

# Evaluation of vaginal delivery for twin pregnancy

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## Summary

Careful management of twin pregnancy is needed because of the high risk for mother and babies, and it is uncertain if vaginal delivery or cesarean delivery is favorable. The purpose of this study was to examine the effect of the mode of delivery on maternal complications and short-term neonatal outcomes in twin pregnancy. Of the 50 cases, vaginal deliveries were attempted in 25 cases, with 17 achieving successful vaginal delivery of both twins and eight requiring emergency cesarean delivery. The other 25 cases underwent planned cesarean delivery. There were no differences in the neonatal outcome including birth weight, Apgar scores, and umbilical artery pH between cases with successful and failed vaginal delivery, or between failed vaginal delivery and planned cesarean delivery, even though vaginal delivery failed in some cases. These findings suggest that vaginal delivery can be attempted safely in twin pregnancy.

**Key words:** Twin pregnancy; Vaginal delivery; Cesarean delivery.

## Introduction

Twin pregnancy has been increasing with use of fertility drugs and state-of-the-art assisted reproductive technology, including in vitro fertilization [1]. Compared with single pregnancy, twin pregnancy has increased risks of maternal complications including preterm delivery, gestational diabetes mellitus (GDM), pregnancy-induced hypertension (PIH), hemolysis, elevated liver enzymes, low platelet (HELLP) syndrome, and acute fatty liver during pregnancy, and fetal complications such as fetal growth retardation [2]. The fetal prognosis also depends on the membrane type in twin pregnancy. Perinatal mortality in dichorionic/diamniotic twins is 1.7-1.8% and the incidence of neurological sequelae ranges from 1.7-2.4%, whereas in monochorionic twins these respective rates are 4.4-7.5% and 5.5-16.4%, with significant increases due to more complications, including twin-to-twin transfusion syndrome (TTTS), discordant twin, and fetal death [3, 4].

These findings indicate that twin pregnancy causes both maternal and fetal complications, and complications at delivery, including uterine inertia, umbilical cord prolapse, and atonic bleeding; therefore, twin delivery itself is at high risk. There is no absolute consensus on the procedure for twin delivery; however, guidelines in many countries generally recommend: 1) vaginal delivery for twins with a cephalic-cephalic position, 2) breech delivery in accordance with single breech delivery for twins with a

cephalic-non-cephalic position, and 3) planned cesarean delivery for the first twin with a non-cephalic position. However, even for twins with a cephalic-cephalic position, prolonged delivery and umbilical cord prolapse may occur for the second twin after successful vaginal delivery of the first twin. Furthermore, for second twins with a breech position, delivery of the head of the latter twin may have problems [5, 6]. Consequently, there is no consensus on the delivery procedure and the current choice depends on the estimated birth weight and weeks of gestation, and on institutional experience of breech delivery, emergency cesarean delivery, and neonatal management.

Selective cesarean delivery is common for a single fetus in a breech position, and thus hospitals worldwide have increasingly selected this method for planned twin delivery [7-9]. The increase in the percentage of cesarean deliveries among total deliveries leads to concerns of surgical complications including bleeding, injury to other organs, and postoperative infection, and a possible need for cesarean delivery in a subsequent pregnancy. Thus, there is a need to re-evaluate the safety of vaginal delivery. In the present hospital, the authors attempt vaginal delivery in twin delivery when the specific conditions are satisfied, although with restrictions based on the availability of perinatal obstetricians and the capacity of the neonatal intensive care unit (NICU). In this study, the authors evaluated the outcomes of management and delivery of twin pregnancy in their hospital.

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Table 1. — Demographic and clinical characteristics of the 50 cases.

	Value	Number
Age (years) (median)	31.9	
Nulliparous	48.0 (%)	24
History of infertility treatment	30.0 (%)	15
Types of chorionicity and amniosity		
Monochorionic / monoamniotic	0(%)	0
Monochorionic / diamniotic	26.0 (%)	13
Dichorionic / diamniotic	74.0 (%)	37

Table 2. — Maternal and fetal complications.

Complication	n (%)	Description
Maternal complication		
Threatened premature delivery	36 (72.0%)	Mean of 30.5 gestational weeks at admission
PIH	10 (20.0%)	
GDM	4 (8.0%)	
Others		Myoma, ovarian cyst, ischemic enteritis
Fetal complication		
Discordant twin	2 (4.0%)	

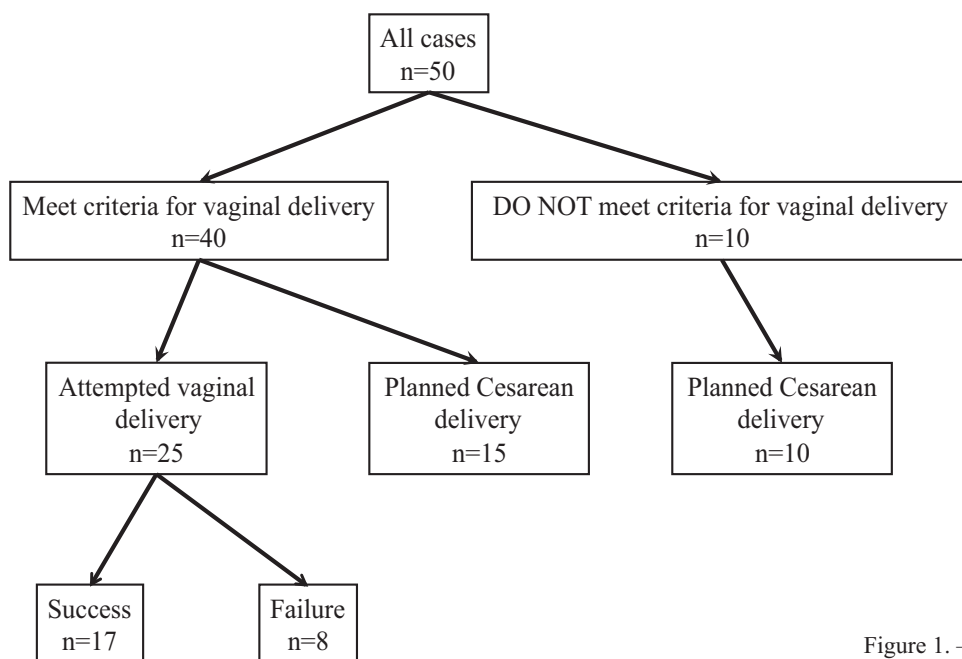


Figure 1. — Summary of delivery outcomes.

## Materials and Methods

From 2007 to 2015, 50 cases of twin pregnancy were managed and delivered at the National Hospital Organization Saitama National Hospital. Maternal and obstetric data, including maternal age, parity, chorionicity, pregnancy complications, labor induction, presentation, mode of delivery, obstetric maneuvers, inter-twin delivery interval, and postpartum hemorrhage were obtained from medical records. Neonatal data, including birth weight, one- and five-minute Apgar scores, and umbilical artery pH were also extracted from medical records. Data were analyzed by Fisher exact test and Student *t*-test using SPSS software. A value of  $p < 0.05$  was considered to be significant.

## Results

The median maternal age was 31.9 years and 24 (48.0%) mothers were nulliparous (Table 1). Of the 50 cases, 35 (70.0%) were spontaneous pregnancies and 15 (30.0%) oc-

curred after fertility treatment (Table 1). Membrane diagnosis showed dichorionic/diamniotic and monochorionic/diamniotic twins in 37 (74.0%) and 13 (26.0%) cases, respectively (Table 1). The highest incidence of maternal complication included threatened premature delivery requiring hospitalization in 36 (72.0%) cases, and the mean gestational age at admission was 30.5 weeks (Table 2). PIH occurred in ten (20.0%) cases and GDM in four (8.0%); uterine leiomyoma, benign ovarian tumor, and ischemic enteritis were also observed (Table 2). Fetal complication was discordant twin in two (4.0%) cases (Table 2). There was no fetal death in late pregnancy.

The delivery outcomes in 50 cases of twins delivered from 33 weeks of gestation onward that could be treated in the NICU are shown in Figure 1. Forty cases met the criteria for vaginal delivery and ten had planned cesarean delivery due to non-cephalic presentation or prior cesarean delivery. Vaginal delivery was actually performed in 25

Table 3. — *Clinical characteristics of cases with successful and failed vaginal delivery.*

Item	Success (n=17)	Failure (n=8)	p-value
Age (years, median)	30.0	34.5	0.12
Nulliparous (%)	52.9	62.5	0.65
Types of chorionicity and amniosity (%)			0.91
Monochorionic / diamniotic	35.3	37.5	
Dichorionic / diamniotic	64.7	62.5	
Gestational age at delivery (week+day)	36+6	36+2	0.73
Fetal position (%)			0.53
Cephalic / cephalic	76.5	62.5	
Cephalic / non-cephalic	23.5	37.5	

Table 4. — *Perinatal outcomes of cases with successful and failed vaginal delivery.*

Item	Success (n=17)	Failure (n=8)	p-value
Apgar score (1 <sup>st</sup> / 5 <sup>th</sup> minutes)			
First twin	8.4 / 8.9	8.0 / 8.9	0.20 / 0.76
Second twin	7.1 / 8.9	7.4 / 8.8	0.76 / 0.50
Umbilical artery pH			
First twin	7.36	7.32	0.06
Second twin	7.27	7.29	0.51
Weight at birth (g, average)			
First twin	2,303	2,521	0.06
Second twin	2,325	2,432	0.35
Blood loss (ml, average)	1,157	1,176	0.96

cases (Table 3), and in 17 (68.0%) of these cases both twins were born by vaginal delivery, including 13 cephalic-cephalic twins and four cephalic-breech twins. Two mothers gave birth to the first baby vaginally and the second by emergency cesarean delivery due to obstructed labor and fetal bradycardia caused by placental abruption, respectively. The fetal position was a cephalic-breech position in both subjects. In six cases (24.0%), vaginal delivery was attempted, but cesarean delivery of both twins was ultimately required due to obstructed labor. These twins included five in the cephalic-cephalic position and one in the cephalic-breech position.

A comparison of the clinical backgrounds of cases with successful and failed vaginal delivery indicated no significant differences in age, delivery history, membrane diagnosis, mean weeks of gestation at delivery, and fetal position (Table 3). A similar comparison of short-term fetal prognosis between these cases showed no significant differences in Apgar score, umbilical artery pH, mean birth weight, and blood loss (including amniotic fluid volume in cesarean delivery) (Table 4). The blood loss volume was significantly lower in cases with failed vaginal delivery compared to those with planned cesarean delivery, but there was no significant difference in other outcomes between these cases (Table 5).

Table 5. — *Perinatal outcomes of cases with failed vaginal delivery and planned cesarean section.*

	Failed vaginal delivery (n=8)	Planned Caesarean section (n=25)	p-value
Apgar score (1 <sup>st</sup> / 5 <sup>th</sup> minutes)			
First twin	8.0 / 8.9	7.9 / 8.7	0.75 / 0.56
Second twin	7.4 / 8.8	8.0 / 8.7	0.10 / 0.91
Umbilical artery pH			
First twin	7.32	7.30	0.20
Second twin	7.29	7.29	0.87
Weight at birth (g, average)			
First twin	2,521	2,303	0.06
Second twin	2,432	2,311	0.27
Blood loss (ml, average)	1,176	1,811	< 0.01

## Discussion

There is no consensus on procedures for twin delivery and for premature delivery of twins at <33 weeks of gestation or those with an expected body weight of < 1,500 grams [10]. The results of this study showed preterm delivery in 36 cases (72.0 %) at a mean of 36.3 weeks, and mean birth weights in premature delivery of 2,275 grams for the first twin and 2,262 grams for the second twin. Prevention of premature birth is critical for improvement of the perinatal prognosis in twin pregnancy. Tocolytic agents including ritodrine hydrochloride were administered in 36 (72.0 %) cases and cervical cerclage was performed in one (2.0%) in the present hospital. There is no evidence that tocolytic agents and cervical cerclage improve the prognosis of twin pregnancy; however, frequent measurement of the length of the uterine cervix facilitates diagnosis of threatened premature delivery and contributes to prolonged gestation [11]. The present authors recommend frequent evaluation of the length of the uterine cervix and uterine contractions in prenatal checkups, and hospitalization of mothers with risks for preterm delivery to allow earlier rest.

For the first twin with an estimated birth weight  $\geq 1,500$  grams in a cephalic position at  $\geq 32$  weeks gestation, there are no significant differences in perinatal mortality, incidence of five-minute Apgar score < 7, and neonatal morbidity between planned cesarean delivery and vaginal delivery; therefore, these cases can undergo vaginal delivery [10]. Thus, the present authors select vaginal delivery for the first twin in a cephalic position at  $\geq 33$  weeks gestation without severe fetal growth restriction, and cesarean delivery for cases that do not meet these criteria. The decreased tendency for vaginal delivery of twins is based on the burden on medical staff and the concern of parents for infants conceived after infertility treatment. Therefore, it is important to confirm that the prognosis is not worsened by vaginal delivery and to identify factors that increase the success of vaginal delivery. In this study, the short-term prognosis did not differ significantly

between successful and failed vaginal delivery or between failed vaginal delivery and planned cesarean delivery. A recent large-scale random study also found no differences in fetal and neonatal death and serious neonatal complications between vaginal delivery and selective cesarean delivery from day 0 of week 32 to day 6 of week 38 of gestation [12]. The results of this study similarly show no superiority of selective cesarean delivery.

In cases in which the first twin was in a cephalic position and the second in a non-cephalic position, perinatal mortality increases and the Apgar score is low for the second twin after vaginal delivery [5, 13, 14]. Therefore, cesarean delivery is likely to be chosen for such cases. However, active management including inversion and eversion of the second twin after delivery of the first twin decreased the rate of cesarean delivery of the second twin to 0-0.5%. Experienced obstetricians perform breech delivery of second twins in the present hospital, and the rates for the second twin in a non-cephalic position did not differ between cases with successful and failed vaginal delivery (23.5% vs. 37.5%).

The results of this study indicate that vaginal delivery of twins does not lead to a poor prognosis for infants. However, in addition to obstetricians and neonatologists, collaboration between anesthesiologists and operation room staff is required for safe delivery with preparation for an emergency. Failed vaginal delivery also places a physical and mental burden on the mother and on medical staff, and this increases safety concerns compared to successful vaginal delivery. Thus, vaginal delivery requires careful consideration and further evaluation in twin pregnancy. However, if emergency cesarean delivery and fetal resuscitation are available, vaginal delivery of twins has a reduced maternal burden and will contribute to the need for reduction of the rate of cesarean delivery worldwide.

## Conclusions

The neonatal outcome in twin pregnancy did not differ between vaginal delivery and cesarean delivery, even though vaginal delivery failed in some cases. These findings suggest that vaginal delivery can be attempted safely in twin pregnancy.

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