



Prediction of intrauterine death and severe preterm delivery in twin pregnancies discordant for major fetal abnormality



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ABSTRACT

Objective: To investigate predictors of spontaneous fetal death and preterm delivery in twin pregnancies with one fetus affected by a major structural malformation.

Study design: Retrospective study (1999–2012) conducted at a tertiary teaching hospital involving 51 twin pregnancies (dichorionic = 31, monozygotic diamniotic = 15, monozygotic monoamniotic = 4, not established = 1) with a major fetal abnormality, enrolled before 26 weeks and managed expectantly. Primary outcomes: spontaneous fetal death, and/or delivery before 32 weeks. Prediction was examined with stepwise logistic regression analysis, and independent variables included: maternal age, gestational age at diagnosis, chorionicity, fetal gender, number and type of fetal abnormalities. Significance level was set at 0.15.

Results: Fetal abnormalities were diagnosed at a mean gestation of 21.5 ± 3.7 weeks: cardiac abnormalities were observed in 31.4% of abnormal fetuses, abdominal wall defects in 29.4%, central nervous system 21.5%, spine 17.6%, effusions 17.6%, noncardiac thoracic abnormalities 15.7%, genitourinary and urinary system 13.7%, limbs and soft tissue 3.9%, intestinal 1.9% and facial defects 1.9%. Fetal death occurred in 15 (29.4%) abnormal fetuses and was significantly correlated with the number of fetal malformations ($p = 0.02$, OR = 2.54, 95% CI = 1.14–5.62), presence of effusion/hydrops ($p = 0.06$, OR = 4.7, 95% CI = 0.95–24) and monozygotic placenta ($p = 0.11$, OR = 2.8, 95% CI = 0.78–9.8). Normal co-twin fetal death occurred in four cases (7.8%) and was related to monozygotic pregnancies ($p = 0.14$, OR = 5.8, 95% CI = 0.56–61). Delivery before 32 weeks was observed in 14 (27.5%) pregnancies and was related to presence of effusion/hydrops ($p = 0.04$, OR = 5.5, 95% CI = 1.07–28).

Conclusion: Spontaneous fetal death and/or delivery before 32 weeks in twin pregnancies with one fetus affected by a major structural malformation are related to the number of abnormalities diagnosed and presence of fetal effusion or hydrops.

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Introduction

Twin pregnancies are at increased risk of several maternal and fetal complications, including congenital abnormalities. In dichorionic twins, the incidence of structural defects is almost 1.5 times greater than in singletons, and in monozygotic twins, 2.3 times. In most cases, abnormalities are found in only one of the fetuses and include cardiac, central nervous system, genitourinary, gastrointestinal and musculoskeletal defects [1].

Although perinatal mortality is clearly increased in such pregnancies [2], perinatal deaths related to congenital abnormalities have decreased during the last decades due to improved prenatal diagnosis, and subsequent selective feticide in some cases [3]. Nevertheless, about 20% of deaths are still related to congenital defects [4].

Perinatal outcome, however, is not only determined by the type of abnormality found in the affected fetus but there is also concern about the implications for the normal co-twin, especially in monozygotic pregnancies, where intrauterine death of one fetus is potentially hazardous for the other twin [5]. Moreover, some defects are often associated with polyhydramnios and increased risk of preterm labor. Nevertheless it is still debatable if preterm delivery and low birthweight are significantly increased in twin pregnancies with fetal abnormalities [6–9].

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¹ Study conducted in São Paulo, Brazil.

Table 1
Maternal characteristics and pregnancy information in 51 twin pregnancies with a major congenital anomaly in one fetus.

	Mean ± standard deviation/n (%)
Maternal age, years	30.0 ± 7.9
First pregnancy	18 (35.3)
Gestational age at diagnosis, weeks	21.5 ± 3.7
Chorionicity	
Monochorionic	19 (37.2)
Dichorionic	31 (60.8)
Not defined	1 (2.0)
Intrauterine death	
Abnormal fetus	15 (29.4)
Normal co twin	4 (7.8)
Gestational age at delivery, weeks	33.9 ± 3.8
Delivery <32 weeks	14 (27.5)
Delivery <34 weeks	24 (47.1)
Mode of delivery	
Vaginal	11 (21.6)
Cesarean	40 (78.4)
Birthweight (g)	
Affected twin	1849 ± 536
Normal co twin	2016 ± 674
Gender	
Female	48 (47.1)
Male	44 (43.1)
Unknown	10 (9.8)
Neonatal death	
Abnormal fetus	17 (33.3)
Normal co twin	4 (7.8)

The present study investigates predictors of intrauterine fetal death and severe preterm delivery in twin pregnancies with major fetal structural defects, in a tertiary center where selective feticide is not performed.

Materials and methods

This was a retrospective study involving twin pregnancies with major fetal structural defects seen at the Department of Obstetrics and Gynecology, São Paulo University Medical School Hospital, between January 1999 and September 2012. The study protocol was registered and approved by the Institutional Ethics Review Board (CAPPesq 0212/2010).

A computer database search was performed to identify all twin pregnancies with a major fetal abnormality diagnosed before 26 weeks of gestation. Cases in which both fetuses were affected or which presented with fetal death at the time of diagnosis, and conjoined or acardiac fetuses or twin-to-twin transfusion syndrome were excluded. Perinatal outcome and clinical data were retrieved from hospital notes and necropsy reports.

All ultrasound scans were performed by one of the senior members of the staff and confirmed after birth. Major defects were classified according to Marden et al. [10] and Grandjean et al. [11] into the following categories: central nervous system anomalies,

heart and great vessels, respiratory, digestive and urinary tract systems, musculoskeletal, effusion/hydrop and miscellaneous.

Pregnancy chorionicity was determined by ultrasound according to characteristic first trimester findings [12]. During the second trimester, dichorionic pregnancies were recognized by the 'lambda sign', presence of two separate placentas or discordant fetal gender. Chorionicity was also established by placental histological examination after birth in some cases.

Primary end-points were defined as spontaneous intrauterine fetal death (IUD) and delivery before 32 weeks' gestation (PTD). Stepwise logistic regression analysis was used to examine the association with: maternal age, pregnancy chorionicity, fetal gender, gestational age at diagnosis, number and type of abnormalities, and occurrence of spontaneous intrauterine death of one fetus. Statistical analysis was performed with MedCalc Software, Belgium, and significance level was set at 0.05.

Results

The database search identified 89 twin pregnancies with a major congenital abnormality affecting one of the fetuses: 23 cases were referred after 26 weeks of gestation, and outcome was unknown in 15. Final data analysis was based on 51 pregnancies. Maternal characteristics and pregnancy information are summarized in Table 1.

Overall there were 79 major defects: central nervous system ($n = 20$, 25.2%), musculoskeletal ($n = 17$, 21.5%), heart and great vessel ($n = 16$, 20.3%), effusion/hydrops ($n = 9$, 11.4%), respiratory system ($n = 8$, 10.1%), urinary tract ($n = 7$, 8.9%), digestive system ($n = 1$, 1.3%) and miscellaneous ($n = 1$, 1.3%). Thirty-three (64.7%) fetuses presented a single major malformation, 12 (23.5%) had two abnormalities and 6 (11.8%) had three or more.

Table 2 summarizes the stepwise logistic regression analysis results. Intrauterine death was observed in 15 (29.4%) pregnancies: 15/51 (29.4%) abnormal and 4/51 (7.8%) normal fetuses ($p = 0.01$). Stepwise logistic regression analysis demonstrated that abnormal twin IUD occurrence was related to the number of abnormalities ($p = 0.02$, OR = 2.38, 95% CI = 1.13–4.99). Normal co-twin IUD was not significantly related to any of the predictors investigated.

Delivery before 32 weeks with at least one fetus alive occurred in 10/47 (21.3%) pregnancies and the presence of fetal effusion or hydrops was a significant predictor ($p = 0.04$, OR = 5.5, 95% CI = 1.07–28.3).

The presence of a fetal effusion or hydrops remained the only significant predictor ($p = 0.03$, OR = 7.0, 95% CI = 1.28–38.2) for occurrence of IUD and/or delivery before 32 weeks ($n = 21$).

Comments

The present study investigates predictors of fetal death and severe preterm delivery in twin pregnancies with major structural

Table 2
Stepwise logistic regression analysis for the prediction of intrauterine fetal death and preterm delivery before 32 weeks in twin pregnancies with a major congenital abnormality in one fetus.

	Coefficient	Standard error	p^*	OR	95% CI
Abnormal fetus intrauterine death					
Constant	−2.28	0.70	0.001		
Number of major abnormalities	0.87	0.38	0.02	2.38	1.13–4.99
Preterm delivery before 32 weeks					
Constant	−1.70	0.44	<0.001		
Effusion/hydrops	1.70	0.83	0.04	5.50	1.07–28.3
Intrauterine death and/or preterm delivery before 32 weeks					
Constant	−0.69	0.33	0.03		
Effusion/hydrops	1.95	0.87	0.03	7.00	1.28–38.2

* Significance level set at 0.05; CI: confidence interval, OR: odds ratio.

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