

## Prediction of safe and successful vaginal twin birth

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**OBJECTIVE:** The objective of the study was to establish predictors of vaginal twin birth and evaluate perinatal morbidity according to mode of delivery.

**STUDY DESIGN:** One thousand twenty-eight twin pregnancies were prospectively recruited. For this prespecified secondary analysis, obstetric characteristics and a composite of adverse perinatal outcome were compared according to the success or failure of a trial of labor and further compared with those undergoing elective cesarean delivery. Perinatal outcomes were adjusted for chorionicity and gestational age using a linear model for continuous data and logistic regression for binary data.

**RESULTS:** Nine hundred seventy-one twin pregnancies met the criteria for inclusion. A trial of labor was considered for 441 (45%) and was successful in 338 of 441 (77%). The cesarean delivery rate for the second twin was 4% (14 of 351). Multiparity and spontaneous conception predicted vaginal birth. No statistically significant differences in perinatal morbidity were observed.

**CONCLUSION:** A high prospect of successful and safe vaginal delivery can be achieved with trial of twin labor.

**Key words:** cesarean, labor, twin gestation

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With advanced reproductive technologies, twin pregnancy rates have steadily increased over the past decade, such that they currently account for approximately 3% of all deliveries in the United States.<sup>1</sup> This trend is inevitably accompanied by an increased perinatal morbidity and mortality burden. Although much of the disproportionate morbidity observed in multiple gestations (eg, congenital anomalies, preterm delivery) is not amenable to preventive therapy, careful selection of the optimal mode of delivery may represent one facet of twin pregnancy management in which decision making may potentially offer risk reduction.

However, the optimal mode of delivery for twins remains a contentious issue.

Neonatal outcomes following vaginal birth of twins vs cesarean delivery have been the subject of several retrospective series<sup>2-6</sup> and metaanalyses<sup>7,8</sup> as well as one small randomized trial.<sup>9</sup>

The aforementioned studies did not provide evidence to support cesarean in favor of vaginal delivery, yet large population-based studies have demonstrated an increased risk for neonatal morbidity and mortality of the second twin undergoing vaginal delivery.<sup>10-15</sup> In light of these conflicting data gleaned from retrospective series, the optimal mode of delivery for twins is currently the subject of an ongoing randomized trial.<sup>16</sup>

The objective of this study was to prospectively determine the factors that favor a successful trial of labor in twin

pregnancies to include evaluation of neonatal morbidity according to mode of twin delivery.

### MATERIALS AND METHODS

A consecutive cohort of 1028 unselected twin pregnancies was enrolled for the ESPriT study (Evaluation of Sonographic Predictors of Restricted growth in Twins), a multicenter prospective study conducted at 8 academic perinatal centers in Ireland, all with tertiary neonatal intensive care facilities, from March 2007 to June 2009. Institutional review board approval was obtained at each participating site, and the study participants gave written informed consent. For this prespecified secondary analysis, inclusion criteria were all twin pregnancies presenting to the study centers between 11 and 22 completed weeks' gestation, with both fetuses alive at the time of prelabor cesarean delivery or onset of labor. Monoamnicity, a major structural abnormality in either twin or fetal aneuploidy (either suspected or confirmed) led to exclusion from the study.

All prenatal and ultrasound data were contemporaneously transferred to an ultrasound software system (Viewpoint; MDI Viewpoint, Jacksonville, FL) and uploaded onto a live web-based central consolidated database. Pediatric outcomes for all twins not requiring neonatal intensive care were recorded by the research

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sonographer and uploaded onto the consolidated database. Infants requiring neonatal intensive care admission had their outcomes recorded by neonatology medical or nursing staff.

Management decisions relating to timing and mode of delivery were at the discretion of the lead clinician managing each twin case. Across all 8 centers, the intrapartum management protocol for twin birth included the routine use of regional anesthesia, continuous intrapartum fetal heart rate monitoring, and immediate access to the operating suite for emergency cesarean delivery, and all obstetricians in this system were trained in operative vaginal delivery, breech extraction, and internal podalic version. Tertiary-level neonatal care facilities were available in all 8 sites.

Maternal and obstetric characteristics were compared according to planned mode of delivery (elective cesarean section, emergency prelabor cesarean, or trial of labor) and further analyzed according to the success or failure of a trial of labor. Cesarean section was considered elective if cesarean delivery was chosen in the absence of any evidence of maternal or fetal compromise. This group included planned cesarean deliveries that ultimately were performed in early labor. Indications for emergency prelabor cesarean delivery were antepartum hemorrhage, nonreassuring fetal testing, and preeclampsia. Intrapartum cesarean delivery applied only in instances in which patients embarked on a trial of labor that did not succeed.

Neonatal intensive care unit or special care baby unit admission was recorded as indicators of neonatal morbidity. In addition, a composite measure of adverse perinatal outcome was analyzed according to mode of delivery. This measure included either perinatal mortality or any of the following: hypoxic ischemic encephalopathy (HIE), periventricular leukomalacia (PVL), necrotizing enterocolitis (NEC), respiratory distress, or sepsis.

A diagnosis of hypoxic ischemic encephalopathy was recorded in the setting of all of the following criteria: profound umbilical arterial acidemia (pH <7), persistence of an Apgar score of 3 or less for longer than 5 minutes, neonatal neurologic se-

quelae, and multiple organ involvement. Periventricular leukomalacia was diagnosed by neonatal ultrasound and subsequent magnetic resonance imaging.

A diagnosis of respiratory distress was considered for any infant requiring invasive or noninvasive respiratory support and was supported by radiographic criteria in which available and length of oxygen-dependence was recorded. A diagnosis of neonatal sepsis was determined with the support of positive microbiological cultures.

### STATISTICAL ANALYSIS

For a study with a sample size of 441 and assuming a morbidity risk of 15% in those with a successful vaginal delivery, the study was sufficiently powered (80%) to detect a 2-fold increase in the risk of morbidity in those without a successful vaginal delivery. The study was underpowered to detect any smaller changes in risk.

The association between maternal or obstetric characteristics and mode of delivery as an outcome were made using the  $\chi^2$  test for categorical variables and the Wilcoxon rank sum test for continuous variables.

Outcomes were also adjusted for chorionicity and gestational age using a general linear model based on ranks for continuous data and a logistic regression for binary data. If a particular mode of delivery group had very few numbers, this was excluded from the model analyses but nevertheless summarized.

### RESULTS

A total of 1028 unselected patients were prospectively recruited and 1001 patients delivered in a participating center. The remaining 27 recruited patients did not complete the study because of transfer of obstetric care to a nonparticipating center or research staff shortage leading to inability to complete the sonographic surveillance protocol.

Spontaneous fetal loss or intrauterine fetal demise of 1 or both twins was observed in 30 study participants (3%), who were therefore excluded from this analysis. Delivery outcome data were available for all 971 of the remaining patients, in whom both twins were alive at

the onset of labor or at the time of prelabor cesarean section.

The proportion of twins that was designated as monochorionic and dichorionic by standard sonographic criteria was 19% (186 of 971) and 81% (785 of 971), respectively, whereas chorionicity was reassigned according to placental pathology examination in 17 of 971 cases (1.7%) such that the study comprised 181 monochorionic and 790 dichorionic twin pairs.

Mode of delivery for the study cohort is depicted in the Figure. Cesarean delivery was planned (elective) for 430 of 971 (44%) of subjects and 95 of 430 (22%) of whom were in early labor at the time of their delivery. An additional 100 of 971 (10%) underwent cesarean delivery as an emergency procedure prelabor at varying gestational ages from 23 to 38 weeks. A trial of labor was therefore deemed not appropriate for 55% (530 of 971) of this twin cohort.

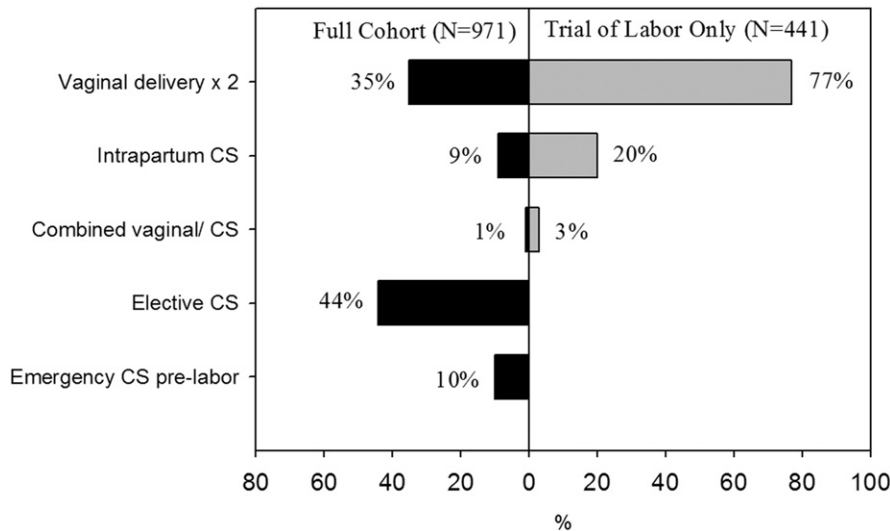
The maternal and perinatal characteristics of women according to perceived suitability for a trial of labor are depicted in Table 1. Multiparous women, younger women, those with a spontaneous conception without prior cesarean delivery, normotensive women, and pregnancies in which the nonpresenting twin had a vertex presentation were all more likely to be considered for a trial of labor.

Nulliparous women or those with hypertension had twice the rate of emergency prelabor cesarean delivery than their multiparous or normotensive counterparts.

Women who underwent assisted conception or had a prior cesarean delivery or nonvertex presentation of the second twin were more likely to undergo planned (elective) cesarean delivery.

All degrees of intratwin birth weight discordance greater than 10% were more commonly delivered by planned or emergency prelabor cesarean section. In cases in which intratwin size discordance was cited as a factor that led to exclusion from consideration for a trial of labor, the mean birthweight discordance was 23.4% (range, 5–52%) and 27% (range, 6–48%), respectively. The reliability of prenatal ultrasound for the prediction of this degree of birthweight discordance

**FIGURE**  
**Mode of delivery in total ESPRiT cohort (n = 971 pregnancies)**



*Double asterisks* indicate that both twins were alive at time of onset of labor or prelabor cesarean. *Asterisk* indicates that elective cesarean section refers to planned prelabor cesarean delivery in the absence of identified maternal or fetal compromise.

CS, cesarean section; ESPRiT, Evaluation of Sonographic Predictors of Restricted growth in Twins.

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and the significance of varying degrees of discordance for predicting perinatal morbidity are the subject of the primary analyses of ESPRiT.

A trial of labor was considered for 441 twin pregnancies and was successful in 338 (77%). Vaginal breech extraction was required for the second twin in 97 of 338 (29%) of this group. There were no cases of head entrapment. Among the 97 vaginal breech extractions, 56 of 97 (58%) were noted to have a vertex presentation of the second twin on prelabor ultrasound (performed within 2 weeks of delivery).

Maternal and obstetric characteristics were further compared among those patients who had a successful trial of labor versus those who underwent intrapartum cesarean delivery (Table 2). Multiparity and spontaneous conception were identified as the only maternal or obstetric characteristics that predicted a successful trial of labor. Specifically, a successful trial of labor did not correlate with advancing gestational age, with vertex presentation of the second twin, nor with concordant size, even in instances in which the second twin was more than 20% larger than the presenting twin.

Indications for intrapartum cesarean delivery were contemporaneously recorded. Fetal heart rate abnormalities (44%) or delayed progress in the first stage of labor (46%) accounted for 90% of intrapartum cesarean twin deliveries. Delayed progress in the first stage of labor included cases deemed failed induction.

In instances in which the leading twin delivered by the vaginal route, cesarean section was required for the second twin in 14 of 351 subjects (4%). A gestational age in excess of 36 weeks had been attained in 11 of 14 (79%) of these subjects, and 10 of 14 (71%) cited malpresentation of the second twin (transverse/shoulder/brow or compound presentation) as the indication for combined vaginal/cesarean delivery. Fifty percent of combined vaginal/cesarean deliveries were noted to have a vertex-vertex presentation on prelabor ultrasound.

There was one case of intrapartum fetal demise, at 23 weeks' gestation: Owing to ruptured membranes and a compound presentation of the presenting twin, an intrapartum classical cesarean delivery was performed. One twin was stillborn (birthweight 680 g), whereas

the cotwin (652 g) survived to discharge from hospital.

Perinatal outcomes according to mode of delivery are depicted in Table 3 and are adjusted for chorionicity and gestational age at delivery. A small decrease in birthweight (median difference of approximately 100 g) was noted among infants who successfully delivered by the vaginal route, and although admission rates to the neonatal intensive care unit, at 37-43%, were high across all modes of delivery, serious perinatal morbidity rates were low, and no statistically significant differences were observed among infants who succeeded or failed in delivering by the vaginal route.

Following adjustment for gestational age and chorionicity, there remained a trend toward increased respiratory morbidity among infants delivered by elective cesarean section, but this difference did not reach statistical significance. Furthermore, the nonpresenting twin had the same rate of adverse perinatal outcome when compared with the presenting twin, when both shared the same mode of delivery. The subgroup of 14 infants who were delivered by emergency cesarean section following vaginal delivery of the presenting twin had a notable (29%) perinatal morbidity rate, but the numbers in this group were insufficient for inclusion in the statistical analysis.

## COMMENT

In considering the safest approach to delivering twin pregnancies, appropriate counseling of patients mandates that accurate data are at hand to assist in identifying the pertinent predictors of successful and safe vaginal delivery. These contemporaneous data, obtained from 8 tertiary referral centers in 1 country, allow us to provide the most insightful and applicable data to assist in more accurately counseling patients.

Patients in this study were not randomized to a particular mode of delivery, yet the comparative characteristics of patient groups according to the decision to accommodate or exclude a trial of labor give considerable insight into principles and trends that guide contemporary obstetric practice.

TABLE 1

## Maternal and perinatal characteristics according to planned mode of delivery (n = 971)

Characteristic <sup>a</sup>	n	Elective cesarean delivery	Emergency prelabor CD	Trial of labor	P value <sup>b</sup>
Total	971	430 (44%)	100 (10%)	441 (45%)	NA
Maternal age (median y)	970	34.0	33.2	32.7	.0096
Parity					
≥1 births	495	220 (44%)	34 (7%)	241 (49%)	.0011
Nullipara	460	206 (45%)	63 (14%)	191 (42%)	
Ethnicity					
White	788	351 (45%)	82 (10%)	355 (45%)	.7330
Nonwhite	61	24 (39%)	7 (11%)	30 (49%)	
Conception					
Spontaneous	614	254 (41%)	62 (10%)	298 (49%)	.0021
Assisted	231	122 (53%)	28 (12%)	81 (35%)	
Previous CS					
Yes	88	69 (78%)	6 (7%)	13 (15%)	< .0001
No	883	361 (41%)	94 (11%)	428 (48%)	
Chorionicity					
Monochorionic	182	73 (40%)	27 (15%)	82 (45%)	.0700
Dichorionic	788	356 (45%)	73 (9%)	359 (46%)	
Hypertension/preeclampsia					
Yes	130	53 (41%)	28 (22%)	49 (38%)	< .0001
No	841	377 (45%)	72 (9%)	392 (47%)	
Gestational age at delivery (median wks)	971	37.0	34.4	37.1	< .0001
BW discordance <sup>c</sup>					
<10%	511	221 (43%)	38 (7%)	252 (49%)	—
≥10%	460	209 (45%)	62 (13%)	189 (41%)	.0020
≥20%	164	86 (52%)	30 (18%)	48 (29%)	< .0001
≥20% T1/T2	98	53 (54%)	20 (20%)	25 (26%)	< .0001
Presentation of second twin <sup>d</sup>					
Vertex	588	249 (42%)	51 (9%)	288 (49%)	.0098
Nonvertex	383	181 (47%)	49 (13%)	153 (40%)	

BW, birthweight; CD, cesarean delivery; CS, cesarean section; NA, not applicable.

<sup>a</sup> Unavailable data: parity (16), ethnicity (122), assisted conception (126); <sup>b</sup> The  $\chi^2$  test was used to determine associations between possible predisposing factors (categorical) and mode of delivery as an outcome. Continuous variables (maternal and gestational age) were compared using the Wilcoxon rank-sum test; <sup>c</sup> Birthweight discordance is defined as the absolute difference in weight of the lighter twin taken relative to the heavier twin. The discordance defined as  $\geq 20\%$  T1/T2 more specifically refers to a minimum 20% reduction in the weight of twin 1 as compared with twin 2; <sup>d</sup> Presentation of second twin refers to presentation identified on final, pre-delivery, ultrasound examination performed within 2 weeks of delivery.

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Those patients who were delivered by planned (elective) cesarean section were an older group, more likely to have had a prior cesarean delivery, and to have availed of assisted reproductive technology.

A trial of labor was considered for 441 twin pregnancies and was successful in 338 (77%). Vaginal breech extrac-

tion was required for the second twin in 98 of 338 of this group (29%). In selecting appropriate candidates for a trial of labor, maternal and perinatal characteristics can be interrogated as a means of identifying possible predictors of success or failure. The only characteristics that favored a successful trial of la-

bor were multiparity and spontaneous conception.

In instances in which a trial of labor failed, the most common reason was delayed progress in the first stage of labor (including those who were deemed failed inductions). Nonetheless, induction of labor per se did not prove to be a factor

TABLE 2

## Maternal and obstetric characteristics of patients undergoing a trial of labor (n = 441)

Characteristic <sup>a</sup>	n	Successful vaginal delivery of both twins	Intrapartum CS	Combined vaginal-CS	P value <sup>b</sup>
Total	441	337 (76%)	90 (20%)	14 (3%)	NA
Maternal age (median y)	441	32.9	32.5	31.6	.9551
Parity					
≥1 births	241	211 (88%)	20 (8%)	10 (4%)	< .0001
Nullipara	191	119 (62%)	68 (36%)	4 (2%)	
Ethnicity					
White	355	276 (78%)	66 (19%)	13 (4%)	.5291
Nonwhite	30	22 (73%)	7 (23%)	1 (4%)	
Conception					
Spontaneous	298	232 (78%)	54 (18%)	12 (4%)	.0147
Assisted	81	54 (67%)	25 (31%)	2 (2%)	
Previous CS					
Yes	13	9 (69%)	4 (31%)	0	.3842
No	428	328 (77%)	86 (20%)	14 (3%)	
Chorionicity					
Monochorionic	82	60 (73%)	21 (26%)	1 (1%)	.2346
Dichorionic	359	277 (77%)	69 (19%)	13 (4%)	
Onset of labor					
Spontaneous	195	153 (78%)	35 (18%)	7 (4%)	.2689
Induced	246	184 (75%)	55 (22%)	7 (3%)	
Hypertension/preeclampsia					
Yes	49	37 (76%)	11 (22%)	1 (2%)	.7402
No	392	300 (77%)	79 (20%)	13 (3%)	
Gestational age at delivery (median wks)	441	37.1	37.2	37.6	.1693
BW discordance <sup>c</sup>					
<10%	252	192 (76%)	53 (21%)	7 (3%)	—
≥10%	189	145 (77%)	37 (20%)	7 (4%)	.7441
≥20%	48	39 (81%)	8 (17%)	1 (2%)	.4699
≥20% T1/T2	25	20 (80%)	5 (20%)	0	.8523
Presentation of second twin <sup>d</sup>					
Vertex	288	219 (76%)	60 (21%)	9 (3%)	.7659
Nonvertex	153	118 (77%)	30 (20%)	5 (3%)	

BW, birthweight; CS, cesarean section; NA, not applicable.

<sup>a</sup> Missing data (unavailable information): parity (9 patients), ethnicity (56 patients), method of conception (62 patients); <sup>b</sup> The  $\chi^2$  test was used to determine associations between possible predisposing factors (categorical) and mode of delivery as an outcome. Continuous variables (maternal and gestational age) were compared using the Wilcoxon rank-sum test. Because of small numbers, the combined vaginal-CS group was excluded from the statistical comparisons; <sup>c</sup> Birthweight discordance is defined as the absolute difference in weight of the lighter twin taken relative to the heavier twin. The discordance defined as  $\geq 20\%$  T1/T2 more specifically refers to a minimum 20% reduction in the weight of twin 1 as compared with twin 2; <sup>d</sup> Presentation of second twin refers to presentation identified on final, predelivery, ultrasound examination performed within 2 weeks of delivery.

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that predicted failure to achieve a vaginal delivery.

Two key factors that are commonly considered in determining the optimal route

of delivery for a twin pair are intertwin size discordance and malpresentation of the second twin. Prior studies have indicated that significant weight discordance may

increase the prospect of intrapartum cesarean delivery,<sup>15,17</sup> a concern that persists even when the presenting twin is delivered by the vaginal route.

TABLE 3

## Perinatal outcome by mode of delivery (elective cesarean delivery and trial-of-labor group) (n = 1728)

Variable	Elective CS (n = 860)	Successful vaginal delivery of both twins (n = 674)	Intrapartum CS (n = 180)	Twin 2 in combined pair (n = 14)	Adjusted P value <sup>a,b</sup>
Gestation at delivery, median (IQR)	37.0 (35–38)	37 (35–37)	37 (36–38)	37 (35–38)	.0309
Birthweight, median	2530	2580	2670	2695	.0015
NICU admission, %	42	37	39	43	.1745
Mortality, n	0	4	1	0	.8676
IVH, n	6	13	3	0	.8565
HIE, n	0	1	0	0	.9578
PVL, n	1	0	1	0	.9950
NEC, n	2	4	1	1	.9337
RDS, n (%)	109 (12.7)	79 (11.7)	21 (11.7)	4 (28.6)	.8612
RDS requiring assisted ventilation, n (%)	90 (56)	55 (34)	13 (8)	2 (1)	.2465
Sepsis, n	39	35	6	1	.2159
Any of mortality/IVH/HIE/PVL/NEC/RDS/ sepsis, n (%)	116 (13)	95 (14)	25 (14)	4 (29)	.7515

No effect of birth order (twin 1 vs twin 2) was observed ( $P = .0763$  in the analysis of composite outcome).

CS, cesarean section; HIE, hypoxic ischemic encephalopathy; IVH, intraventricular hemorrhage; IQR, interquartile range; NEC, necrotizing enterocolitis; NICU, neonatal intensive care unit; PVL, periventricular leukomalacia; RDS, respiratory distress syndrome.

<sup>a</sup> Combined vaginal-CS group excluded due to small sample size; <sup>b</sup> Adjusted for chorionicity and gestational age at delivery.

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Although intertwin size discordance did not indicate an increased risk for failed trial of labor in this cohort, it is important to emphasize that some planned cesarean deliveries were performed specifically for this indication. Indeed, in the setting of any degree of birthweight discordance in excess of 10%, planned or emergency prelabor cesarean delivery were more likely. Therefore, although birthweight discordance did not emerge as a factor that mitigated against successful vaginal delivery, the relatively small numbers of significantly discordant pairs in the trial-of-labor cohort, 48 pairs with at least 20% intertwin birthweight discordance must be acknowledged.

Although many studies lend support to the practice of allowing vaginal delivery of vertex-vertex twins,<sup>2-9</sup> the optimal management of a twin pair in which the second twin is nonvertex is a more contentious issue, with some authors advocating elective cesarean delivery for such cases, whereas others adopt a polarized view that looks favorably on the second twin having a breech presentation, in-

stead adopting maneuvers to achieve this scenario if the vertex is high.<sup>5</sup>

Among cases of vaginal breech extraction, both twins were cephalic on prelabor ultrasound evaluation in 56 of 97 subjects (58%). Although it is standard practice in Ireland to confirm fetal presentation for twins at the onset of labor, the findings of these delivery room ultrasound assessments were not uniformly recorded on the study database. Nonetheless, a formal prelabor ultrasound was performed for all patients within the final 2 weeks of pregnancy and within the final 7 days for 92% of patients.

Arguably, the least desirable mode of delivery is a combination of vaginal delivery of 1 twin, with cesarean section required for the nonpresenting cotwin. Such deliveries are associated with increased perinatal morbidity for the second twin.<sup>18</sup> Even in situations in which perinatal outcome is not compromised, maternal morbidity is increased.<sup>18</sup>

Careful patient selection for vaginal delivery is aimed at avoiding this scenario, yet the factors that conspire against a successful trial of labor have not

been established in a prospective study. The rate of combined vaginal-cesarean deliveries, at 1% of the overall cohort, or 4% of those who successfully delivered the leading twin by the vaginal route, is lower than in other series.<sup>12,15,19</sup>

It is also noteworthy that half of combined vaginal-cesarean deliveries in this cohort were in the setting of vertex presentation of both twins in the prelabor sonographic evaluation. This observation indicates that the presentation of the second twin on prelabor evaluation within 2 weeks of the onset of labor bears little relationship to the fetal presentation following delivery of the presenting twin and calls into question the utility of prenatal counseling patients on anticipated success or failure of a trial of labor based on presentation of the second twin.

The prospectively recorded neonatal morbidity data from this cohort are at variance with evidence gleaned from some retrospective population-based studies that indicate an increased risk of serious perinatal morbidity for the nonpresenting twin<sup>10,15,20</sup> exposed to a trial

of labor. The experience of our study is likely a consequence of very low overall levels of mortality or serious perinatal morbidity.

Prior studies that demonstrated an excess of delivery-related perinatal deaths among second twins attributed the majority of such deaths to intrapartum anoxia in the second twin, yet in this overall cohort of 1730 infants, there were only 2 cases of hypoxic ischemic encephalopathy. In addition, overall perinatal mortality in the ESPRiT cohort, at 3.8 per 1000 among dichorionic twins and 30 per 1000 among monochorionic twins, was remarkably low in comparison with prior studies.<sup>21-23</sup>

The strength of this study is in its prospective nature, which resulted in elimination of selection/ascertainment bias, allowed for controlling for maternal factors, and recorded 100% delivery outcome data for recruited cases. The short time frame for recruitment (<2 years) minimized the prospect of changes in obstetric or neonatal practice, which can potentially influence the outcomes reported in large, retrospective, long-term population studies. An additional strength of this study lies in the accurate determination of chorionicity, a factor that is usually not reported in large population series.

In conclusion, until such time as a randomized trial indicates superior safety associated with 1 mode of twin delivery over another, the mode of delivery for twin gestation should be considered on the basis of individual case characteristics to include comorbidity, gestational age at delivery, availability of expertise in the management of vaginal twin birth, and patient preference. The data gleaned from this prospective series nonetheless

indicate that under appropriate conditions and with careful patient selection, vaginal twin birth can be associated with minimal neonatal morbidity and a high prospect of success. ■

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