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The Risks to Maternal Health of a Pregnancy in Pre- Existing Diabetes.

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Introduction

Pre gestational diabetes is the most common medical problem that complicates pregnancy. Diabetes can cause problems for both the mother and foetus and, despite recent advances in antenatal care, the outcomes in terms of perinatal health and survival remains significantly less good than for pregnancy in the absence of diabetes.

The prevalence of pre gestational diabetes has increased in the last decade, primarily as a result of the increase in T2D. Recent large studies of women with pre gestational diabetes continue to show higher rates of complications compared to the general population, including perinatal mortality, congenital malformations, HTN, preterm delivery, large for gestational age, caesarean delivery and neonatal morbidities.

Effects of pregnancy on the woman with pre-existing diabetes:

- Susceptible to hypoglycemia in early pregnancy due to increased insulin sensitivity and changes in eating due to nausea and need for tight glycemic control.
- increasing insulin requirments after 16 weeks gestation due to decreased insulin sensitivity induced by pregnancy related hormones.
- Potential hypoglycemia in later pregnancy due to delayed gastric empyting and/or esophageal reflux.
- Risk of deterioration of retinopathy and nephropathy
- Risk of DKA increased due to renal bicabonate loss and pro-ketotic metabolism in later pregnancy
- Risk of UTI due to increased glycosuria secondary to reduction in the renal threshold for reabsorption

Effects of maternal diabetes on pregnancy

- Need for pre -concepttual care and planning.
- Increased risk of congenital malfromation with poor glycemic control in early pregnancy.
- Increased risk of an SGA infant with poor glycemic control in early pregnancy with increased risk of an LGA infant with poor glycemic control in later pregnancy with risk of birth trauma with LGA.

- -Increased risk of polyhydramnios, miscarriage, late intra uterine death and stillbirth .
- -Inreased risk of pre-ecalmpsia, induction of labor and c-section and finaly increased maternal and neonatal morbidity and mortality.

Special concerns in pregnant women with T2D as compared with T1D: -

Women with T2D are at least as a risk of pregnancy complications as women with T1D, especially if they have HTN, obesity or are in poor glycemic control. Many studies, in fact show that pregnancy outcome may be less favorable in women with T2D compared with T1D , including a higher perinatality rate .

The reasons for this may include older age, a lower rate of preconception counseling, a higher incidence of poor glycemic control, and the coexistence of the metabolic syndrome, all of which are significant risk factor for pregnancy complications.

Failure to achieve optimal control in early pregnancy in women with any type of pre-existing diabetes may have teratogenic effects or lead to early fetal loss.

Pre-conception care for pregnant women who have T1D or T2D:

Women with DM and childbearing potential should be educated about the need for good glucose control before pregnancy and should participate in effective family planning. Whenever possible, organize multi-discipline patient-centered team care for women with pre-existing DM in preparation for pregnancy.

Women with diabetes should be evaluated and if indicated, treated for diabetic nephropathy, neuropathy and retinopathy, as well as cardiovascular disease, HTN, dyslipidemia, depression, and thyroid disease. So women with diabetes should be planned and can use contraception as per doctor's advice. Good glycemic control before conception and during pregnancy is important to reduce risks of complication such as still birth, miscarriage and congenital malformation. The target HBA1C level should be below 6.5% thus it is likely to reduce risk of congenital malformations in the baby. Patients with HBA1C of above 10% is not advised to get pregnant because of associated risk Lastly, regular follow-up visits are important for adjustment in the treatment plan related to stage of pregnancy, glycemic and blood pressure control, weight gain and individual patient needs.

What is the role of continuous glucose monitoring system in pregnancy

A continuous glucose monitoring system(CGMS) can be helpful, especially in Type1 patients who are having frequent hypoglycemia episodes and suffer from hypoglycemia unawareness, allowing better delineation of glucose patterns so that basal or bolus insulin can appropriately be adjusted. it has also been shown to reveal postprandial hyperglycemia that might to otherwise unrecognized and that is strongly associated with excess fetal growth. In one series, a mother had to check her glucoses a minimum of 10 times per day to given an indication of the glucose patterns obtained during CGMS. In other hand CONCEPT Trial demonstrated the value of real-time CGM in pregnancy complicated by T1D by showing a mild improvement in AIC without an increase in hypoglycemia and reductions in large for gestational-age births, lenght of stay and neonatal hypoglycemia. Use of of the CGM time in rage (TIR) can be used with T1D ,but thera are no data to use it in T2D .

Glycemic targets in pregnant Women with pre- existing diabetes:

Accoding to (ADA,AACE, ACOG) guidelines, in Women With pre-existing T1D and T2D who become pregnant the, it is recommended that glucose be controlled to meet the following goals, but only if the goals can be safely achieved: Pre-meal, bedtime and overnight glucose value between 60-99mg/dl (3.3-5.4mmol/L) a 1-hour PPG value between 100-129mg/dL (5.4-7.1mmol/L). 2-hour glucos 100-120 mg/dl (5,5-6,7 mmol/l) secondry target wuld be an A1C<6.0% if it can accomplished without significant hypoglycemia .

Effects of pregnancy on diabetes complications:

Women with pre-existing diabetes have an increased risk for a wide range of complications including hypoglycemia, ketoacidosis, thyroid disorders ,cardiovascular disease, coronary heart disease, cardiovascular, autonomic neuropathy, heart failure, ischemic stroke, peripheral arteriosclerotic vascular disease, hypertension, dyslipidemia, nephropathy, retinopathy and peripheral neuropathy During pregnancy women with pre-existing diabetes are also at risk for pregnancy-induced hypertension, pre-eclampsia, worsening of chronic complications, and maternal mortality. However available literature on some complications to provide some insights on the impact of diabetes in pregnancy on maternal complication.

Diabetic Retinopathy

Diabetic retinal disease commonly progress during pregnancy, sometimes to the point where laser treatment becomes necessary, the degree of pre-existing retinopathy and the degree to which glycemic controls improve are the two main factors determine the severity of deterioration. Also the women at greatest risk are therefore those with pre-existing moderate to severe retinopathy who enter pregnancy with high HBA1c and then have very rapid improvement in glycemia. Conversely, women who come into pregnancy with no retinopathy and HBA1c low are at minimal risk. The risk of progression to sight threatening retinopathy is of the order of 20-30% for those with moderate to severe retinopathy before pregnancy but <2% for those with minimal disease or no retinopathy. Finaly the overall risk of deterioration in retinopathy may persist upto 1 year after delivery and some women may require laser treatment in the postpartum period.

Diabetic Nephropathy

Nephropathy are related to increase risk of maternal and fetal complications. The development of pre-ecalmpsia superimposed upon the renal disease is the greatest hazard. In a prospective study of 203 mowen with T1DM, pre-ecalmpsia developed in 6% of women without microalbuminuria, in 42% of those with microalbuminuria and 64% of those with heavy proteinuria. Diabetic nephropathy, especially when the serum creatinine is raised, carries a significant risk of birth before 32 weeks' gestation, very low birth weight, and neonatal hypoglycemia. The increased rate of pre-term births may well explain the mild disturbances in growth and development in early childhood seen in offspring of the pregnancies.

Neuropathy

There is limited information, on whether symptoms of sensorimotor or autonomic neuropathy worsen during pregnancy. The important thing during pregnancy is the association of autonomic neuropathy with an increased risk of severe hypoglycemia and the presence of gastroparesis that can be factor in hyperemesis gravidarum and a precipitant of ketoacidosis in women with T1DM. Woman who have already suffered neuropathic foot ulceration are generallly advised not to become pregnant.

Hypertensive disorder of pregnancy

HTN disorder of pregnancy are common in women with diabetes in all types and the combination of HTN with DM has greater impact.

T1D during pregnancy is more related to pre-eclampsia, while T2D with chronic hypertension. 40%-45% of pregnant women with pre-existing diabetes are more likely to have a hypertension. Calcium channel blockers, labetalol and methyldopa are safe in pregnancy as antihypertensive

The combination of HTN with DM has greater impact on adverse maternal and fetal outcomes than either alone. There is a wide range of HTN in pregnancy defines by severety, time of onset and associated features. The impact of pregnancy is greatest with early-onset pre-eclampsia and least with gestational HTN. Study in women with DM have been in those with T1DM in whom hypertensive disorders of pregnancy are reported to be 2-4 folds more prevalent in women without DM. The worst outcomes are seen with severe early-onset pre-eclampsia. Diabetes itself is more strongly associated with late-than early-onset pre-eclampsia. Finally the overall impact of htn disorder of pregnancy-on-pregnancy outcomes maybe less for women with T2D than those with T1D.

Conclusion

Recent studies indicating that with excellent control of glucose, blood pressure, lipids, and weight, pregnancy may not constitute a risk factor for long-term progression of diabetic microvascular complications and offer some promise for potential prevention intervention. However translation of research results for pregnant women with preexisting diabetes is likely to remain a challenge, particularly among women with severe complications of diabetes and among women who present late for antenatal care and/or who are noncompliant in their management of diabetes during pregnancy.

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