Perinatal outcomes in twin pregnancies: Association with fetal presentation and mode of delivery

Resultados perinatales en gestaciones gemelares en relación a la presentación de ambos fetos y a la vía del parto

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Abstract:
Objective: To analyze perinatal outcomes in twin deliveries considering fetal presentation, delivery mode, and birth order.

Material and methods: We performed a retrospective observational study of 639 women with twin pregnancies yielding 1278 newborns. The mode of delivery was chosen according to the presentation of the first twin and the mother’s medical and obstetric history.

Results: The pregnancy was dichorionic-diamniotic in 82.6% of cases, monochorionic-diamniotic in 14.6% of cases, and monochorionic-monoamniotic in 0.6% of cases. The overall rate of cesarean delivery was 20.7%. Of the 1278 newborns, 0.2% were admitted to the Neonatal Intensive Care Unit (NICU). Presentation at delivery was cephalic in 70.7% of first twins and only 49.9% of second twins. The rate of cesarean delivery was 28.5% for first twins in cephalic presentation and 85.8% for first twins in breech presentation. Analysis of perinatal outcomes for the first and second twins revealed no differences in newborns’ weight, 5-minute Apgar score, arterial pH, rate of admission to the NICU, or perinatal mortality. Similarly, no differences were identified in perinatal outcomes according the presentation of both fetuses.

Conclusions: There was no evidence of poorer perinatal outcomes related to order of birth, fetal presentation, or mode of delivery. Therefore, attempting vaginal delivery in a twin pregnancy is a reasonable approach.

Resumen:
Objetivo: analizar los resultados perinatales en las gestaciones gemelares con respecto a su relación con la presentación y la vía del parto, atendiendo al orden de cada feto.

Material y métodos: se incluyeron 639 mujeres con embarazos gemelares, con un total de 1278 recién nacidos. El tipo de parto se eligió de acuerdo con la presentación del primer feto y el historial médico y obstétrico de la madre.

Resultados: el 82.6% fueron BC-BA, el 14.6% MC-BA y el 0.6% MC-MA. Hubo una tasa global de cesáreas del 20.7%. De los 1278 recién nacidos, el 0.2% fue ingresado en la Unidad de Cuidados Intensivos Neonatales. La presentación al nacer fue cefálica en el 70.7% de los primeros gemelos y solo el 49.9% de los segundos. La tasa de cesáreas fue del 28.5% para los primeros en presentación cefálica y del 85.8% en presentación de nalgas. En el análisis de los resultados perinatales no se encontraron diferencias en peso de los recién nacidos, puntuación de Apgar, pH arterial, tasa de ingreso al NICU o mortalidad perinatal.

Conclusiones: no hubo diferencias estadísticamente significativas en los resultados perinatales atendiendo al orden de cada feto, a su presentación y a la vía del parto; por tanto, el intento de parto vaginal en gemelares es una opción razonable.
INTRODUCTION

Twin pregnancy is a high-risk situation that is associated with a high incidence of maternal and fetal morbidity and mortality. Multiple pregnancy accounts for 10% of all cases of perinatal mortality. In fact, this risk is 10-fold greater than that of singleton pregnancies. Preterm labor—whether induced or spontaneous—is the determining factor and complicates more than 50% of multiple pregnancies. However, perinatal morbidity and mortality are increased even after excluding prematurity. Fabre y cols. (1) reported a relative risk of 3.54 (95% CI, 1.82-6.88) for a birth weight ≥2501 g.

Morbidity and mortality are greater for newborns from multiple pregnancies than for those from singleton pregnancies, mainly owing to the risks inherent to prematurity and low weight. First twins have a lower morbidity rate than second twins (3.0% vs 4.6%; OR, 0.53; 95% CI, 0.39-0.70) and a lower neonatal mortality rate (0.3 vs 0.6%; OR, 0.55; 95% CI, 0.38-0.91), irrespective of fetal presentation and mode of delivery in each case (2). Perinatal complications are mainly due to the anatomic and functional immaturity associated with preterm birth. Notwithstanding, if we compare newborns from singleton pregnancies with newborns from twin pregnancies, both with the same gestational age, we see that the prevalence of complications is higher in the latter. We know that perinatal outcomes are worse for second twins, probably because of their lower weight and/or abnormalities in presentation that often require active maneuvers for extraction. In addition, the risk that is inherent to the second twin is further complicated by the 25–30-minute prolongation of the interval after extraction of the first twin. However, a study published in the New England Journal of Medicine in 2013 found that perinatal outcome for the second twin is the same regardless of the mode of delivery (3).

There is some debate as to whether the mode of delivery plays a role in the poorer perinatal outcomes with respect to the product of conception and whether it contributes to increased maternal morbidity and mortality in the short and long terms (4). Therefore, the objective of the present study was to analyze perinatal outcomes in twin pregnancies in terms of fetal presentation, mode of delivery, and birth order.

MATERIAL AND METHODS

We performed a retrospective observational study between 2009 and 2013. The study included women with twin pregnancies registered on the computerized database of the Obstetrics and Gynecology Department.

We studied 639 women with twin pregnancies and 1278 newborns classified according to whether they were the first or second twin. The study variables were as follows: maternal age, maternal personal history, gynecologic-obstetric history, gestational age, chorionicity, gestational pathology, low-weight fetuses, type of onset of labor, intrapartum pathology, presentation, mode of delivery, need for instrumental delivery and cesarean delivery, weight of newborn, 5-minute Apgar score, destination of newborn, reason for admission of newborn, and neonatal mortality. Cases where 1 or both twins died before week 24 were excluded.

The women were seen according to standard departmental protocols. The mode of delivery depended on the presentation of the first twin and the personal and gynecologic-obstetric history of the mother. Conclusion of pregnancy was decided based on chorionicity and the Bishop score; therefore, monochorionic-monamniotic pregnancies (MC-MA) required elective cesarean delivery, whereas monochorionic/dichorionic-diamniotic pregnancies (MC-DA and DC-DA) ended at week 38 when the Bishop score was favorable (≥6) and at week 40 if the score was lower.

The presentation of both fetuses was confirmed at the time of labor; the presentation of the second fetus was confirmed again after the birth of the first fetus. Heart rate was continuously monitored for both fetuses during dilation and expulsion. When necessary for induction and labor, a continuous intravenous infusion of oxytocin was administered.

The statistical analysis was performed using SPSS Version 20.0. The 2 test was used, and statistical significance was set at 0.05 with a 95% confidence interval (CI). Comparisons were made based on the birth order, presentation of both fetuses, history of sterility, and chorionicity.

RESULTS

Two-thirds of the study population (66.2%) were aged between 20 and 35 years. More than half of the women (51%) were primiparous and 70.4% nulliparous. Of the 639 pregnancies, 317 were spontaneous (49.6%). In most cases, the birth was after week 37 (52.4%). Labor was spontaneous in 36.3% and induced in 37.1%, with a general cesarean delivery rate of 23.1%. Of the 1278 newborns, 0.2% were admitted to the Neonatal Intensive Care Unit (NICU), mainly because of prematurity and/or low birth weight. One intrapartum fetal death was recorded (first twin, breech delivery). We also recorded 15 prepartum fetal deaths, 9 early neonatal deaths, and 5 late neonatal deaths.

In 70.7% of cases, the presentation of the first twin was in cephalic presentation; however, this only occurred in 49.9% of second twins, with the difference being statistically significant. Thus, in the first twin, normal cephalic births were more common (38.5% vs 19.6%, p=0.00), as
were forceps deliveries (12.1% vs 5.8%, p=0.00). There were no differences in the rate of cesarean deliveries between the first and second twin. Similarly, when perinatal outcomes were analyzed in terms of birth order, no differences were recorded for birth weight, 5-minute Apgar score, arterial pH, frequency of admission to the NICU, or perinatal mortality.

The frequency of cesarean delivery in the first twin in cephalic presentation was 28.5%; the frequency was 85.8% for first twins in breech position. No statistically significant differences were found with respect to perinatal outcomes (birth weight, 5-minute Apgar score, arterial pH, frequency of admission to the NICU, and perinatal mortality) between the first twin in cephalic presentation and the second twin in breech position. Similarly, no significant differences in perinatal outcomes were found between the second twin in cephalic presentation and the second twin in noncephalic presentation.

In the study population, 50.4% of pregnancies were the result of assisted reproductive technologies (ART). The number of pregnancies achieved using ART was significantly higher in women aged >36 years. In addition, 87.3% of sterile women were nulliparous. The number of abortions did not differ between the groups, and there were no differences with respect to previous cesarean deliveries, diabetes mellitus, chronic arterial hypertension, or heart disease. In sterile women, 96% of twin pregnancies were DC-DA, only 2.2% were MC-DA, and there were no cases of MC-MA. As for spontaneous pregnancies, 69.1% were DC-DA, 27.1% were MC-DA, and 1.3% were MC-MA.

In pregnancies achieved using ART, there were no differences with respect to the development of illness during pregnancy or birth. The frequency of stimulation and induction was similar both in spontaneous pregnancies and in those achieved with ART. There were significant differences in the frequency of cesarean delivery. Thus, 25.8% of sterile women underwent elective cesarean without labor compared with 15.5% of nonsterile women. In those cases where vaginal delivery was attempted, 53.7% of pregnancies achieved with ART resulted in cesarean delivery compared with 38.8% of the spontaneous pregnancies.

In pregnant women with a history of sterility, there were no differences with respect to low birth weight for gestational age or intrauterine growth restriction. As for perinatal outcomes, 75.9% of the nonsterile women had a newborn whose weight was ≥ 2000 g and sterile women had double the number of newborns with weights between 800 g and 1500 g. No differences were detected with respect to the results of the 5-minute Apgar score or arterial pH. Consequently, admissions to the NICU were similar for both groups (0.2%), with no differences in reason for admission or perinatal mortality.

Of the 639 pregnancies, 82.6% were DC-DA, 14.6% MC-DA, and 0.6% MC-MA. In women older than 36 years, dichorionic pregnancies were more common than monochorionic pregnancies (35.8% vs 17.6%), probably as a result of the higher percentage of women undergoing ART. Most dichorionic pregnancies (72.9%) were in nulliparous women, and monochorionic pregnancies were more frequent in multiparous women; the difference was statistically significant. Preterm births were significantly more common in monochorionic pregnancies (58.8%) than in dichorionic pregnancies (45.1%). No differences were found with respect to personal history, although differences were detected for gestational pathology. Monochorionic pregnancies were characterized by a more frequent threat of preterm birth, intrahepatic cholestasis of pregnancy, gestational diabetes, intrauterine death of one of the twins (2.1% vs 0.6%), twinning-transfusion syndrome, oligohydramnios, and preeclampsia. The course was normal in 69.1% of the dichorionic pregnancies, although these were also characterized by more frequent gestational hypertension, differences between the weight of the twins, fetal malformations (the latter two were twice as frequent as in monochorionic pregnancies), and placenta previa. There were more cesarean deliveries among the dichorionic twins (47.6%) than among the monochorionic twins (39.7%). Cesarean deliveries in dichorionic twins were mainly elective without labor owing to the breech presentation, consistent with our departmental breech delivery protocol; therefore, elective cesarean delivery is indicated in pregnancies with a history of sterility and where the presentation of the first fetus is breech.

Analysis of perinatal outcomes reveals that newborns from monochorionic pregnancies more frequently weighed <2000 g than newborns from dichorionic pregnancies. This difference was statistically significant. The 5-minute Apgar score also revealed significant differences, in contrast with arterial pH. Therefore, a score of less than 7 was more frequent in monochorionic pregnancies. Similarly, admission to the NICU was more common in monochorionic pregnancies (0.5%) than in dichorionic pregnancies (0.1%); most admissions were due to prematurity. Lastly, perinatal mortality was more frequent in monochorionic pregnancies. The risk of prepartum fetal death was 4 times greater in monochorionic pregnancies. The early and late neonatal mortality rates were higher in monochorionic pregnancies. Only 1 case of intrapartum death was recorded (monochorionic pregnancy).

**DISCUSSION**

During the last few decades, the number of twin pregnancies has increased worldwide at the cost of dizygotic pregnancies, mainly because of the close association with a greater use of ART. The prevalence of monozygotic pregnancies, on the other hand, has remained stable during this period. Furthermore, the frequency of cesarean deli-
in recent years has grown exponentially, both in singleton and in twin pregnancies. The percentage of cesarean deliveries in multiple pregnancies has increased from 53% to 75% in the last 20 years (5). Consequently, clinical guidelines for twin births should be revised and improved by specialists in maternofetal health.

In our general population, the frequency of cesarean delivery was 13.7% in 2013, with twin pregnancies in 23.1% of cases. The frequency of cesarean delivery in singleton pregnancies with breech presentation between 2009 and 2013 was 65.9%; in twin births with the first twin in breech presentation, this figure was 85.8%, probably owing to the type of presentation and indication for elective cesarean in our protocol for attending breech births in women with a history of sterility.

A systematic review and meta-analysis (2) investigated perinatal outcomes for twins depending on birth order, presentation, and mode of delivery. No statistically significant differences were found between the first and second twin or for presentation of each or mode of delivery. Similarly, our study did not show differences in perinatal outcomes according to the presentation of the first and second twin and the mode of delivery.

As for the approach to the presentation of the second twin, the results of a prospective randomized trial of 1406 women who underwent elective cesarean delivery or vaginal delivery in multiple pregnancies with the first twin in cephalic presentation (3) clearly showed that vaginal delivery is a more reasonable approach in when the second twin is in noncephalic presentation. Elective cesarean delivery did not significantly modify the risk of fetal or neonatal death or severe neonatal morbidity compared with elective vaginal delivery (2.2% and 1.9%, respectively; p=0.49; OR, 1.16; 95%CI, 0.77-1.74). It was observed that even though the second twin was more likely to progress with severe neonatal morbidity than the first twin (OR, 1.90; 95%CI, 1.34-2.69), this was not associated with the type of presentation or mode of delivery. Of the 639 second twins in our study, 556 were in breech presentation, and no differences were found with respect to mode of delivery or perinatal outcomes compared with second twins in cephalic presentation.

In 2014, a multicenter study in the WHO Global Survey on Maternal and Perinatal Health (6) evaluated outcomes for second twins with noncesarean presentation. After vaginal delivery of the first twin in cephalic presentation, the second twin in noncesarean presentation was associated with a 5-minute Apgar score <7 but not with other poor perinatal outcomes. Furthermore, when vaginal delivery is chosen, the outcome is more successful (96-100%) when the second twin is born in breech presentation rather than after attempted intrapartum external cephalic version of the second twin (40-50%) (7); cesarean delivery with the second twin is more common if external cephalic version is attempted than if the fetus is extracted via breech delivery immediately after delivery of the first twin. In our study, 49.8% of the second twins in breech presentation were born via cesarean delivery (42.6% for second twins in cephalic presentation), although the differences were not significant in terms of perinatal outcome. Therefore, there is insufficient evidence to recommend cesarean delivery to patients with a second twin in noncephalic presentation; moreover, published data confirm that cesarean delivery is more dangerous for the mother and the newborn, since in both cases it increases neonatal respiratory morbidity and mortality, maternal morbidity and mortality, and length of hospital stay for both mother and newborn.

A systematic review and meta-analysis (8) of twin studies with the first twin in both breech and cephalic presentation concluded that elective cesarean delivery could reduce the risk of a low 5-minute Apgar score, especially when the first twin is in breech presentation. Even so, no significant differences were found with respect to perinatal and neonatal mortality or neonatal and maternal morbidity. A retrospective multicenter study published in the year 2000 in which twin perinatal outcomes with the first fetus in breech presentation were compared according to mode of delivery showed that a 5-minute Apgar score <7 and neonatal mortality were significantly more frequent in fetuses delivered vaginally with a weight <1500 g; above this weight, cesarean delivery was not seen to be more advantageous than vaginal delivery (9).

When our findings were analyzed based on a history of sterility, they only showed poorer perinatal outcomes with respect to birth weight. However, no significant differences between sterile and nonsterile women were observed for the remaining perinatal variables. Consistent with the literature, we did find that chronicity was associated with significant differences for weight, 5-minute Apgar score, admission to the NICU, and perinatal mortality. Therefore, outcome is better for newborns from dichorionic pregnancies than for those from monochorionic pregnancies.

CONCLUSIONS

We did not find significant differences in perinatal outcome between the first and second twin. There were no differences between the first twin in breech presentation and the first twin in cephalic presentation or between the second twin in cephalic presentation and the second twin in noncephalic presentation. Similarly, no differences were found for perinatal outcomes with respect to presentation of the twins or mode of delivery.

No statistically significant differences were found for perinatal outcomes with respect to birth order, presentation, or mode of delivery. Therefore, attempting vaginal delivery in twin births is a reasonable option regardless of the presentation of either twin depending on local policy on breech delivery, clinical opinion, and obstetric staff experience.
RECOMMENDED REFERENCES


2. Rossi AC, Mullin PM, Chmait RH. Neonatal outcomes of twins according to birth order, presentation and mode of delivery: A systematic review and meta-analysis. BJOG 2001;118:523.


