The risk factors of preeclampsia in discordant twin pregnancies and comparisons of maternal and neonatal outcomes

Hye Jin Lee, Mi Ju Kim, Hyun Mi Kim, Haemin Kim, Hyo Shin Kim, Hyun-Hwa Cha, Won Joon Seong

Department of Obstetrics and Gynecology, Kyungpook National University Hospital, Kyungpook National University, School of Medicine, Daegu, Korea

Purpose

- We aimed to find out the risk factors of preeclampsia occurrence in discordant twin pregnancies
- In discordant twin groups, we would like to compare the maternal and neonatal outcomes between groups with and without preeclampsia.

Methods

- This is a retrospective study including 65 pairs of twin pregnancies of **discordant twin** out of 432 twin pregnancies delivered at 24+1-38+2 weeks of gestation between January 2015 and September 2021 at our institution.
- Discordant twin was defined as a case where the difference in birth weight of a newborn is more than 20%.
- We excluded one fetal demise, major anomaly, twin-to-twin transfusion syndrome(TTTS), twins with unknown chorionicity, and monochorionic monoamnionic twins.
- The subjects were divided into **preeclampsia group (PG)** (N=15 (mothers), N=30 (babies)) and **non-preeclampsia group (NG)** (N=50 (mothers), N=100 (babies)).
- We compared the maternal basal characteristics and pregnancy-related complications (threatened preterm labor, abnormal placentation, postpartum hemorrhage) and the neonatal outcomes including of composite morbidities (respiratory distress syndrome (RDS), sepsis, intraventricular hemorrhage (IVH), necrotizing enterocolitis (NEC), periventricular leukomalacia (PVL)) between two groups.
- Notably, in discordant twin pregnancies accompanied by preeclampsia, the correlation between the weeks of gestation in which discordancy was first diagnosed and the severity of preeclampsia was analyzed.

Results

Table 1. Maternal characteristics between NG group and PG group.

	Non-preeclampsia (n=50)	Preeclampsia (n=15)	p-value
Age (year)	33.16 ± 5.24	33.20 ± 4.38	0.970
Delivery GA (weeks)	34.35 ± 3.36	34.33± 1.87	0.966
First discordancy GA (weeks)	31.81 ± 3.12	27.67 ± 6.32	0.010*
Nulliparous	36 (72.00%)	12 (80.00%)	0.524
Prepregnant BMI	23.05 ± 3.93	21.14 ± 1.96	0.001*
Delivery BMI	28.05 ± 3.98	26.92 ± 2.36	0.058
PAPP-A	1.26 ± 0.61	1.03 ± 0.60	0.293
Gestational diabetes	8 (16.00%)	2 (13.33%)	0.947
Threatened preterm labor	25 (50.00%)	8 (53.33%)	0.911
PROM	15(30.00%)	3 (20.00%)	0.400
Placenta previa	2 (4.00%)	1 (6.67%)	0.048*
Cause of delivery			
elective	11 (22.00%)	1 (9.09%)	0.027*
spontaneous	27 (54.00%)	7 (46.67%)	
iatrogenic	12 (24.00%)	7 (46.67%)	

Gestational age, GA; Body mass index, BMI; pregnancy associated plasma protein A, PAPP-A; premature rupture of membrane, PPROM

Table 2. Neonatal outcome between NG group and PG group.

	Non-preeclampsia (n=100)	Preeclampsia (n=30)	p-value
GA at delivery (weeks)	34.35 ± 3.36	34.33± 1.87	0.966
Gender, male	49 (49.00%)	13 (43.33%)	0.736
Birthweight (gram)	1984.85 ± 629.10	1913.67 ± 553.13	0.578
Weight percentile	28.25 ± 27.18	26.97 ± 26.00	0.819
Apgar score at 1-min (<7)	32 (32.00%)	11 (36.67%)	0.799
Apgar score at 5-min (<7)	8 (8.00%)	3 (10.00%)	1.000
NICU admission	87 (87.00%)	30 (100.00%)	0.083
Neonatal death	6 (6.00%)	2 (6.67%)	1.000
Composite morbidity	41 (41.00%)	10 (33.33%)	0.588
Resuscitation at OR	19 (19.59%)	11 (36.67%)	0.093
Intubation	21 (21.00%)	11 (36.67%)	0.132
Ventilator use (nasal cPAP)	40 (40.00%)	16 (53.33%)	0.279
O_2 supply	50 (50.00%)	17 (56.67%)	0.665
Inotropic use	8 (8.00%)	1 (3.33%)	0.636
RDS	19 (19.00%)	6 (20.00%)	1.000
Sepsis	26 (26.00%)	8 (26.67%)	1.000
PDA	13 (13.00%)	4 (13.33%)	1.000
ROP	5 (5.00%)	2 (6.67%)	1.000
NEC	5 (5.00%)	1 (3.33%)	1.000
BPD	5 (5.00%)	2 (6.67%)	1.000
Photo Therapy	27 (27.00%)	10 (33.33%)	0.657
Developmental delay	13 (13.00%)	2 (6.67%)	0.531

Neonatal intensive care unit, NICU; operation room, OR; continuous positive airway pressure, cPAP; Respiratory distress syndrome, RDS; patent ductus arteriosus, PDA; retinopathy of prematurity, ROP; necrotizing enterocolitis, NEC; bronchopulmonary dysplasia, BPD

Discussion

- Compared to NG, PG had an earlier occurrence of discordancy (27.67 ± 6.32 vs 31.81 ± 3.12, weeks, p=0.010), tended to have a lower BMI before pregnancy (21.14 ± 1.96 vs 23.05 ± 3.93, p=0.001), and higher incidence of emergency preterm delivery due to iatrogenic causes (46.67% vs. 24.00%, p=0.027).
- Between the two groups, gestational age of delivery, fetal weight, 1- and 5-minutes APGAR score below 7, neonatal intensive care unit admission, neonatal mortality and composite morbidity did not show significant difference.

- In the correlation analysis, the timing of the diagnosis of discordancy had negative correlations with proBNP (correlation coefficient -0.517, p=0.028), LDH (correlation coefficient -0.700, p=0.001) and 24-hour urine protein (correlation coefficient -0.736, p=0.000*).
- However, the time of diagnosis of discordancy and delivery time were not statistically significant (p=0.516).

Conclusion

- In discordant twin pregnancies, the earlier discordancy was diagnosed, the higher the incidence of preeclampsia, but this had no significant effect on delivery timing and prognosis of neonates.