

Pregnancy Induced Hypertension in Twin Pregnancy

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Objective: To compare the incidence, severity and pregnancy outcomes of pregnancy induced hypertension in twins and singleton gestations.

Material and Method: The cohort study enrolled 305 twins and 298 singleton gestations at Department of Obstetrics and Gynaecology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand between January 1996 and December 2001. The rates of pregnancy induced hypertension and pregnancy outcomes were statistically analysed in both groups. P-value of < 0.05 was considered statistically significant.

Results: Pregnancy induced hypertension was found to develop 18.36% in the twin gestations, compared with 5.03% in the singleton gestations ($P < 0.05$). Women with twin gestations had higher rates of pregnancy induced hypertension (RR 3.65, 95% CI 2.11-6.30, $P < 0.05$) and occurred earlier than singleton gestations (35.86 ± 2.50 VS 37.40 ± 1.18 weeks, $P < 0.05$). Twin gestations with pregnancy induced hypertension had significantly higher rate of cesarean delivery, low birthweight, NICU admission and perinatal death than singleton gestations with pregnancy induced hypertension ($P < 0.05$). Moreover, the abruptio placenta, postpartum hemorrhage and perinatal mortality in twin gestations with pregnancy induced hypertension group were significantly higher than in normotensive group ($P < 0.05$).

Conclusion: The incidence of pregnancy induced hypertension was significantly higher and occurred earlier with greater adverse pregnancy outcomes among twin gestations than singleton gestations. Moreover, the rate of adverse maternal and perinatal outcomes in twin gestations with pregnancy induced hypertensive group was higher than in normotensive group.

Keywords: Twin gestations, Pregnancy induced hypertension, Pregnancy outcomes

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Pregnancy induced hypertension is an important cause of morbidity and mortality for both mother and fetus, but its etiology remains unclear^(1,2) Pregnancy induced hypertension is classified as either gestational hypertension (hypertension only) or preeclampsia (hypertension plus proteinuria)⁽¹⁾. Epidemiologic studies have identified association of pregnancy induced hypertension with several factors including parity, maternal age, race, smoking and socioeconomic status⁽³⁻⁶⁾. Women with twin gestations are at an increase risk for both maternal and fetal complications as well as risk for the development of pregnancy induced hyper-

tension, with a reported incidence of 11-26.6%⁽⁶⁻¹⁰⁾. This incidence is two to three times higher than that usually reported for women with singleton gestations^(11,12).

The objectives of this study were to compare the incidence, severity and pregnancy outcomes of pregnancy induced hypertension in twins and singleton gestations, including adverse maternal and perinatal outcomes compared between twin gestations with pregnancy induced hypertensive group and normotensive group.

Material and Method

Data for this study were collected from obstetric chart records at the Department of Obstetrics and Gynaecology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand between January, 1996 and December, 2001. Three hun-

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dred and thirteen cases of twin pregnancies from the women who booked in our antenatal clinic and diagnosed twin pregnancies by ultrasonography before 20 weeks' gestation, whose followed up at twin clinic until delivery. In control group, three hundred and thirteen singleton pregnancies who booked before 20 weeks' gestation and ultrasonography was performed at the same time as the study group by computerization. We excluded those who had preexisting disease, eg. diabetic mellitus, chronic renal disease, chronic hypertension or connective tissue disease and who delivered at other hospitals or delivered before 28 weeks' gestation, from analysis. Complete outcomes data were available for 305 twins and 298 singleton pregnancies. At the initial visit, a personal history was obtained and demographic data were collected including maternal age, education, occupation, parity, blood pressure, family history of hypertension and total number of antenatal clinic visits.

Hypertension (systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg) was considered severe if systolic values were ≥ 160 mmHg or diastolic values ≥ 110 mmHg. Gestational hypertension was defined as hypertension without proteinuria after 20 weeks' gestation or during the postpartum period. Preeclampsia was diagnosed in the presence of hypertension plus proteinuria (either ≥ 300 mg/24 hrs or 1+ dipstick)⁽¹⁾. Severe preeclampsia was diagnosed on the basis of severe hypertension plus marked proteinuria (either ≥ 2 g/24 hrs or $\geq 2+$ dipstick)⁽¹⁾. Women were considered to have eclampsia if they met the criteria for preeclampsia and had convulsion. Preterm delivery was defined as that delivered prior to the completion of 37 weeks' gestation. Low birthweight was diagnosed in the presence of birthweight less than 2500 g. Perinatal mortality was used as a subsidiary end point, and defined as the sum of all fetal death with a birthweight of 1000 g or more, delivered at or beyond 28 weeks' gestation and neonatal death of 1000 g or more within 7 days after birth.

Statistical analysis consisted of calculating relative risks (RR) and their 95% confidence interval (CI) by standard univariate method. Differences were examined for statistical significance with use of the Chi's square test for discrete variables, and Fishers' exact test for number less than 5 (two-tail). P-value of < 0.05 was considered statistically significant.

Results

Baseline clinical characteristics are shown in Table 1. There were no statistically significant differ-

ences between women with twin gestations and women with singleton gestations in maternal age, education, occupation, parity, blood pressure at first antenatal visit, family history of hypertension, and total numbers of antenatal clinic visits.

The incidence expressed in percent of pregnancy induced hypertension in twins and singleton gestations is summarized in Table 2. Women with twin gestations were diagnosed pregnancy induced hypertension 18.36% (95% CI, 14.17-23.17), compared with 5.03% (95% CI, 2.84-8.17) in the singleton group ($P < 0.05$). There were higher incidences in both gestational hypertension and preeclampsia in twin gestations than in singleton gestations. A diagnosis of the syndrome of hemolysis, elevated liver enzymes, and a low platelet count (HELLP) was found in one preeclamptic twin pregnant woman, but eclampsia was not observed in both groups. Twin gestations had a greater chance of developing pregnancy induced hypertension than singleton gestations (RR 3.65; 95% CI, 2.11-6.30, $P < 0.05$).

Maternal and perinatal outcomes of women with pregnancy induced hypertension compared between twins and singleton gestations are summarized in Table 3. Pregnancy induced hypertension was found to develop in 56 women with twin gestations and in 15 women with singleton gestations. These twin pregnant women had a significantly lower mean gestational age at diagnosis (35.86 ± 2.50 VS 37.40 ± 1.18 weeks' gestation, $P < 0.05$). The maternal complications, either abruptio placenta or postpartum hemorrhage were not different in both groups. In addition, twin gestations with pregnancy induced hypertension had significantly higher rate of cesarean delivery (66.7% VS 20%, $P < 0.05$). Moreover, twin gestations with pregnancy induced hypertension had significantly higher rate of low birthweight (58.04% VS 6.67%, $P < 0.05$). NICU admission and perinatal death were higher in twin gestations with pregnancy induced hypertension.

Maternal and perinatal outcomes of women with twin gestations are shown in Table 4. The mean gestational age at delivery, preterm labor, and cesarean delivery of twin gestation group were not different between women with normotensive and pregnancy induced hypertensive groups. Twin gestations with pregnancy induced hypertension had significantly higher rates of postpartum hemorrhage (14.29% VS 3.61%). A diagnosis of acute renal failure was found in a twin pregnant woman who had HELLP syndrome. The means of birthweight, low birthweight, and severe birth asphyxia were not different in both groups of

Table 1. Baseline clinical characteristics

	Twins (n=305)	Singleton (n=298)	p-value
Maternal age (years)			
< 35	251	253	0.39
≥ 35	54	45	
Education			
Primary school	95	82	0.42
Secondary school	28	26	
High school	31	23	
Diploma	51	48	
Bachelor	100	119	
Occupation			
Housewife	63	58	0.29
Employee	163	156	
Government officer	43	48	
Private business	36	36	
Parity			
Nulliparous	186	194	0.29
Multiparous	119	104	
Blood pressure 1 st ANC visited			
Systolic (mmHg, mean ± SD)	112.23±8.33	111.17±7.80	0.11
Diastolic (mmHg, mean ± SD)	71.08±7.37	70.50±7.52	0.34
Family history of hypertension	18	20	0.68
Total number of ANC visited [median (range)]	8 (2,15)	8 (2,13)	0.78

ANC : Antenatal care

Table 2. Incidence of pregnancy induced hypertension

Group	gestational hypertension No (%) (95% CI)	mild pre-eclampsia No (%) (95% CI)	severe pre-eclampsia No (%) (95% CI)	total No (%) (95% CI)	RR (95% CI)	p-value
Twins (n=305)	27 (8.85) (5.91, 12.62)	12 (3.93) (2.05, 6.77)	17 (5.57) (3.28, 8.77)	56 (18.36) (14.17, 23.17)	3.65 (2.11, 6.30)	<0.05
Singleton (n=298)	5 (1.68) (0.54, 3.78)	7 (2.35) (0.95, 4.78)	3 (1.01) (0.21, 2.91)	15 (5.03) (2.84, 8.17)		

Table 3. Maternal and perinatal outcomes of women with pregnancy induced hypertension

	Twins (n=56)	Singleton (n=15)	P-value
Gestation age at PIH developed (weeks, mean ± SD)	35.86 ± 2.50	37.40 ± 1.18	<0.05
Preterm labor	27 (48.21%)	4 (26.67%)	0.39
Cesarean delivery	37 (66.07%)	3 (20.00%)	<0.05
Abruptio placenta	2 (3.57%)	0	
Postpartum hemorrhage	8 (14.29%)	1 (6.67%)	0.12
Birthweight (g, mean ± SD)	2312.85 ± 538.32 (n=112)	2876 ± 214.97	<0.05
Low birthweight	65 (58.04%) (n=112)	1 (6.67%)	<0.05
Severe birth asphyxia	1 (0.89%) (n=112)	0	
NICU admission	10 (8.93%) (n=112)	0	
Perinatal death	6 (5.36%) (n=112)	0	

PIH : Pregnancy induced hypertension

NICU : Neonatal intensive care unit

Table 4. Maternal and perinatal outcomes of women with twin gestations

	Pregnancy induced Hypertension (n=56)	Normotension (n=249)	p-value
Gestation age at delivery(weeks, mean \pm SD)	35.86 \pm 2.50	36.22 \pm 2.22	0.28
Preterm labor	27 (48.21%)	107 (42.97%)	0.48
Cesarean delivery	37 (66.07%)	153 (61.45%)	0.52
Abruptio placenta	2 (3.57%)	0	
Postpartum hemorrhage	8 (14.29%)	9 (3.61%)	<0.05
Birthweight (g,mean \pm SD)			
- First twin	2322.14 \pm 533.36	2379.62 \pm 496.55	0.44
- Second twin	2303.57 \pm 543.27	2295.06 \pm 499.96	0.91
Low birthweight			
- First twin	31(55.36%)	136 (54.62%)	0.92
- Second twin	34(60.71%)	154 (61.85%)	0.88
Severe birth asphyxia	1 (0.89%) (n=112)	2 (0.40%) (n=498)	0.50
NICU admission	10 (8.93%) (n=112)	14 (2.81%) (n=498)	<0.05
Perinatal death	6 (5.36%) (n=12)	10 (2.01%) (n=498)	<0.05

NICU : Neonatal intensive care unit

twin gestations. Twin gestations with pregnancy induced hypertension had more perinatal complications, either neonatal care unit (NICU) admission (17.86% VS 5.62%) or perinatal death (10.71% VS 4.02%) than twin gestations with normotension ($P < 0.05$).

Discussion

Twin gestations have long been recognized as high-risk pregnancies, and they also carry a higher risk of morbidity and mortality for both maternal and neonatal compared to singleton gestations. Several studies have described the risk factors and the incidences of pregnancy induced hypertension between women with twin gestations as compared with those of women with singleton gestations⁽³⁻⁷⁾. Few studies, however, have explored the association between twin gestations and pregnancy induced hypertension⁽⁸⁻¹¹⁾.

In this study, pregnancy induced hypertension was found to be significantly more common in twin gestations than in singleton gestations. We found that the incidence of pregnancy induced hypertension in twin pregnancies was 18.36% compared with 5.03% in singleton gestations and carried an overall fourfold increase risk of pregnancy induced hypertension (RR 3.65, 95%CI, 2.11-6.30); this value was comparable with those seen in a previous study showing the relative risk at 3.5 (95%CI, 3.0-4.2).⁽⁶⁾ Most of these studies were hospital based and their findings were affected by selection bias because women with these obstetric complications were more likely to be referred to tertiary medical center. For this reason we have included in our

study only women who were under our antenatal care before 20 weeks' gestation.

In our study, women with pregnancy induced hypertension in twin gestations had more preterm deliveries and higher rates of cesarean delivery than in singleton gestations. Abruptio placenta and postpartum hemorrhage were more common in twin pregnancies, especially when pregnancy induced hypertension had developed. This higher rate of adverse pregnancy outcomes among women with twin gestations is not surprising, considering the fact that it tends to occur with pregnancy induced hypertension in twin gestations early during pregnancy, is more likely to be severe and has lower gestational age at delivery than singleton gestations, all of which can contribute to the increased rate of indicated preterm births in twins. These findings support the results of previous reports on this subject^(11,13).

Moreover, in the pregnancy induced hypertension group, twin gestations increased the risk of adverse maternal and perinatal outcome more than singleton gestations, in most cases due to extremely low birthweight, similar to the previous study reported that preterm delivery influences on adverse perinatal outcome⁽¹⁴⁾. A higher proportion of preterm labor is often caused by the condition of twin pregnancies itself and may be attributable to induction of labor for a pregnancy induced hypertension before term.

There was no difference in twins' gestational age at time of delivery between the normotensive group and the hypertensive group. These findings suggest

that low birthweight and severe birth asphyxia in women with gestations were often unrelated to pregnancy induced hypertension. We found that NICU admission and perinatal mortality were significantly higher in twin gestations with pregnancy induced hypertension, in most cases due to extremely low birthweight and related complications, similar to a previous study⁽¹⁴⁾.

It is suggested that women with twin gestations should be monitored in specialized clinic in addition to quality of obstetrical care routinely provided as well as the frequently perinatal care. Experience has shown that this management reduces the incidence of adverse maternal and neonatal outcome and decreases perinatal mortality⁽¹⁵⁾.

In conclusion, the incidence of pregnancy induced hypertension was higher in twin gestations and was associated with greater risks for both mother and fetuses when compared with singleton gestations. Moreover, the rate of adverse maternal and perinatal outcomes in twin gestations with pregnancy induced hypertensive group was higher than that in normotensive group.

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ภาวะความดันโลหิตสูงขณะตั้งครรภ์ในการตั้งครรภ์แฝด

อภิชาติ จิตต์เจริญ, สุวิมล เวชพุกษพิทักษ์, สมศักดิ์ สุทัศน์วรวิ

วัตถุประสงค์ : เพื่อเปรียบเทียบอุบัติการณ์ ความรุนแรง และผลของการตั้งครรภ์ของครรภ์แฝดที่มีภาวะความดันโลหิตสูงขณะตั้งครรภ์กับครรภ์เดี่ยวที่มีภาวะความดันโลหิตสูงขณะตั้งครรภ์

วัสดุและวิธีการ : ได้ทำการศึกษาสตรีตั้งครรภ์แฝด 305 ราย และสตรีตั้งครรภ์เดี่ยว 298 ราย ที่มาคลอดที่ภาควิชาสูติศาสตร์- นรีเวชวิทยา คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล ระหว่างเดือนมกราคม พ.ศ. 2539 ถึง ธันวาคม พ.ศ. 2544 โดยได้เก็บรวบรวมข้อมูลการเกิดภาวะความดันโลหิตสูงขณะตั้งครรภ์ และผลของการตั้งครรภ์ของทั้งสองกลุ่มเพื่อนำมาวิเคราะห์ผล

ผลการศึกษา : ภาวะความดันโลหิตสูงขณะตั้งครรภ์เกิดขึ้นในการตั้งครรภ์แฝดร้อยละ 18.36 ขณะเดียวกันเกิดขึ้นในการตั้งครรภ์เดี่ยวร้อยละ 5.03 ($P < 0.05$) สตรีที่ตั้งครรภ์แฝดมีอัตราการเกิดภาวะความดันโลหิตสูงขณะตั้งครรภ์สูงกว่า (RR 3.65, 95% CI 2.11 - 6.30, $P < 0.05$) และเกิดภาวะนี้ขึ้นในอายุน้อยกว่าสตรีที่ตั้งครรภ์เดี่ยว (35.86 ± 2.50 กับ 37.40 ± 1.18 สัปดาห์, $P < 0.05$) การตั้งครรภ์แฝดที่เกิดภาวะความดันโลหิตสูงขณะตั้งครรภ์มีอัตราการผ่าตัดคลอดทางหน้าท้อง น้ำหนักตัวทารกแรกเกิดต่ำ ทารกแรกเกิดอยู่ใน NICU และการตายของทารกแรกเกิดสูงกว่าการตั้งครรภ์เดี่ยวที่เกิดภาวะความดันโลหิตสูงขณะตั้งครรภ์ ยิ่งไปกว่านั้นพบว่า การเกิดภาวะรกหลุดตัวก่อนกำหนด การตกเลือดหลังคลอดและการตายของทารกแรกเกิดในครรภ์แฝดที่มีภาวะความดันโลหิตสูงขณะตั้งครรภ์สูงกว่าครรภ์แฝดที่มีความดันโลหิตปกติขณะตั้งครรภ์อย่างมีนัยสำคัญ ($P < 0.05$)

สรุป : อุบัติการณ์การเกิดภาวะความดันโลหิตสูงขณะตั้งครรภ์ในการตั้งครรภ์แฝดสูงกว่า เกิดขึ้นเมื่ออายุน้อยกว่า และเกิดภาวะแทรกซ้อนในขณะตั้งครรภ์สูงกว่าในการตั้งครรภ์เดี่ยว ยิ่งไปกว่านั้นการตั้งครรภ์แฝดที่มีภาวะความดันโลหิตสูงขณะตั้งครรภ์มีภาวะแทรกซ้อนต่อมารดาและทารกสูงกว่าการตั้งครรภ์แฝดที่มีความดันโลหิตปกติขณะตั้งครรภ์
