusion, due to the current relatively high prevalence of gestational diabetes, it is vital that studies be done to evaluate the metabolic changes of women and their children in relation to breastfeeding. The studies at this time do not enable formal conclusions to be drawn. There are no grounds for differentiating women who have had gestational diabetes from other women in relation to breastfeeding.
not occur. Blood glucose monitoring in maternity hospitals is not based on recommendations; the blood glucose norms are those of the general population, i.e., less than 1.10 g/L fasting (expert opinion).

If diabetes continues in the postpartum period, we recommend that a diabetologist be seen (expert advice).

Diabetic medications are all contraindicated in breastfeeding women. Studies are currently inadequate for assessing possible side effects in children. Metformin, glipizide and glimeperide might be compatible with breastfeeding [18]. According to Feig et al., the three studies that measured the levels of these drugs in breast milk found non-significant levels of Metformin, and one study was unable to detect glimeperide or glipizide. Nevertheless, there are currently no diabetic drugs with a Marketing Authorisation in breastfeeding women.

2.4.4. Special precautions

In women with hypertension who had presented with gestational diabetes and do not wish to breastfeed, treatment with Bromocriptine is contraindicated. In addition, women with gestational diabetes are more often obese and therefore more at risk of thromboembolic complications. Prevention of thrombotic risk is thus necessary (see Beucher, G. et al. Maternal complications of gestational diabetes).

2.5. Contraception after gestational diabetes

Few articles have reported on current data in the literature on this subject [19, 20]. The questions raised concern the influence of gestational diabetes history on the contraception prescription, the metabolic effects of combined oestrogen/progestogen contraceptive pills and the use of other contraceptives.

2.5.1. Does a history of gestational diabetes influence contraception?

A recent article [21] shows that with a few exceptions, there is no link between a history of gestational diabetes and different contraceptive prescriptions.

2.6. Effects of oestrogen/progestogen combined contraception

2.6.1. Oestrogen/progestogen combined contraception and glucose metabolism

We studied the published data concerning non-diabetic women, women with known diabetes and several studies of women who had had gestational diabetes.

2.6.2. Non-diabetic women

A Cochrane review was published in 2009 on the effects of hormonal contraceptives on glucose metabolism [22]. Out of the 43 available trials, only 27 contained sufficient information for undergoing analysis. The study concluded that the effect of hormonal contraception on glucose metabolism was very limited in non-diabetic women. The studies on the combined pills with different progestogens showed effects that were discordant and with little significance but with no differences on blood insulin levels; the sample sizes however were insufficient for conclusions to be drawn. Most of the studies had a small number of women, many cases of treatment dropout and few were randomised [23]. There was no data collected regarding women at risk of diabetes due to excessive weight.

One study caught our attention, although it had a small sample size. It was carried out on 37 insulin-resistant women with polycystic ovary syndrome, 16 of whom used a combined oral contraceptive pill for an average of 97 months; the other 21 had never used birth control pills. Pasquali et al. showed deterioration of glucose metabolism (higher glucose levels, higher insulin levels) in patients not using the combined pill, in contrast to patients taking the pill whose glycaemic profile remained stable ten years later [24]. This effect was related to less abdominal fat in women taking the combined oral contraceptive.

2.6.3. Women with diabetes before pregnancy

A Cochrane review published in 2006 did not find any notable effects of low doses of combined oestrogen/progestogen contraceptive pills on glucose levels. It should just be noted that only two studies were randomised, that these studies included few patients and they were fairly short in duration [25]. The studies in type 1 diabetics did not show an increase in insulin requirements [26]. There were no studies comparing different doses of ethinyl estradiol.

It should be pointed out that no modifications in glucose metabolism were found in the study by Grigoryan et al. [27], which was done using a ring oestrogen/progestogen hormone-releasing system in type 1 diabetic women.

2.6.4. Women who have had gestational diabetes (Table 3)

Few studies have been published on the effects of hormonal contraception in women with a history of gestational diabetes.

Baptiste-Roberts et al. performed a review, published in 2009 [28], of 14 articles investigating 9 risk factors of type 2 diabetes in women who had had gestational diabetes; in the review, combined oral contraception did not emerge as a risk factor.

Skouby et al. studied glucose metabolism in 16 women who had had gestational diabetes at time points before, after
2 months and after 6 months of oral triphasic hormonal contraception use compared to 19 female controls [29]. Before taking the pill, the women with a history of gestational diabetes had higher glucose levels (p < 0.05). The glucose and insulin levels and the glucagon response in both groups were not modified with the use of the combined oral contraception at 2 and 6 months.

The same authors performed a comparative study on insulin sensitivity using the euglycaemic clamp technique in 6 women with a history of gestational diabetes and with normal plasma glucose and insulin levels per oral glucose tolerance tests in the beginning, and 6 women without a history of gestational diabetes, before and after 6 months of using triphasic combined oral contraception [30]. This validated technique consists of calculating the quantity of intravenous glucose needed to maintain the euglycaemic state during an intravenous infusion of insulin. Although the two groups did not differ before the treatment, the quantity of infused glucose at 6 months was significantly decreased only in the group of women with a history of gestational diabetes. This signified reduced sensitivity to the insulin; nevertheless, this alteration remained minimal and was not sufficient to alter the glucose level in this group.

The results of an oral glucose tolerance test with 75 grams of glucose, repeated at 3 months and between 6 and 12 months after the start of contraception in 156 women with a recent history of gestational diabetes, randomised according to a combined oral contraception using norethindrone or levonorgestrel, were retrospectively compared with those of a matched control population using non-hormonal contraception [31]. The prevalence of diabetes between 6 and 12 months did not differ between the 3 groups: non-hormonal contraception 17%, ethinyl estradiol-norethindrone 15%, and ethinyl estradiol-levonorgestrel 20%.

The article that is based on the largest sample size is that by Kjos et al. [8]. This study was done on a retrospective cohort of 904 women, all of Mexican or Central American origin, who had had gestational diabetes and a normal oral glucose tolerance test at the initial visit between 4 and 16 weeks after delivery. Four hundred and forty-three of them received non-hormonal contraception; 383 received a low-dose combined oral contraceptive pill; and 78 breastfed and used microdose progesterogen contraception. They all had a repeat oral glucose tolerance test within a maximum time period of 7 1/2 years. The annual incidence of type 2 diabetes was 8.7% in the non-hormonal contraceptive group, 10.4% in the combined oral contraceptive group and 26.5% in the microdose progesterogen group. There was no difference between the group using combined oral contraception and that using non-hormonal methods throughout the entire follow-up. In contrast, after adjustment for the different confounding factors, the use of a microdose progesterogen in these women while breastfeeding was associated with a three-fold risk of type 2 diabetes (EL2).

<table>
<thead>
<tr>
<th>Authors</th>
<th>Type</th>
<th>Sample size</th>
<th>Parameter</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skouby 1985 [29]</td>
<td>Prospective case controlled</td>
<td>16 women with history of gestational diabetes and 189 women controls</td>
<td>OGGT (plasma glucose, insulin and glucagon)</td>
<td>No change in plasma levels of glucose, insulin and glucagon between the two times in both groups</td>
</tr>
<tr>
<td>Kung 1987 [34]</td>
<td>Prospective case controlled</td>
<td>Women with history of gestational diabetes Treated with triphasic COC. Compared to women with history of gestational diabetes using copper IUD contraception</td>
<td>OGGT at 6 months (plasma glucose, insulin)</td>
<td>26% abnormality of OGGT in COC group versus 0% Insulin response increased from 48.3% in the COC group versus 23.4%</td>
</tr>
<tr>
<td>Skouby 1987 [30]</td>
<td>Prospective case controlled</td>
<td>6 women with history of gestational diabetes treated with triphasic COC versus 6 women controls</td>
<td>Sensitivity to insulin per euglycaemic clamp technique at 6 months</td>
<td>Decreased sensitivity to insulin in the COC group No change in control group</td>
</tr>
<tr>
<td>Kjos 1990 [31]</td>
<td>Cohort study</td>
<td>156 women with history of gestational diabetes treated with randomised low-dose COC, or EE + norethindrone, or EE + levonorgestrel Compared to a cohort of women with history but no hormonal contraception</td>
<td>OGGT at 3 months and between 6 and 13 months Prevalence of diabetes between 6 and 13 months</td>
<td>No COC 17% EE + norethindrone 17% EE + levonorgestrel 20%</td>
</tr>
<tr>
<td>Kjos 1998 [8]</td>
<td>Retrospective</td>
<td>904 women with history of gestational diabetes, Latino origin with non-hormonal contraception 383 with low-dose COC 78 progesterogen-only (0.35 mg of norethindrone with normal glycaemic regulation between 4 and 16 weeks postpartum</td>
<td>Annual incidence of gestational diabetes Mean follow-up of 7.5 years</td>
<td>8.7% non-hormonal contraception 10.4% COC 26.5% progesterogen-only</td>
</tr>
</tbody>
</table>
2.7. Combined oral contraception and vascular risk

Women that have had gestational diabetes often have the risk of developing metabolic syndrome [32] (see Vérier-Mine, O: Maternal outcomes after gestational diabetes. Screening and prevention of type 2 diabetes. Literature review). They often have a higher BMI than women without this history. Consequently, they are often exposed to the vascular risks of oral contraceptives. One reassuring fact however is that there has been no demonstration of significant negative modification of lipid metabolism with the use of oestrogen/progestogen combination contraception in women with a history of gestational diabetes [29, 31, 33, 34].

Women who have had gestational diabetes that also present with hypertension, dyslipidaemia, or venous/arterial thromboembolic risks are subject to the classic contraindications of combined oral contraception [recommendations of the French High Health Authority (HAS), 2004].

Recent alternatives to combined oral contraception, whether combined oestrogen/progestogen via vaginal (ring) or transdermal (patch) route, or oral contraceptives based on estradiol valerate instead of ethinyl estradiol, have the same vascular contraindications at this time. It should be noted that there is reduced efficacy for the patch in obese women with a BMI greater than 30 kg/m² [35] and perhaps also for the implant during the third year of use, thus justifying an earlier replacement in these women.

2.8. Effects of progestogen-only contraception

2.8.1. Effects of microdose progestogen

A single study has been done on the risk of diabetes in women with a history of gestational diabetes that are taking microdose progestogen. This study, which was already cited in the section on combined oral contraceptives, showed an increased risk of diabetes with microdose progestogen in the postpartum period in women with a history of gestational diabetes and who were breastfeeding, with a relative risk of 3 if the duration of microdose progestogen treatment was between 4 and 8 months, and 5 for treatment over 8 months [8] (EL4). Only breastfeeding women were investigated in this study; therefore it is unknown whether this same result would have been found in other women. These surprising results, which certainly merit confirmation, including in other ethnic groups, are interpreted by the authors as being the effect on insulin resistance and beta-cell dysfunction induced by progestogen alone without the counterbalancing effect of oestrogen. These women were in a hypo-oestrogenic state as well due to the breastfeeding.

Other studies are needed to assess long-term glucoregulation in women who have had gestational diabetes and are using microdose progestogen.

2.8.2. Use of injectable Depot médroxyprogesterone acetate (DMPA)

In a retrospective study of a Navajo Indian population focusing on 284 diabetic women and 570 controls, an increased risk of diabetes was found with the use of DMPA compared to combined oral contraception pills, with a relative risk of 3.6 (1.6-7.9) after adjustment for weight and age versus the estrogen/progestogen contraception [36]. In a Latino-American population of 526 women (96 of whom were taking DMPA) with histories of gestational diabetes who had been followed-up for an average of 12 months, this risk was found to be 1.58 (CI 1.00-2.50) but disappeared after adjustment for different confounding factors, including weight [37].

Randomised studies in other populations will be needed for further answers, but if a woman chooses this method of contraception, her glucose levels should be monitored more closely, especially if she gains weight, which is a common side effect of this contraception [38]. Annual plasma glucose testing can thus be recommended.

2.8.3. Effects of macrodose progestogen-only contraception

Macro-dose progestogen-only contraception still does not have a Marketing Authorisation for a contraception indication.

2.8.4. Implants

Implants have not shown metabolic or vascular side effects in non-diabetic women [39, 40]. A study was done on 23 diabetic women using insulin. There was no modification of the glycaemic profile or of the insulin doses at 3, 6, 12 and 24 months [41].

No studies have been done to date on the effects of an implant on the long-term metabolic profile of women with gestational diabetes. There are no grounds for restricting their use in patients with a history of gestational diabetes.

2.8.5. Intrauterine device

The intrauterine device (IUD) has not been specifically studied in women with a history of gestational diabetes. The study by Kimmerle et al. in diabetic women confirmed the absence of an increased infectious risk in diabetic women [42].
Copper IUD

There are no contraindications for this form of contraception in diabetic women. It is an excellent method to promote in women that have had gestational diabetes.

IUD with hormone

No specific studies have been published to date on the use of the levonorgestrel-releasing IUD in women that have had gestational diabetes; its use, on the contrary, seems well suited for endometrial protection in these patients, who are often somewhat older and obese and therefore more at risk of endometrial hyperplasia.

Two studies favoured the metabolic impact of the levonorgestrel-releasing IUD in diabetic women, whether type 1 [43] or all types of diabetes in the premenopausal period [26], with no metabolic changes shown.

3. Recommendations of scientific societies

Few recommendations have been made by scientific societies concerning contraception for women that have had gestational diabetes: Alfeldiam in 1996 [44], WHO in 2004, the American Diabetes Association in 2004 [45], the 5th international workshop conference on gestational diabetes mellitus in 2007 [46], NICE in 2008 [17], and those discussed in two articles [47, 48]. WHO just published guidelines in 2010 for the use of contraception by individualising certain conditions, including gestational diabetes [49]. In this text, WHO indicates that the use of combined oral contraception (< 35 mcg ethinyl estradiol), the pure progestogen-only pill, implants, DMPA, and IUDs with or without hormones is possible without any restrictions for use in women with a history of gestational diabetes. It bashes this lack of restriction on the absence of side effects in the different studies on subsequent risk of diabetes or lipid parameters. In 2004, the French national agency on health accreditation and evaluation (ANAES) did not issue any specific guidelines concerning contraception but did issue a reminder that the medical history of gestational diabetes should prompt testing for diabetes in asymptomatic women before starting combined oral contraception, in addition to measurements of total cholesterol and triglycerides. Glycaemia levels should be checked 3 to 6 months after the start of combined oral contraception [ANAES 2004].

Contraindications aside, combined oral contraception remains an excellent method if the patient desires hormonal birth control. In cases of hypertension or with cardiovascular risk factors, hormonal methods without the estrogen/progesterone combination (microdose progestogen-only, implants, macroprogestogen-only) may be an alternative.

New forms of contraception (i.e., combination oestrogen/progestogen per patch or per ring, or that composed of valeriate estradiol and progestogen) currently have the same vascular contraindications as the classic estrogen/progestogen forms. The choice of contraception must take risk factors into account.

The IUD is an excellent form of contraception in women that have already had at least one pregnancy, and present with cardiovascular and metabolic risk factors. The levonorgestrel-releasing IUD may be beneficial for endometrial protection in overweight women.

Hormonal contraception must not be started before the 6th postpartum week [HAS guidelines, May 2002]. Microdose progestogens, injectable progestogens and progestogen implants may be used without complications in breastfeeding women. An intrauterine device may be placed without particular risk from the 4th postpartum week, even if the menstrual cycle has not resumed.

4. Conclusion

In the immediate postpartum period in women that have had gestational diabetes, it is recommended that glycaemia levels be checked for a return to normal. Breastfeeding is encouraged as with all women if desired. Contraception in patients that have had gestational diabetes must take cardiovascular risk factors, sometimes in association with overweight, into consideration. The use of the IUD is not associated with side effects and appears to be a good choice. The use of combined oral contraception, if it is not contraindicated by potential risk factors, is completely feasible and is not associated with increased risk of subsequent diabetes. The other forms of contraception, particularly progestogen-only, have not been fully assessed, but pending further studies they do not seem to be associated with particular risks in this population.

The choice of contraception is individual and personalised and must take into consideration the request of the patient and her foreseeable compliance with the prescribed method. Gynaecological tolerance is also a factor that may influence the choice of contraception. These women, who have a very high risk for subsequent diabetes, must be informed and have regular testing of their glucose levels regardless of the contraceptive method.

5. Conflicts of interest

No conflict of interests related to the article.

References


