Prevalence and Associated Factors of Discordant Twins in Siriraj Hospital

Wantana Pongpanich MD*,
Dittakarn Borriboonhirunsarn MD, MPH, PhD*

** Department of Obstetrics and Gynecology, Faculty of Medicine Siriraj Hospital, Mahidol University*

Objectives: *To determine the prevalence of discordant twins in Siriraj Hospital and to evaluate associated factors.*
Design: *Cross-sectional study.*
Setting: *Department of Obstetrics and Gynecology, Faculty of Medicine Siriraj Hospital, Mahidol University.*
Subjects: *A total of 150 women with twin pregnancy, ≥ 28 weeks of gestation, who had deliveries of both live twins at Siriraj Hospital from 2003 to 2004.*
Method: *A review of medical records was conducted. Discordance was defined as ≥ 20% difference in birth weight. Prevalence of discordance was calculated and associated risk factors were evaluated.*
Results: *Discordance was found in 35 cases; therefore, the prevalence was 23.3%. No significant association was found between discordance and various factors, including maternal age, maternal complications, parity, pregnant by assisted reproduction, gestational age at first diagnosis, chorionicity. However, discordant twins delivered at earlier gestational age compared to concordant twins (34.9 ± 3.2 and 36.2 ± 2.4 weeks, p = 0.037). Infants of discordant pairs were more likely to be admitted to the NICU than those of concordant pairs (17.1% and 3.9%, p < 0.001, both larger and smaller infants). Other neonatal morbidities were not significantly different.*
Conclusion: *Discordance twin was found in 23.3% of the cases. No significant associated risk factor was found. Infants of discordant pairs were more likely to be admitted to the NICU than those of concordant pairs.*

Keywords: *Twins, Birth weight discordance, Pregnancy outcome*

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Unequal size of fetuses, a frequent complication of multifetal gestations, is associated with increased perinatal mortality and morbidity[1]. Every twin gestation should be evaluated for growth discordance and, when diagnosed, should be observed very closely. Intertwin birth weight discordance might result from a combination of intrinsic variations between siblings and extrinsic factors that affect fetal growth. However, birth weight discordance might not always be indicative of abnormal fetal growth.

The degree of birth weight difference might be an important outcome determinant. Greater birth weight discordance was significantly associated with increase adverse neonatal outcomes[2-4]. Definitions of discordance varied between studies, but many studies have defined the condition as a birth weight difference of 15-30%[5-11]. There is still no standardized definition of fetal growth discordance based on fetal weight differences and thus, the incidence varied upon the definition used for discordance.

Amaru et al have reported increased risk for some adverse neonatal outcomes when there is 20% or more growth discordance in twins[8]. Reported adverse neonatal outcomes included low and very low birth weight, neonatal intensive care unit admission, neonatal oxygen requirement, hyperbilirubinemia and increased likelihood of having a cesarean delivery.

The purpose of the present study was, therefore, to determine the prevalence of discordant twins

Correspondence to : Pongpanich W, Department of Obstetrics and Gynecology, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand.

in Siriraj Hospital. In addition, possible associated risk factors and perinatal outcomes of discordance fetal growth were also evaluated.

Material and Method

The present study was a retrospective review of all live-born twins delivered at ≥ 28 weeks of gestation during a 2 year period (2003-2004) at Siriraj Hospital. Only pregnancies containing live born of both infants were included in the present study. In addition, those with major congenital anomalies which affected the infant's birth weight, e.g., anencephaly, hydrocephalus, were also excluded.

A total of 150 women with twin pregnancy who met the inclusion and exclusion criteria were recruited. A review of medical records was conducted among these women. Data regarding maternal baseline and obstetric characteristics, pregnancy complications, route of delivery, and perinatal outcomes were abstracted. Specific characteristics of the twins were also evaluated, including mode of conception (spontaneous or artificial), chorionicity of the placenta. Prevalence of discordance was estimated. Discordance was defined as a difference in weight of ≥ 20% and was calculated by subtracting the birth weight of the smaller twin from that of the larger twin and dividing the difference by the birth weight of the larger twin.

Comparison was made between discordant and concordant twins with regard to various characteristics to evaluate possible associated factors. In addition, comparisons of adverse perinatal outcomes were also made between the 2 groups as well as between larger and smaller infants.

Descriptive statistics, including mean, standard deviation, number, and percentage, were used to describe baseline characteristics. Comparisons between groups were made using Student's t test and Chi Square test or Fisher Exact test as appropriate. Statistical significance was considered when p value < 0.05.

The present study was reviewed and approved by the Ethics Committee, Faculty of Medicine Siriraj Hospital, Mahidol University.

Table 1. Baseline maternal characteristics and obstetric data (N = 150)

Characteristics	N (%)
Mean maternal age (year) ± SD	28.5 ± 5.9
Occupation	
- Worker	92 (61.3%)
- Official government	5 (3.3%)
- House wife	36 (24.0%)
- Private practice	17 (11.4%)
Income	
< 5,000 baht	83 (55.3%)
5,001-10,000 baht	37 (24.7%)
10,001-20,000 baht	17 (11.3%)
> 20,000 baht	13 (8.7%)
Education	
- Primary school	67 (44.7%)
- Secondary school	40 (26.7%)
- College	16 (10.7%)
- University	27 (18.0%)
Maternal medical complications	
- No	128 (85.3%)
- Yes	22 (14.7%)
Parity	
0	73 (48.7%)
1	57 (38.0%)
≥ 2	20 (13.3%)
Assisted reproduction	
No	137 (91.3%)
Yes	13 (8.7%)
Mean gestational age at first diagnosis (weeks) ± SD	22.5 ± 9.0
Mean gestational age at delivery (weeks) ± SD	35.9 ± 2.6

Results

During the 2 year period, 150 women with twin pregnancy and delivered at Siriraj Hospital met the inclusion criteria and were enrolled in the present study. Table 1 shows baseline characteristics and obstetric data of the women. Mean maternal age was 28.5 ± 5.9 years, mean gestational age at first diagnosis was 22.5 ± 9.0 weeks and mean gestational age at delivery was 35.9 ± 2.6 weeks. The majority of these women were nulliparous (48.7%). Pregnancy by assisted reproductive technique was found in only 8.7% of cases.

Degree of birth weight discordance of the twin pairs is shown in Table 2. Discordance, as defined in the present study as ≥ 20% difference in birth weight, was found in 35 twin pairs that the prevalence was 23.3% (95%CI 16.5%-30.2%). Of these, birth weight difference of 20-25% was found in 19 pairs (12.6%), and 16 pairs (10.7%) had birth weight discordance that exceeded 25%

Comparisons of various characteristics between discordant and concordant twins were made and the results are shown in Table 3. The 2 groups were similar with regard to maternal age, mode of conception, gestational age at first diagnosis, maternal medical complication, chorionicity, and fetal sex. Cesarean section rate was only slightly higher among discordant than concordant pairs (68.6% and 60.0% respectively, p = 0.360). Discordant twin pairs were delivered at significantly lower gestational age than concordant pairs (34.9 ± 3.2 and 36.2 ± 2.4 weeks respectively, p = 0.037). When birth weight was compared, larger infants of the discordant twin pairs had comparable birth weight to those of concordant pairs while smaller infants of discordant pairs had significantly lower birth weight than those of concordant pairs (1698.8 ± 465.8 g and 2153.7 ± 428.1 g respectively, p < 0.001). Mean placental weight was comparable between the 2 groups.

Table 2. Distribution of birth weight discordance (N = 150)

% Discordance	N	%
<20%	115	76.7%
20-25%	19	12.7%
>25%	16	10.7%

Table 3. Comparison between discordant and concordant twin pairs with regard to various characteristics

Characteristics	Discordant (N = 35) (%)	Concordant (N = 115) (%)	p value
Maternal age (year) mean ± SD	28.2 ± 5.7	28.6 ± 5.9	0.695
Maternal medical complications			
No	32 (91.4%)	96 (83.5%)	0.290
Yes	3 (8.6%)	19 (16.5%)	
Parity			
0	20 (57.1%)	53 (46.1%)	
1	11 (31.4%)	46 (40.0%)	
≥ 2	4 (11.4%)	16 (13.9%)	
Assisted reproduction			
No	31 (88.6%)	106 (92.2%)	0.502
Yes	4 (11.4%)	9 (7.8%)	
Mean gestational age at first diagnosis (weeks) ± SD	21.6 ± 9.1	22.7 ± 9.1	0.554
Mean gestational age at delivery (weeks) ± SD	34.9 ± 3.2	36.2 ± 2.4	0.037
Chorionicity			
Monochorion	14 (40.0%)	49 (42.6%)	0.843
Dichorion	14 (40.0%)	45 (39.1%)	
Cesarean delivery	24 (68.6%)	69 (60.0%)	0.360
Mean birth weight (g) ± SD			
Larger	2331.7 ± 531.9	2376.6 ± 454.1	0.624
Smaller	1698.8 ± 465.8	2153.7 ± 428.1	<0.001
Mean placenta weight (g) ± SD	989.4 ± 203.5	1022.4 ± 198.8	0.395
Gender			
Same	33 (94.3%)	98 (85.2%)	0.245
Different	2 (5.7%)	17 (14.8%)	

Table 4. Comparison between discordant and concordant twin pairs with regard to adverse neonatal outcomes

Characteristics	Discordant (N = 35) (%)	Concordant (N = 115) (%)	p value
Asphyxia			
Larger	2 (5.7%)	3 (2.6%)	0.332
Smaller	2 (5.7%)	3 (2.6%)	0.332
NICU			
Larger	5 (14.3%)	4 (3.5%)	0.032
Smaller	7 (20.0%)	5 (4.3%)	0.007

Table 4 shows comparison of adverse neonatal outcomes between the 2 groups. Admission to the neonatal intensive care unit (NICU) was significantly higher among discordant pairs, both in larger and smaller infants of the twin pairs, compared to those of concordant twins (14.3% and 3.5%, p = 0.032 for larger infants and 20.0% and 4.3%, p = 0.007 for smaller infants). Neonatal asphyxia was slightly higher in the discordant group both in larger and smaller infants.

Discussion

In the present study, the prevalence of discordant twins was 23.3%, defined as more than 20% difference in birth weight. Of these, 12.6% showed 20-25% discordance and 10.7% showed more than 25% discordance. The rate was slightly different from other studies. A retrospective population-based cohort study in Lebanon showed that the rate of discordance was 19.6%, 7.7% had 20-25% discordance and 11.9% had more than 25% discordance[9]. In the United States, the rate of discordance was 15%, 6.9% had 20-25% discordance and 8.1% had more than 25% discordance[3]. In Texas, the rate of discordance was 15%; 7% had 20-25% discordance and 8% had more than 25% discordance[2]. The difference in reported rate might be due to different populations and the definition used.

Many studies have evaluated possible associated factors for fetal growth discordance. Victoria et al found that severe discordance ($\geq$ 25% birth weight difference) occurred significantly more often in monochorionic than in dichorionic twins and monochorionic twins had worse outcomes than dichorionic twins, and were significantly more likely to deliver before 30 weeks of gestation[5]. Another study showed that maternal age and parity were associated with discordance fetal growth[4]. However, the authors did not find any significant associated factors for discordant twins, similar to the study by Amaru et al[8].

The present study demonstrated that discordant twins delivered at significantly earlier gestational age compared to concordant twins. Similar findings were also observed by others[2,10]. Another study found that greater birth weight discordance was significantly associated with preterm delivery due to intervention and cesarean deliveries were associated with greater discordance[2,12]. However, the present result showed that both groups had a similar rate of cesarean delivery. Victoria et al. reported that the most frequent finding in the placentas of severely discordance twins were small placental weight and umbilical cord abnormalities[5]. In the present study, the authors found only a slight difference in placental weight between the 2 groups and no umbilical cord abnormalities were observed.

With regard to neonatal complications, the authors found that neonatal NICU admission increased significantly among those discordant pairs, in both larger and smaller infants. The same results were also observed by others[2,6,8]. Neonatal asphyxia also increased with discordance pairs but not with statistical significance. Vergani et al suggested that birth weight discordance was a significant predictor of adverse neonatal outcome that was independent of gestational age at delivery, small for gestational age, and chorionicity[13].

The results of the present study demonstrated that birth weight discordance among twins is a fairly common occurrence in Siriraj Hospital; approximately 24% of twin deliveries were affected by discordance of at least 20%. However, no significant associated risk factors were demonstrated. As expected, increased perinatal morbidity was observed among twin pregnancies that are complicated by discordant fetal growth. As the rate of twin births increases, early detection and timely appropriate management of birth weight discordance will become an increasingly important consideration in the management of twin pregnancies to improve both maternal and neonatal outcomes.

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ความชุกและปัจจัยที่มีความสัมพันธ์กับการเกิดภาวะ Discordance twins ในโรงพยาบาลศิริราช

วันทนา พงษ์พานิช, ดิฐกานต์ บริบูรณ์หิรัญสาร

วัตถุประสงค์: *เพื่อศึกษาถึงความชุกของการเกิดภาวะ Discordance twins ในโรงพยาบาลศิริราชและ ศึกษาถึงปัจจัยที่มีความสัมพันธ์กับการเกิดภาวะนี้*

วิธีการศึกษา: *การศึกษาแบบตัดขวาง*

สถานที่ทำการศึกษา: *ภาควิชาสูติศาสตร์-นรีเวชวิทยา, คณะแพทยศาสตร์ศิริราชพยาบาล, มหาวิทยาลัยมหิดล*

กลุ่มตัวอย่าง: *หญิงตั้งครรภ์แฝดสอง จำนวน 150 คน ที่มีอายุครรภ์ไม่ต่ำกว่า 28 สัปดาห์ และมาคลอดที่โรงพยาบาลศิริราช ในช่วงปี พ.ศ. 2546-2547*

การกระทำ: *ทำการทบทวนแฟ้มบันทึกประวัติผู้ป่วยกลุ่มดังกล่าว โดยจะวินิจฉัยภาวะ Discordance เมื่อมีความแตกต่างของน้ำหนักตัวแรกคลอดมากกว่าหรือเท่ากับ 20 % จากนั้นทำการหาค่าความชุกของการเกิดภาวะ Discordance twins รวมถึงศึกษาถึงปัจจัยต่างๆ ที่มีผลเกี่ยวข้องกับการเกิดภาวะนี้*

ผลการศึกษา: *พบภาวะ Discordance ในทารกแฝด 35 คู่ คิดเป็นความชุก 23.3 %, โดยไม่พบว่ามีปัจจัยเสี่ยงสำคัญที่ทำให้เกิดภาวะดังกล่าว ไม่ว่าจะเป็นอายุมารดา, ภาวะแทรกซ้อนทางอายุรกรรมของมารดา, จำนวนครั้งที่เคยคลอดบุตร, ภาวะการตั้งครรภ์โดยใช้เทคนิคช่วยการเจริญพันธุ์, อายุครรภ์ที่ตรวจพบครั้งแรกว่าตั้งครรภ์แฝด และชนิดของรก อย่างไรก็ตาม พบว่ากลุ่ม Discordant twins คลอดที่อายุครรภ์เฉลี่ยต่ำกว่าในกลุ่ม Concordant twins อย่างมีนัยสำคัญทางสถิติ (34.9 $\pm$ 3.2 และ 36.2 $\pm$ 2.4 สัปดาห์, $p = 0.037$), และพบว่าทารกในกลุ่ม Discordant twins ต้องเข้ารับการรักษาในหออภิบาลทารกแรกเกิดสูงกว่าอย่างมีนัยสำคัญทางสถิติเทียบกับทารกในกลุ่ม Concordant twins ทั้งในแฝดน้ำหนักน้อยและน้ำหนักมาก (17.1% และ 3.9%, $p < 0.001$) ส่วนภาวะแทรกซ้อนอื่น ๆ ในทารกไม่พบว่ามีความแตกต่างกัน*

สรุป: *ความชุกของภาวะ Discordant twins ในโรงพยาบาลศิริราชเท่ากับ 23.3% โดยไม่พบว่ามีปัจจัยเสี่ยงที่มีนัยสำคัญทางสถิติในการเกิดภาวะนี้ แต่พบว่าทารกที่มีภาวะ Discordance มีโอกาสเสี่ยงที่จะต้องเข้ารับการรักษาในหออภิบาลทารกแรกเกิดสูงกว่าทารกในกลุ่ม Concordance*