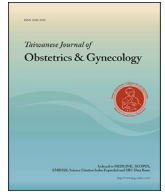




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Original Article

Effect of twin pregnancy chorionic properties on maternal and fetal outcomes

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ABSTRACT

Objective: This study aimed to determine the effect of twin pregnancy chorionic properties on pregnancy complications and fetal outcomes.

Materials and methods: A total of 559 subjects with gemellary pregnancy were included in the retrospective analysis, and clinical data, such as monitoring data during pregnancy and maternal and fetal outcomes, were recorded in detail. Based on the ultrasound results and methods of the postpartum pathologic examination of the placental membranes, the subjects were divided into the twin group with monochorionic diamnion (MCDA group, $n = 198$) and twin group with dichorionic diamnion (DCDA group, $n = 361$). The relationships of different chorionic properties and maternal and fetal outcomes were determined by comparing the maternal complications and fetal outcomes.

Results: The occurrence rate of gemellary pregnancy was 2.97% and that of monochorionic twin pregnancy was 34.8%. The MCDA group showed a higher incidence of pregnancy-induced hypertension, gestational diabetes mellitus, polyhydramnios, premature rupture of membranes, and abruptio placenta and a lower incidence of severe postpartum hemorrhage than the DCDA group. However, the incidence of preterm birth was significantly different (57.6% vs. 45.7%, $P < 0.05$). Significant differences were also detected in the incidence of fetal loss, complicated twins, neonatal asphyxia, and perinatal death between the two groups ($P < 0.05$).

Conclusion: The incidence of maternal complication (such as pregnancy-induced hypertension, gestational diabetes mellitus, polyhydramnios, premature rupture of membranes, and abruptio placenta and severe postpartum hemorrhage) in the two groups was not significantly different; however, the fetal outcomes in the MCDA group were inferior to those in the DCDA group. The fetal outcomes may be improved by determining the chorionic properties in early pregnancy by using ultrasound and consequently planning for pregnancy monitoring and intervention.

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Introduction

A gemellary pregnancy indicates that a pregnant woman can give birth to two infants; it belongs to the high-risk pregnancy category with an incidence rate of 1–2% [1]. The incidence of gemellary pregnancy is gradually increasing, and the probability of giving birth to twins is approximately 1/90 in America. Generally, 70% of twins are dizygotic twins derived from two different fertilized ova, and 30% of them are monozygotic twins derived from a single fertilized ovum. Clinical data show that the possibility of having dizygotic twins is significantly increased compared with

that of having single pregnancies [2–6]. The twin pregnancy rate has significantly increased in China, which may have been influenced by the recent induction of ovulation drugs.

The destination of chorionic properties is mainly determined on the basis of the pathologic placental examination findings after childbirth. Gemellary pregnancy can be divided into types based on the chorionic properties, number of the placenta, amniotic membrane characteristics, and number of the amnions. For example, if there are two completely separated placentas, and the membrane partition between the fetus is composed of four membranes, it is classified as dichorionic diamnion (DCDA). If two placentas are fused into one, and the partition is composed of two membranes, it is classified as monochorionic diamnion (MCDA). If no partition is detected between the fetus, it is classified as monochorionic monoamnion. The generated type is mainly caused by the time of

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Table 1
Comparison of the general clinical features.

	MCDA group (n = 198)	DCDA group (n = 361)	P
Age	29.8 ± 4.6	29.8 ± 4.6	>0.05
Gravidity	2.18 ± 1.45	2.35 ± 1.68	>0.05
Parity	2.11 ± 0.31	2.09 ± 0.32	>0.05
Delivery pregnancy week	36.63 ± 2.03	36.82 ± 1.93	>0.05

embryo formation, and the separation of the amniotic and chorionic membranes occurs later than fertilization. A previous study has shown that maternal and fetal outcomes vary owing to the effect of ovum properties and membrane properties [7].

Based on the gradually increasing incidence of twin pregnancy, antenatal care and clinical outcome monitoring have attracted the attention of domestic and international scholars. To determine the relationships of different chorionic properties and maternal and fetal outcomes, we performed an analysis on 559 subjects with gemellary pregnancy. This study aimed to provide a basis for antenatal consultation, health care, and clinical procedures by understanding the complications in women with twin pregnancy and different chorionic properties and difference in the fetal outcomes.

Materials and methods

General data

A total of 20,107 pregnant women were registered from January 2011 to December 2015. Of them, 597 had gemellary pregnancies. Based on the findings of ultrasound in early pregnancy, postpartum visual inspection, and pathology of the placental and fetal membranes, 35 (10 with MCDA and 25 with DCDA) subjects were excluded because of the presence of mental diseases and serious primary diseases with brain, heart, liver, kidney, and hemopoietic system problems. Among the remaining subjects, three had monoamniotic twin pregnancy, and therefore were excluded from this study. Therefore, a total of 559 subjects were included in the study and were consequently divided into two groups: MCDA group (n = 198) and DCDA group (n = 361) (Table 1). This study was conducted in accordance with the declaration of Helsinki, and was approved by the Ethics Committee of Capital Medical University. Written informed consent was obtained from all participants.

Based on the clinical data, the maternal complications and fetal adverse outcomes were compared to analyze the relationships between different chorionic properties and maternal and fetal

outcomes. The maternal complications included gestational hypertension, gestational diabetes mellitus, polyhydramnios, premature rupture of membranes, abruptio placenta, premature delivery, and severe postpartum hemorrhage; the fetal adverse outcomes mainly included fetal loss in early and mid pregnancy (abortion and dead fetus), complex twins (inconsistent development, death of one of the twins, deformity in one of the twins, selective fetal growth restriction, fetofetal transfusion syndrome, and twin anemia-polycythemia sequence), neonatal asphyxia, and perinatal death. These diagnostic criteria were obtained from the National Medical Colleges Obstetrics and Gynecology (eighth edition) [8] and published literature [9].

Statistical analysis

All the data were analyzed using SPSS 16.0 [10]. Measurement data were described as means ± standard deviations ($\bar{x} \pm s$). A *t*-test was performed to compare the difference between the two groups, and ANOVA was performed to compare the difference among the groups (Welch test was used if there was a heterogeneity of variance); multiple comparisons were analyzed using LSD (equal variance) or Dunnett's T3 test (heterogeneity of variance). A *P* < 0.05 was considered statistically significant.

Results

Comparison of the general data between the two groups

Among the 559 subjects, 35.42% had MCDA, while 64.58% had DCDA. In the MCDA group, 98.48% (195/198) conceived naturally; in the DCDA group, 83.66% (302/361) conceived naturally. No significant differences were detected in the characteristics, including age, gravidity, parity, and delivery pregnancy week (*P* > 0.05, Table 1).

Comparisons of the gestation period and delivery period

The total incidence of gemellary pregnancy was 2.97% (597/20,107), including 208 MCDAs (34.8%) and 386 DCDA (64.7%). The accuracy rate of early pregnancy ultrasound in diagnosing chorionic properties was 98.5%. The MCDA group had a slightly higher incidence of gestational hypertension, gestational diabetes mellitus, polyhydramnios, premature rupture of membranes, abruptio placenta, and preterm birth than the DCDA group. The incidence of severe postpartum hemorrhage in the MCDA group was lower than that in the DCDA group (*P* < 0.05, Table 2).

Table 2
Comparison of gestation period and complications during delivery between the two groups (n, %).

Group	Numbers	Hypertensive disorder complicating pregnancy	Gestational diabetes mellitus	Polyhydramnios	Premature rupture of membranes	Abruptio placentae	Premature delivery	Severe postpartum hemorrhage
MCDA	198	49 (24.7)	33 (16.7)	29 (14.6)	36 (18.2)	9 (4.6)	114 (57.6)	8 (4.0)
DCDA	361	78 (21.6)	56 (15.5)	49 (13.6)	63 (17.5)	14 (3.9)	165 (45.7)	17 (4.7)
χ^2		4.367	1.257	2.145	0.349	1.325	4.211	1.215
<i>P</i>		0.045	2.936	3.245	2.878	3.815	0.025	2.535

Table 3
Comparison of Maternal AND fetal adverse outcomes (n, %).

Group	Numbers	Fetus loss	Complex twin	Neonatal asphyxia	Perinatal death
MCDA	198	35 (17.7)	108 (54.6)	26 (13.1)	9 (4.6)
DCDA	361	16 (4.4)	77 (21.3)	16 (4.4)	10 (2.8)
χ^2		34.367	21.257	14.329	9.349
<i>P</i>		0.019	0.005	0.025	0.037

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