OBSTETRICS

Adverse outcomes in twin pregnancies complicated by early vaginal bleeding

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OBJECTIVE: We sought to estimate the risks of adverse pregnancy outcomes associated with early vaginal bleeding in twin pregnancies.

STUDY DESIGN: In a retrospective cohort study of consecutive twin pregnancies undergoing anatomic survey, we compared women who reported vaginal bleeding at <22 weeks to those who did not. Exclusion criteria included monoamniotic pregnancies, twin-to-twin transfusion syndrome, and placenta previa. Primary outcomes included preeclampsia, abruption, preterm premature rupture of membranes (PPROM), preterm birth <34 weeks, and intrauterine growth restriction.

RESULTS: Of 2106 pregnancies meeting inclusion criteria, 175 reported vaginal bleeding. Twin pregnancies with early vaginal bleeding had significantly higher risks of abruption, PPROM, and preterm birth compared to twin pregnancies without bleeding. The findings were similar when twin pairs were stratified by parity or maternal comorbidities.

CONCLUSION: Twin pregnancies complicated by vaginal bleeding in early pregnancy have an increased risk of abruption, PPROM, and preterm birth <34 weeks.

Key words: adverse pregnancy outcomes, multiples, vaginal bleeding

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Vaginal bleeding in the first and second trimester of pregnancy is common. Rates in singleton pregnancies are estimated to be as high as 14-27%.[1-6] Although early vaginal bleeding can be associated with spontaneous abortion, most pregnancies result in a live birth.[4] Ongoing pregnancies complicated by vaginal bleeding have an increased risk of adverse outcomes.[1,2,4,7,8] Recent studies in singletons with early vaginal bleeding have described increased risks of preterm premature rupture of membranes (PPROM), preterm birth, preeclampsia, and placental abruption.[1,2,4,7-9]

★ EDITORS' CHOICE ★

Published studies examining early vaginal bleeding and adverse pregnancy outcomes have excluded twin pregnancies.[2-4,7] This leaves clinicians to extrapolate data from singletons to counsel women carrying twin pregnancies who have experienced earlier vaginal bleeding.[2-4,7] Our study aimed to estimate the risk of adverse outcomes in ongoing twin pregnancies with reported bleeding in the first half of pregnancy and to further characterize at-risk groups by assessing whether parity and maternal comorbidities modify risk.

Materials and Methods

We performed a retrospective cohort study of all consecutive twin pregnancies at 17-22 weeks presenting to Washington University Medical Center to undergo routine sonographic anatomic survey from 1990 through 2008. The Washington University School of Medicine Human Research Protection Office approved the study prior to its initiation.

Dedicated research nurses collected the data prospectively. The data were primarily extracted from medical records, and then supplemented by the patient. Each patient was approached and consented at the time of the second-trimester anatomic survey and agreed to provide detailed information on a structured form regarding medical history and obstetrical history (including vaginal bleeding in the current pregnancy). Each patient was also given a form to be completed after delivery reflecting pregnancy outcomes including antenatal complications, delivery complications, and neonatal outcomes. If the form was not completed and received within 4 weeks of the expected date of delivery, a research coordinator called the patient to obtain the information. The majority of patients (92%) delivered at our institution; if the patient could not be reached and delivered at an outside facility, the coordinator contacted the referring physician to obtain outcome data. Only twin pregnancies with complete outcome information were included in this study.

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TABLE 1
Characteristics of women with twin pregnancies with vaginal bleeding compared to women without vaginal bleeding

Characteristics	Bleeding n = 175	No bleeding n = 1931	*P* value
Age, y	31.4 ± 5.4	30.9 ± 6.0	.33
Age ≥35 y	30.3	28.7	.66
Gravidity	2.6 ± 1.5	2.6 ± 1.6	.70
Nulliparity	28.6	27.4	.75
Chorionicity			.02
Monochorionic diamniotic	17.0	24.7	
Dichorionic	83.0	75.3	
Gestational age at delivery, wk	33.6 ± 4.0	34.7 ± 4.2	< .01
BMI, kg/m^2	25.8 ± 7.4	25.8 ± 6.8	.97
BMI, ≥30 kg/m^2	29.1	28.1	.77
African American	14.3	21.4	.03
Tobacco use	6.9	10.2	.16
Alcohol use	11.5	12.7	.65
Chronic hypertension	2.3	3.1	.57
Gestational diabetes	9.7	5.9	.04
Pregestational diabetes	1.7	1.1	.45
History of preterm delivery	7.4	6.3	.55
Any anomaly[a]	3.4	2.1	.24

Data are mean ± SD or percent unless otherwise specified.
BMI, body mass index.

[a] Any major congenital anomaly identified in either twin.

McPherson. Vaginal bleeding in twin pregnancies. Am J Obstet Gynecol 2013.

Study groups were defined by patient-reported vaginal bleeding any time during the pregnancy prior to the sonographic anatomic survey. Monoamniotic pregnancies, pregnancies affected by twin-to-twin transfusion syndrome,[10] presence of placenta previa defined as complete or partial previa,[11] singletons, and higher-order multiple gestations were excluded from the study. Women who underwent assisted reproductive therapies were included and were not evaluated separately. Gestational age was assigned based on the first day of a woman's last menstrual period. If the dating was not consistent with a first-trimester ultrasound or dating based on the anatomic survey (±7 days in the first trimester or ±10 days in the second trimester), the gestational age was reassigned.[11] The primary outcomes were preeclampsia defined by the American College of Obstetricians and Gynecologists,[12] placental abruption as diagnosed by the delivering physician at the time of delivery, PPROM,[13] preterm birth <34 weeks, and intrauterine growth restriction (IUGR) of any twin defined as birthweight ≤10th percentile for gestational age at delivery determined by the Alexander growth standard.[14] As part of the preplanned analysis, study groups were then stratified by known risk factors including parity (nulliparous vs multiparous) and presence of maternal comorbidities including chronic hypertension[15] and pregestational or gestational diabetes (defined as an abnormal 3-hour glucose tolerance test result using the National Diabetes Data Group cutoffs). Within strata risks were estimated. Finally, analyses of the primary outcomes stratified by chorionicity were performed.

Baseline characteristics of women with twin pregnancies complicated by vaginal bleeding <22 weeks and those without bleeding were compared using the Student *t* test or Mann-Whitney *U* test for continuous variables and the χ^2 or Fisher exact test for categorical variables as appropriate. Incidences of the primary outcomes were compared between study groups and the unadjusted relative risks with 95% confidence intervals (CIs) were estimated. Bivariable analyses were performed to identify potentially confounding factors. Logistic regression models were developed to estimate the independent risk of vaginal bleeding for each outcome adjusting for confounding factors that were identified historically and in the bivariable analyses. Backward stepwise selection was used to reduce the number of variables in the regression model by assessing the magnitude of change in the effect size of remaining covariates. Differences in the explanatory model were tested using the likelihood ratio test or Wald test.[16] Statistically significant variables were included in the final models and adjusted odds ratios (aOR) with 95% CI were obtained ($P < .05$ was considered significant). Analyses were repeated with stratification by parity and maternal comorbidities. Statistical analyses were performed using software (STATA 10.0, special edition; StataCorp, College Station, TX).

RESULTS

Of 2445 twin pregnancies, 2146 met study inclusion criteria. Of those, 2106 (98.1%) had complete outcome data available and were included in the final analysis. Of those included in the final analysis, 175 (8.3%) reported vaginal bleeding <22 weeks.

The 2 groups were similar on average in terms of age, gravidity, nulliparity, obesity (body mass index ≥30 kg/m^2), tobacco or alcohol use, having chronic hypertension or pregestational diabetes, having a history of preterm delivery, or having any major anomaly[11] diagnosed in the pregnancy. Women who reported vaginal bleeding were less likely to be of African American race and were more likely to have gestational diabetes (Table 1).

Women with twins who reported vaginal bleeding <22 weeks had increased risks of placental abruption (aOR, 7.21; 95% CI, 3.61–14.41), PPROM (aOR, 2.48; 95% CI, 1.68–3.68), and preterm