OBSTETRICS

Mode of delivery of twin gestation with very low birthweight: is vaginal delivery safe?

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OBJECTIVE: The purpose of this study was to determine whether planned vaginal delivery is associated with increased risk of perinatal death and morbidity in twin pregnancies that are complicated by a very low birthweight of the second twin.

STUDY DESIGN: We conducted a retrospective cohort study of twin pregnancies in which the second twin's birthweight was ≤1500 g. One hundred ninety-three twin gestations met the study criteria; patients were classified into 2 groups according to the planned mode of delivery: (1) cesarean delivery (n = 142) and (2) vaginal delivery (n = 51). In the vaginal delivery group, 21 pairs were in cephalic-cephalic presentation at the time of delivery; 28 pairs were cephalic-noncephalic, and 2 pairs were noncephalic-noncephalic. *Composite adverse neonatal outcome* was defined as the presence of neonatal death, respiratory distress syndrome, sepsis, necrotizing enterocolitis, or intraventricular hemorrhage grade 3-4.

RESULTS: Trial of vaginal delivery was successful for both twins in 90.5% of cephalic-cephalic twins and 96.4% in cephalic-noncephalic twins. The rate of intraventricular hemorrhage was significantly higher in the vaginal delivery group (29.4% vs 8.5%, respectively; $P = .013$; adjusted odds ratio [OR], 3.65; 95% confidence interval [CI], 1.32–10.1). The increased risk of intraventricular hemorrhage in the vaginal delivery groups was evident in both twin A (17.6% vs 7.0%; $P = .029$) and twin B (15.7% vs 4.9%; $P = .014$); however, these differences were not significant after adjustment for possible confounders (twin A: adjusted OR, 1.79; 95% CI, 0.58–5.55; twin B: adjusted OR, 2.13; 95% CI, 0.63–7.25). In addition, subgroup analysis revealed that both cephalic-cephalic and cephalic-noncephalic twins who were delivered vaginally had increased risk for intraventricular hemorrhage. There were no significant differences between the cesarean and vaginal delivery groups in the rates of Apgar score <7 at 5 minutes, arterial cord pH <7.1, composite adverse neonatal outcome, and neonatal mortality rate. However, the rate of respiratory distress syndrome was significantly lower in the vaginal delivery group (66.7% vs 69%; $P = .042$; OR, 0.34; 95% CI, 0.12–0.96).

CONCLUSION: Vaginal delivery of very low birthweight twins is associated with an increased risk of intraventricular hemorrhage, regardless of presentation. Because of the small sample size and the retrospective cohort design, large prospective randomized studies are needed.

Key words: intraventricular hemorrhage, mode of delivery, twin delivery, very low birthweight

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The rate of twin gestations has increased over the last 30 years, mainly because of the growing rate of pregnancies that have been achieved via assisted reproductive techniques.[1-4] The rise in twin pregnancies accompanied by the higher risk of premature delivery, which characterizes such pregnancies, have led to a significant increase in the rate of delivery of very low birthweight (VLBW; <1500 g) twins.[5,6]

The optimal method of delivery of twins is controversial; several studies have addressed this question. Although some retrospective population-based studies have reported that vaginal deliveries are associated with increased fetal risk, mainly for the second twin,[7-13] other cohort studies,[14-19] 2 metaanalyses[20,21] and a small prospective randomized study[22] have shown no difference in perinatal outcome between planned vaginal and planned cesarean deliveries. Barrett et al[23] recently have reported on a large prospective randomized controlled trial, in which a total of 2804 twin pregnancies between 32 and 39 weeks gestation were assigned randomly to planned vaginal or planned cesarean delivery. In this study, planned vaginal delivery did not increase risk for neonatal morbidity or death.

However, the data in the literature on the optimal mode of delivery for severe premature or VLBW twins are limited. Despite the limited information available,

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some authors have advocated for cesarean deliveries in cases of a second twin in a nonvertex presentation and with an estimated weight of <1500-2000 g.[24,25] This view largely relies on extrapolation of data from breech deliveries of singleton gestation.[26,27]

Other investigators have shown adverse outcome in VLBW twins who undergo vaginal deliveries and proposed that cesarean delivery is the optimal route of delivery for all twins who are expected to have a birthweight <1500 g, regardless of presentation.[28]

Decisions regarding mode of delivery in VLBW twins are based on very limited data. This is especially true for pregnancies with a VLBW second twin in a nonvertex presentation. Therefore, we aimed to evaluate the association between the mode of delivery and perinatal morbidity and death in twin pregnancies that are complicated by VLBW of the second twin.

Methods

All twin deliveries in a single tertiary care medical center from August 2004 to April 2011 were reviewed. Inclusion criteria included (1) twin gestation and (2) second twin birthweight of ≤1500 g. Exclusion criteria included (1) gestational age at delivery of <24 weeks, (2) fetal death of 1 or both twins before labor, and (3) major malformation diagnosed in 1 or both twins.

The standard of care in our medical center regarding twin delivery is to allow vaginal delivery of cephalic-cephalic and cephalic-noncephalic twins, regardless of their estimated weight or the gestational age, as long as the estimated weight of twin B is not significantly higher (≥20%) than twin A. The delivery is supervised by an experienced obstetrician under continuous fetal monitoring, and the preferred method for delivering the noncephalic second twin is total breech extraction with or without internal podalic version.

A total of 193 twin gestations met the study criteria. Patients were classified into 2 groups according to the planned mode of delivery: cesarean delivery (n = 142) and vaginal delivery (n = 51). In the vaginal delivery group, 21 pairs were cephalic-cephalic; 28 pairs were cephalic-noncephalic, and 2 pairs were noncephalic-noncephalic. The charts of all women and their infants were reviewed for the variables of interest. Maternal characteristics and their pregnancy outcomes were abstracted from the obstetric electronic charts. The following neonatal outcomes were examined: Apgar scores at 5 minutes, cord blood PH, death, birth trauma (spinal cord injury, skull fracture, fracture of a long bone, peripheral nerve injury, and subdural or intracerebral hemorrhage), respiratory distress syndrome (RDS), sepsis, necrotizing enterocolitis (NEC), and intraventricular hemorrhages (IVH). *Composite adverse neonatal outcome* was defined as the presence of neonatal death, RDS, sepsis, NEC, or IVH grade 3-4.

Because decisions regarding the planned mode of delivery are made per pregnancy for both twins, we chose to analyze our data as outcomes per pregnancy. *Outcome measures* were defined as outcomes for twin A, twin B, or any twin. Comparison of continuous variables between the 2 groups was conducted using Mann-Whitney *U* test or the Student *t* test, as appropriate. Chi-square test was used for comparison of categoric variables. Logistic regression analysis was used to examine the relationship between mode of delivery and neonatal outcome measures. Adjustment was conducted for gestational age at delivery, chorionicity, and antenatal steroid treatment because these factors have been shown to be associated significantly with perinatal death and neonatal morbidity and thus may have a confounding potential.[29,30] The regression model was limited to 4 variables to account for the small sample size.[31] However, we also used an alternate regression model that adjusted for maternal age, parity, and birthweight in addition to gestational age at delivery, chorionicity, and antenatal steroid treatment. This model was not used in subgroup analysis according to presentation because the subgroups were significantly smaller. Significance was accepted at a probability value of < .05. Statistical analyses were conducted with the IBM Statistical Package for the Social Sciences (IBM SPSS version 19; IBM Corporation Inc, Armonk, NY).

The study was approved by the local institutional review board.

Results

A total of 193 twin deliveries that were complicated with VLBW of the second twin were identified during the study period. Of them, 142 delivered by cesarean section without trial of vaginal delivery, and 51 underwent trial of delivery. The vaginal delivery group included 2 cases of noncephalic-noncephalic twin pregnancies that attempted vaginal delivery despite our consultation to have a cesarean delivery. The main indications for cesarean delivery were a noncephalic first twin (35.3%), intrauterine growth restriction (17.6%), maternal request (12.5%), suspected fetal distress (11%), and previous cesarean delivery (5.9%). Demographic and clinical characteristics of the patients are presented in Table 1. The groups did not differ with regards to maternal age, parity, body mass index, rate of gestational diabetes mellitus, male/female ratio, and rate of exposure to antenatal steroids. However, the median gestational age at delivery was 31.4 weeks in the cesarean delivery group compared with 30.4 weeks of gestation in the vaginal delivery group ($P = .025$). Despite the significant difference in gestational age at delivery, median birthweights of both twins were not significantly different between the 2 groups (twin A: cesarean delivery 1417.5 g vs vaginal delivery: 1335 g; $P = .183$; twin B: 1258 vs 1195 g; $P = .654$). The rate of monochorionic twins was significantly higher in the cesarean delivery group compared with the vaginal delivery group (33.8% vs 11.8%; $P = .034$). The monochorionic pregnancies in the cesarean group included 4 cases of monoamniotic pregnancies. The higher rate of monochorionic pregnancies was adjusted for in our regression model.

In 8 cases in the vaginal delivery group, labor was induced because of intrauterine growth restriction. Outcome in induced twin pregnancies was generally favorable (no cases of RDS, IVH, or death; 1 neonate with NEC), most likely because of the relatively