

Does treatment of gestational diabetes mellitus affect pregnancy outcome?

GLOSSARY

MACROSOMIA

A larger than normal newborn baby (i.e. 4 kg or larger); the condition can be associated with trauma during birth

SHOULDER DYSTOCIA

A complication of delivery that occurs when the baby's shoulder becomes lodged above the maternal symphysis pubis

SF-36

Medical Outcomes Study 36-Item Short-Form General Health Survey; assesses eight aspects of physical and mental health on a scale of 0 (worst) to 100 (best)

Original article Crowther CA *et al.* (2005) Effect of treatment of gestational diabetes mellitus on pregnancy outcomes. *N Engl J Med* 352: 2477–2486

SYNOPSIS

KEYWORDS gestational diabetes mellitus, perinatal complications, pregnancy outcome

BACKGROUND

Gestational diabetes mellitus (GDM; defined as diabetes mellitus first diagnosed during pregnancy) can cause perinatal complications, including MACROSOMIA and SHOULDER DYSTOCIA. GDM is also associated with long-term adverse effects for both mother and child. Although these risks are acknowledged, there is no consensus on the effectiveness of antenatal treatment programs.

OBJECTIVE

To determine whether treatment of GDM reduces perinatal complications.

DESIGN AND INTERVENTION

This study reports the findings of the Australian Carbohydrate Intolerance Study in Pregnant Women (ACHOIS). Between September 1993 and June 2003, pregnant women were recruited into this multicenter trial. Eligible women were between 16 and 30 weeks of gestation, and had a positive oral glucose challenge test or had one or more risk factors for GDM. Women with previously treated GDM, severe glucose impairment or chronic disease were excluded. GDM was diagnosed according to the WHO criteria following an oral glucose challenge test and participants randomized to either the intervention or routine-care (control) group. Intervention included dietary management, home glucose monitoring and insulin therapy. Insulin was available to women in the control group at the clinicians' discretion. All participants received standard antenatal care.

OUTCOME MEASURES

The primary infant outcome was a composite measure of serious perinatal complications,

defined as one of the following: death, shoulder dystocia, bone fracture and nerve palsy. Maternal health assessment was based on induction of labor, cesarean section and the SF-36 questionnaire.

RESULTS

The study comprised 490 women in the intervention group and 510 in the control group; overall, 93% had a positive glucose challenge test. The number of live births was 506 and 524 in the intervention and control groups, respectively. The incidence of serious perinatal complications was lower in the intervention group than the control group (1% versus 4%, $P=0.01$), although the rate of shoulder dystocia was similar. By contrast, neonatal unit admissions were higher in the intervention group than in the control group (71% versus 61%, $P=0.01$); however, there was no difference in the duration of stay or the number of infants requiring treatment for jaundice. Induced labor was more common in the intervention group than the control (39% versus 29%, $P<0.001$) but the need for cesarean section was similar. Intervention was associated with low mean birth rate and early gestational age. The incidence of macrosomia was reduced when compared with the control group (10% versus 21%, $P<0.001$). After adjustment for confounding variables, the observed differences between groups remained significant (perinatal complications, $P=0.04$; neonatal unit admissions $P=0.04$; induced labor $P=0.003$). Intervention was also associated with improved maternal health status, as assessed by the SF-36 questionnaire, and reduced postnatal depression.

CONCLUSION

Treatment of GDM reduces the rate of perinatal complications and improves maternal wellbeing.

COMMENTARY

Ellen W Seely

GDM is one of the most common medical complications of pregnancy. It is well recognized that women with GDM have an increased risk of fetal and neonatal macrosomia, which increases the likelihood of shoulder dystocia at delivery and resultant cesarean section. Additionally, macrosomia might be a long-term risk factor for childhood obesity and the metabolic syndrome.^{1,2} Despite recognizing the risks of GDM, studies demonstrating that intensive treatment (dietary therapy, glucose monitoring and insulin treatment) decreases perinatal complications have been lacking.^{3,4} If there were no benefits to be gained from treatment of GDM, then clearly screening and subsequent therapy would not be warranted.

Crowther *et al.* have analyzed pregnancy outcomes from the Australian ACHOIS trial to determine whether diagnosis and treatment of GDM decreases perinatal complications. The study demonstrated that, compared with routine care, treatment for GDM reduced perinatal complications, defined as a composite outcome which included fetal and neonatal death, shoulder dystocia, bone fracture, and nerve palsy. Not all outcomes were improved by treatment, however; the intervention group had greater rates of early induction of labor, and more of their infants were admitted to the neonatal nursery.

Several questions are important to consider in applying these findings to clinical practice. First, do we agree with the investigators' definition of perinatal complications? If admission to a neonatal intensive care unit were also considered a perinatal complication, then the observed benefit of treatment would have been attenuated. Second, could factors other than glycemic control explain the better outcomes of the intervention group? Specifically, might improved outcomes relate to earlier induction of delivery and/or enhanced pregnancy monitoring, owing to caregiver knowledge of the diagnosis? Delivery at an earlier gestational age could account for the decrease in the investigator-defined perinatal complications because these infants would be expected to be smaller as a result. In addition,

women given a diagnosis of, and treated for, GDM might have been followed more cautiously during pregnancy. Third, would similar benefits be seen in women diagnosed with GDM using different criteria? The protocols used to diagnose GDM differ worldwide. Fourth, will these results be replicated in other randomized studies? The National Institute of Child Health and Human Development has an ongoing randomized study whose goal is to enroll over 2,000 women with GDM and randomize them to dietary therapy, self-monitoring of blood glucose and insulin or to no specific treatment.⁵ In this study, adverse birth outcome is defined as stillbirth, birth trauma, and neonatal hypoglycemia, hyperinsulinemia and hyperbilirubinemia. Finally, if the benefit of screening and treatment is confirmed, the economic impact will need to be determined and addressed.

Until we have the answers to these questions, the study by Crowther *et al.* supports recommendations of the American College of Obstetricians and Gynecologists¹ and the American Diabetes Association² that women diagnosed with GDM should be treated with diet, blood glucose monitoring and insulin as needed. Ongoing⁵ and future studies should inform clinicians which specific interventions improve pregnancy outcomes for women with GDM.

References

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Competing interests

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PRACTICE POINT

Screening, diagnosis and treatment of GDM reduces perinatal complications (stillbirth, neonatal death, shoulder dystocia, bone fracture, nerve palsy) but increases induction of early delivery and neonatal unit admissions