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Northwestern University Twin Study X: Outcome of Twin Gestations Complicated by Gestational Diabetes Mellitus

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Abstract. Existing data concerning the effect of gestational diabetes on perinatal outcome in twin pregnancies is scant. We hypothesized that altered carbohydrate metabolism would worsen perinatal outcome in twin gestation in a manner similar to singleton gestation. Thirteen twin pregnancies complicated by gestational diabetes mellitus were matched by gestational age at delivery to 13 twin pregnancies unaffected by gestational diabetes. Comparing infants of diabetic mothers to infants of control mothers, there was a trend of greater likelihood of respiratory distress syndrome, hyperbilirubinemia, and prolonged neonatal intensive care nursery admissions. Our experience suggests that altered carbohydrate metabolism in multiple gestations increases the potential for neonatal morbidity.

Key words: Twins, Gestational diabetes, Prematurity

INTRODUCTION

Perinatal morbidity and mortality are well known to be increased in twin gestations. Gestational diabetes mellitus (GDM) is also known to be associated with adverse perinatal outcome [1,2], but there are few data regarding perinatal morbidity in pregnancy complicated by both multiple gestation and GDM. We hypothesize that twin pregnancies complicated by GDM would have an increased risk of adverse perinatal outcome compared to twin pregnancies in which the mother had a normal carbohydrate tolerance [4].

MATERIALS AND METHODS

Between 1983 to 1988, 13 twin pregnancies ranging from 32-38 weeks' gestation at time of delivery and complicated by GDM were identified from the perinatal data base at Prentice Women's Hospital and Maternity Center of Northwestern Memorial Hospital. Each patient was then matched to the next patient with a twin pregnancy unaffected by GDM delivered at the same gestational age. Diagnosis of GDM was made by means of the 100 g, 3-hour oral glucose tolerance test (OGTT) as described by O'Sullivan and Mahan [5] (Table 1). GDM was diagnosed whenever 2 or more values were elevated. GDM was ruled out in control patients by either a 50 g, 1-hour plasma glucose <140/mg/dl or by 4 normal values on a 3-hour OGTT. Maternal demographic characteristics, pregnancy risk factors, and complications were examined in each group. Neonatal outcome variables included admissions to the neonatal intensive care unit lasting longer than 24 hours, respiratory distress syndrome requiring mechanical ventilation, hyperbilirubinaemia requiring either transfusion or phototherapy, and hypoglycemia (plasma glucose <30 mg/dl).

Table 1 - Diagnosis of gestational diabetes by 100 g oral glucose tolerance test

	Plasma mg/dl	Plasma mM/l
Fasting	105	5.8
1 hour	190	10.6
2 hour	165	9.2
3 hour	145	8.1

RESULTS

Maternal demographic characteristics and pregnancy risk factors are shown in Table 2. Maternal complications occurred both in the antepartum and postpartum periods (Table 3). Maternal complications occurred in both control and diabetic patients. Delivery route was similar in diabetic and nondiabetic mothes (Table 4). Indications for operative delivery included abnormal lie, fetal distress, failure to progress, and previous cesarean section. All maternal infectious morbidity occurred in mothers delivered by cesarean section.

Neonatal outcome was examined with respect to several variables (Table 5). In all categories examined there was a consistent trend toward increased morbidity in the infants of diabetic mothers. One fetal death occurred in a diabetic patient with chronic hypertension. In total, there were 27 morbid events in 14 of 25 liveborn infants of diabetic mothers vs 8 events in 7 of 26 control infants.

Table 2 - Maternal characteristics

	Diabetic (N = 13)	Control (N = 13)
Age	29.3	31.4
No. of nulliparae	8	5
Chronic hypertension	2	1
Asthma	1	1
Drug abuse	0	1
Previous C/S	0	2
Weeks at delivery (range)	36 (32–38)	36 (32–38)

Table 3 - Maternal complications

	Diabetic (N = 13)	Control (N = 13)
Antepartum		
Preeclampsia	2	1
Abruption	0	1
Postpartum		
Endometritis	2	1
Wound infection	1	1

Table 4 - Mode of delivery

	Diabetic (N = 13)	Control (N = 13)
Vaginal	6	7
Cesarean	7	6
Abnormal lie	3	4
Fetal distress	2	4
Failure to progress	1	0
Repeat	0	2

Table 5 - Neonatal morbidity

	Diabetic (N=25)	Control (N=26)
Respiratory distress syndrome	5	1
Hyperbilirubinemia	4	1
Hypoglycemia	6	2
Apgar 5 < 7	2	0
Umbilical artery pH < 7.10	2	0
Special care nursery > 24 hours	8	4
Total morbid events	27	8
No. of neonates with morbidity	14	7

DISCUSSION

Twin pregnancies contribute disproportionately to perinatal morbidity and mortality. Although prematurity labor is the most frequent and significant complication of twin pregnancy [3], attention is now being directed toward the impact of other pregnancy complications on twin gestations. There are few data on whether or not GDM is increased in twin pregnancies, and very little has been written concerning its impact on the twin pregnancy when it does occur.

In this study, maternal morbidity occurred in both the diabetic and control patients and was most heavily contributed to by our cesarean section rate of 50% in this study. In contrast, there was a trend of greater neonatal morbidity in the offspring of diabetic mothers both in terms of frequency of occurrence and in the number of infants suffering any morbidity. The increased neonatal morbidity could not be explained on the basis of gestational age which was controlled for in the inclusion criteria or by differences in average birth weight or distribution of low birth weight infants (Table 6).

Table 6 - Birth weight and birth weight distribution (in g)

	Diabetic (N=25)	Control (N=26)	
Mean birth weight	3555 ± 587	3460 ± 495	(p > 0.50)
No. of infants of birth weight			
1500–1999	2	2	
2000–2499	8	8	
> 2500	15	16	

The neonatal morbidities of gestational diabetes are similar to those adverse outcomes most often encountered with prematurity [2]. It has been suggested that premature organ systems are most sensitive to the abnormal metabolic milieu of a diabetic pregnancy [1]. This would be of great concern considering the high rate of preterm birth in twin pregnancies. Because our results suggest excess morbidity in twin gestation complicated by GDM, we recommend that multiple pregnancies deserve special attention toward the detection and treatment of gestational diabetes.

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