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Original Article

Evaluation of vaginal birth safety in twin pregnancies with the first twin in cephalic presentation

Bekir Kahveci [a, †], Mehmet Sukru Budak [b], Ihsan Baglı [a], Sedat Akgol [c]

[a] *Department of Obstetrics and Gynecology, Health Sciences University, Gazi Yasargil Research and Training Hospital, Diyarbakir, Turkey*

[b] *Department of Obstetrics and Gynecology, Izmir Private Can Hospital, Izmir, Turkey*

[c] *Department of Obstetrics and Gynecology, Health Sciences University, Kanuni Sultan Süleyman Training and Research Hospital, Istanbul, Turkey*

ABSTRACT

Objective: To evaluate vaginal birth safety by comparing the results of cesarean birth in twin pregnancies with the first twin in vertex presentation.

Material and methods: A retrospective cohort study of vertex-presenting twin pregnancies between 32 weeks 0 days and 38 weeks 6 days of gestation was conducted at our hospital from January 2013 to December 2014. The study population was divided according to the mode of birth. The primary outcome was early neonatal mortality, and secondary outcomes related to maternal and perinatal clinical characteristics were analysed between the groups.

Results: Of 45,166 births, 1.92% (n = 869) were twin pregnancies. Of the 295 pregnancies meeting the study criteria, 30.16% (n = 89) were in the vaginal birth group, while the remaining 69.84% (n = 206) were in the cesarean birth group. In the vaginal birth group, all the first twins were delivered via vaginal birth, while among the second twins, 82.03% (n = 73) were delivered via vaginal birth, and the remaining 17.97% (n = 16) were delivered via cesarean birth. In the vaginal birth group, the early neonatal mortality rate was 22.4‰ (n = 2), and it was 9.7‰ (n = 2) in the cesarean birth group. All of the deaths occurred in pregnancies under 37 weeks of gestation.

Conclusion: The neonatal outcomes between the vaginal birth and cesarean birth groups were similar in term pregnancies with the first in twin vertex presentation, whereas adverse neonatal outcomes were increased in the vaginal birth group in preterm second twin pregnancies.

Keywords: cesarean section; multiple pregnancy; neonatology; parturition

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Introduction

The frequency of twin pregnancies is increasing worldwide due to increased maternal age and the use of assisted reproductive techniques, and adverse perinatal outcomes are higher in these pregnancies than in single pregnancies [1-3]. Managing this increase in the rate of twin pregnancies is still a major problem. Also twin vaginal birth (VB) presents a unique clinical challenge for obstetricians. Although there is no consensus on the optimal method of birth in twin pregnancies, many researchers suggest that if the first twin has a vertex presentation, both twins are in the range of 1500–4000 g, and the second twin is not significantly larger than the first, VB is recommended [4]. Both the American Congress of Obstetricians and Gynaecologists and the Society for Maternal Fetal Medicine recommend VB of twin gestations with the first twin in vertex presentation [5,6].

The reported cesarean rates of cesareans for the second twin range from 0.5% to 10% [7-9] and between 19.6 and 43.8% for both twins [10,11]. These large rate ranges show that cesarean sections are associated with heterogeneous indications and some of these procedures are performed when VB is possible.

Many studies in the literature compare the effects of VB and cesarean birth (CB) on adverse pregnancy outcomes to clarify this issue.

Although some studies show a reduction in the development of adverse pregnancies with CB [12,13], others report that adverse effects are not different between the two forms of birth [4,14]. The differences in study design and the lack of quality randomized controlled trials are important reasons for this obvious debate.

The aim of this study is to evaluate the safety of VB by comparing the results of CB in twin pregnancies with the first twin in vertex presentation.

Material and methods

Study design and setting

The results of twin pregnancy cases followed and delivered between January 2013 and December 2014 at Health Sciences University, Gazi Yasargil Research and Training Hospital, were obtained retrospectively from the hospital's automation system records. Obstetric ultrasound was performed on all women involved in this study, with verbal consent, and the results were compared with the last menstrual period and first trimester obstetric ultrasound to determine the gestational week and chorionicity. The presentations and estimated fetal weights of the twins were

† Corresponding author.

E-mail: drbekirkahveci@hotmail.com,

ORCID ID: 0000-0002-8729-1669

determined via prenatal obstetric ultrasound. Out of all twin pregnancies, women who desire VB with the first twin in vertex presentation that were undergoing VB were included in group 1. Women who do not want VB with the first twin in vertex presentation that were undergoing a primary 'elective' CB for the first time were included in group 2 and VB has not been attempted for this patient group.

The primary outcome was early neonatal mortality and secondary outcomes related to maternal and perinatal clinical characteristics were analysed between the groups. The groups were compared in terms of maternal age, gravida, parity, body mass index (BMI), assisted reproductive technology (ART), term birth rates (≥37 weeks 0 days) and preterm birth rates (<37 weeks, divided into two groups: between 32 weeks 0 days and 33 weeks 6 days and between 34 weeks 0 days and 36 weeks 6 days), type of birth (infant 1 and 2), birth weight, five-minute activity–pulse–grimace–appearance–respiration (APGAR) score, five-minute APGAR less than 7, trauma-associated morbidity (was identified as spinal cord injury, fracture of skull, humerus, femur or clavicle, brachial plexus injuries, facial nerve injuries, subdural, subarachnoid and intracerebral hemorrhages), early neonatal mortality rate (ENMR: number of neonatal deaths in 0–7 days x 1000/total live births), maternal death and severe postpartum hemorrhage.

Experienced obstetricians evaluated all twin pregnancies that were accepted to the birth room after the start of spontaneous labor pains, and these pregnancies were continuously monitored during labor. The oxytocin regimen is the same as in singleton pregnancies. Oxytocin was started, especially if the labor did not progress during the delivery of the fetus in the second vertex presentation. After the birth of the first twin, the presentation of the second twin was determined by ultrasound. For pregnancies with the second twin in vertex presentation, amniotomy was not performed before the head of the twin was engaged unless forceps or vacuum was required due to unsafe fetal condition. In the second twin with non-vertex presentation, the obstetrician decided the best birth method (spontaneous breech birth, assisted breech birth, external cephalic version, internal podalic version, etc.) and implemented it following consultation with the pregnant woman. If the second twin is not in a cephalic presentation (eg, breech or transverse), our preference is breech extraction if there are no contraindications to this procedure. All twin VBs were performed by experienced obstetricians [13,14]. The women for whom the obstetrician decided CB was needed for the second twin were taken to an operating room quickly, and the twin CB was performed. The hospital serves a wide area, and because of the high number of births and an anaesthesia team are ready around the clock so CBs can be performed without loss of time if necessary.

Sample selection

Twin pregnancies included in the study had a gestation age between 32 weeks 0 days and 38 weeks 6 days, had a first infant with vertex presentation, and were delivered via VB or CB at the above-mentioned hospital. Exclusion criteria for this study were gestational age less than 32 weeks 0 days, women under 19 years of age, monoamniotic twins, fetal death in utero, fetal anomalies, contraindications for twin VB (first twin in non-vertex presentation, both twins' estimated weight less than 1500 g or more than 4000 g, a weight difference above 20% between first and second twins, placenta previa, prior classical CB, and others), prior low-segment cesarean, gestational hypertension, gestational diabetes mellitus, twin pregnant women with chronic disease, twin pregnancies underwent cesarean section for the first time due to induction of failure and, fetal distress during the labor.

Statistical analysis

Descriptive statistics were presented using mean and standard deviations for continuous variables. The chi-square test (χ^2) was used for categorical variables and expressed as observation counts. Statistical significance was accepted when the two-sided *P* value was lower than 0.05. For comparison of two non-normally distributed groups, the Mann–Whitney U test was used. All statistical analyses were performed using IBM SPSS Statistics 26.0 was used (IBM Corp., Armonk, NY, USA).

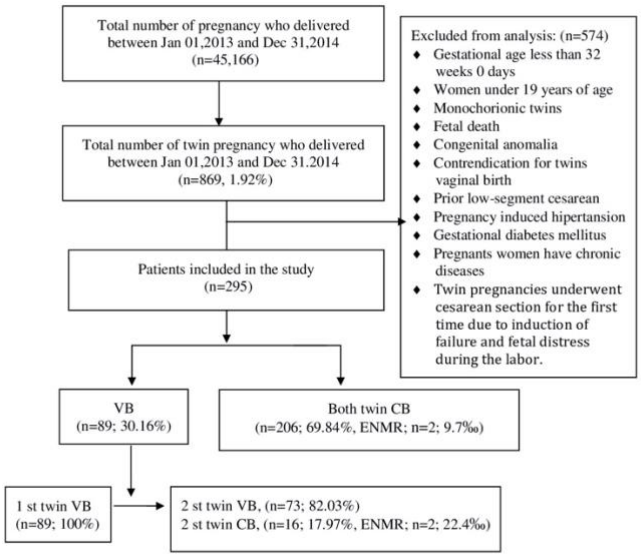
Ethical considerations

The study was approved by the Ethics Committee of the Health Sciences University, Gazi Yasargil Research and Training Hospital, and conformed to the ethical guidelines of the Declaration of Helsinki from 1964 (Number, 2018/77).

Results

The total number of deliveries in the study period was 45,166, of which 1.92% (n = 869) were twin pregnancies. Of these 295 twin pregnancies with the first twin in vertex presentation and meeting the study criteria, 30.16% (n = 89) were in the VB group, while the remaining 69.84% (n = 206) were in the CB group. In the VB group, all the first twins with vertex presentation were delivered via VB, while of the second twins, 82.03% (n = 73) were delivered by VB, and the remaining 17.97% (n = 16) were delivered via CB. The distribution of all births that included twins during this period is summarized in Figure 1.

Figure 1. Study flowchart



VB, Vaginal birth; CB, Cesarean birth; ENMR, Early neonatal mortality rate.

A comparison of the demographic characteristics of the two groups is shown in Table 1. The VB and CB groups presented the following mean respective results: maternal age 32.28±5.19 and 32.36±5.24; gravida 2.55±1.12 and 2.58±1.90; parity 1.57±1.13 and 1.61±1.91; BMI (kg/m2) 23.7 ± 4.7 and 24.7 ± 4.6. Pregnancy ratio with assisted reproductive technology 47.19% (n = 42) and 49.5% (n = 102), respectively.

The failure of intrauterine maneuvers was most frequently observed for cesarean indication of the second twin (n=6, 37.5%) (Table 2).

Table 1. Demographic characteristics of patients according to mode of delivery

	VB group (n=89)	CB group (n=206)	*P-value*
Age (year)[a]	32.28±5.19	32.36±5.24	0.839*
Gravida[a]	2.55±1.12	2.58±1.90	0.076*
Parity[a]	1.57±1.13	1.61±1.91	0.094*
BMI (kg/m2)[a]	23.7 ± 4.7	24.7 ± 4.6	0.913*
Gestational age (week)[a]	36.11±2.11	36.13±2.93	0.856*
32 wk to 33 wk 6 days[b]	11 (12.35)	23 (11.16)	0.924**
34 wk to 36 wk 6 days[b]	41 (46.06)	99 (48.05)	0.851**
37 wk to 38 wk 6 days[b]	37 (41.59)	84 (40.77)	0.998**
In vitro fertilization/ART[b]	42 (47.19)	102 (49.5)	0.831**

*VB, Vaginal birth; CB, Cesarean birth; wk, week; BMI, Body mass index; ART, assisted reproductive technology. aData are given as mean ± standart deviation. bData ara presented as number (percentage). *Mann-Whitney; **Chi-Square. P≤0.05, statistically significant.*

A comparison of the clinical characteristics of the two groups is shown in Table 3. When comparing the groups, VB and CB presented the following respective results; birth weight of first twin 2370±441 g and 2362±374 g; birth weight of second twin 2363±414 g and 2361±403 g; five-minute APGAR of first twin 9.13±0.74 and 9.11±0.89; five-minute APGAR of second twin 8.81±1.77 and 8.90±1.18; rate of second twin's five-minute APGAR<7 5.6% (n = 5) and 3.9% (n = 8); birth trauma 1.12% (n = 1) and 1.45% (n =3) (p>0.05). For the remaining characteristics, the VB and CB groups presented the following respective results: ENMR 22.4‰ (n = 2) and 9.7‰ (n = 2).

Table 2. Indications for cesarean deliveries in second twin (n=16)

Indications	n (%)
Failure of intrauterine manoeuvres	6 (37.5)
No descent of the fetal presentation	4 (25.0)
Non-reassuring fetal heart rate monitoring	2 (12.5)
Cervical retraction	1 (6.25)
Prolapse of an arm	1 (6.25)
Prolapse of umbilical cord	1 (6.25)
Placental abruption	1 (6.25)

These results were considered statistically significant (p = 0.006). When considering the distribution of early neonatal death cases in the two death cases in both the VB and the CB group occurred in the preterm groups. In addition, these four neonatal death cases were the vertex presentation, dichorionic diamniotic, did not have intrauterine growth retardation and inter-twin weight discordance too.

Discussion

In this cohort study of pregnant women with the first twin in cephalic position, we found that neonatal outcomes between VB and CB were similar in term pregnancies whereas adverse neonatal outcomes were increased in the VB group in preterm second twin.

A large retrospective study concluded that vaginal twin delivery is safe if experienced staff monitor birth weight differences, birth interval, and blood values. [15]. In a comprehensive randomized study, no difference was observed between fetal and neonatal mortality rates and severe neonatal morbidity when comparing VB and CB in twin pregnancies between 32 and 38 weeks with the first twin in vertex presentation [4,14].

Table 3. Clinical characteristics of maternal and perinatal outcomes according to mode of delivery

	VB group (n=89)	CB group (n=206)	*P-value*
Birth weight (g)[a]			
First twin	2370±441	2362±374	0.672*
Second twin	2363±414	2361±403	0.909*
Five-minute APGAR[a]			
First twin	9.13±0.74	9.11±0.89	0.786*
Second twin	8.81±1.77	8.90±1.18	0.405*
Second twin presentation[b]			
Cephalic	58 (65.16)	103 (50.0)	**0.023****
Non-cephalic	31 (34.83)	103 (50.0)	**0.022****
Five-minute APGAR<7[b]			
First twin	0 (0.0)	0 (0.0)	-
Second twin	5 (5.6)	8 (3.9)	0.731**
Birth trauma[b,c]	1 (1.12)	3 (1.45)	0.861**
ENMR (‰)			
First twin	0 (0.0)	0 (0.0)	-
Second twin	2 (22.4‰)	2 (9.7‰)	**0.006****
32 wk to 36 wk 6 days	2 (22.4‰)	2 (9.7‰)	**0.006****
37 wk to 38 wk 6 days	0 (0.0)	0 (0.0)	-
Maternal death[b]	0 (0.0)	0 (0.0)	-
Severe postpartum hemorrhage[b]	5 (5.61)	12 (5.82)	0.871**

ENMR, Early neonatal mortality rate; VB, Vaginal birth; CB, Cesarean birth; wk, week; g, gram.

[a]Data are given as mean ± standart deviation, [b]Data ara presented as number (percentage).

[c]Birth trauma: spinal cord injury, fracture of skull, humerus, femur or clavicle, brachial plexus injuries, facial nerve injuries, subdural, subarachnoid and intracerebral hemorrhages

[*]Mann-Whitney; [**]Chi-Square; P≤0.05, statistically significant

A recently published prospective cohort study found that an increased risk on adverse neonatal outcomes was seen after planned CB compared to planned VB (patients who accepting VB for twin and no contraindication for twin VB) at a gestation age of 32 weeks 0 days to 36 weeks 6 days. In addition, no difference was found between the groups after 37 weeks [10]. In another study, no difference was observed between the groups for term pregnancies, but preterm pregnancies were found to have significantly higher rates in the VB group [13]. Another study found that perinatal mortality did not differ statistically significant between planned CB and planned VB in preterm twins but at term, a planned CB may result in less asphyxia and trauma-related outcomes [16]. In our study, there was no difference in ENMR in the term pregnancy groups when comparing CB and VB, but this rate was significantly higher in the VB group in the preterm group.

As for neonatal outcomes, it seems that second twins have higher morbidity rates [9,17,18]. In our study, all the first twins were delivered via VB in group 1, and 17.97% of the second twins were delivered via emergency intrapartum cesarean sections, which is similar to the VB group in the study performed by Goossens et al. (intrapartum CB rate of 19.7%) [16]. Early neonatal deaths occurred in two of the second twins who had to be delivered via emergency

intrapartum cesarean sections in the VB group, and the ENMR in this group was 22.4‰, while this rate was 9.7‰ in the CB group for the second twins. However, in the subgroup analysis, early neonatal deaths in both groups were observed in the preterm pregnant group. Unlike in our study, Barrett et al. [11], who reported no difference in terms of early neonatal mortality after CB and VB in the preterm pregnant group.

Zafarmand et al. [19] identified gestational age at birth as a strong prognostic factor for the outcomes of neonates, depending on the planned mode of birth. They also stated that from 32 to 37 weeks, a planned VB seems favourable, while from around 37 weeks on, a CB might be safer. In our study, early neonatal mortality was observed in both the VB and CB groups at 32–37 weeks but not over 37 weeks.

When VB is attempted, the capacity for immediate CB is important in the event that complications necessitating urgent birth arise (e.g., prolapsed umbilical cord, non-reassuring fetal heart rate, no descent of the fetal presentation, failed breech extraction, or failed internal podalic or external cephalic version, cervical retraction, prolapse of an arm and placental abruption). Our study showed that main indication for cesarean for the second twin was the failure of intrauterine manoeuvres. In the main, emergency situations presenting more than one obstetrical complication were responsible for this uncommon practice [20]. Studies have shown that in twin pregnancies, the incidence of adverse perinatal outcomes in twin pregnancies delivered with emergency intrapartum cesarean sections is higher than in planned CBs [21-23]. Our study also showed high ENMR results in twins with emergency intrapartum cesarean sections in the VB group, which is similar to the results of literature.

Grossman et al. [24] found that maternal morbidity increased in the VB group compared to the planned CB group. Also, in this study, the highest rate of adverse outcomes was seen in twins who underwent CB after failed induction of labor [24]. Also, Mei-Dan et al. [14] found that planned VB group had more antepartum hemorrhage (1.9% vs 0.6%) and maternal complication (e.g. death, haemorrhage, blood transfusion, dilation and curettage after delivery, laparotomy, perineal third-degree or fourth-degree tear involving anal sphincter, thromboembolism requiring anticoagulant therapy, systemic infection, wound infection, wound dehiscence or breakdown, major serious or life-threatening medical illness) (2.4% vs 0.1%) compared with the planned CB group. Conversely, in another study was found that in twin pregnancies with planned VB, CBs for the second twin and for both twins are associated with higher risks of severe acute maternal morbidity than VB [3]. The multicentre retrospective study of Wenckus et al. [8] comparing maternal and neonatal outcomes in twins undergoing a trial of labor versus prelabor caesarean, there was an increased risk for postpartum haemorrhage and blood transfusion for the trial of labour. In our study, we did not find any difference in terms of maternal morbidity/mortality according to the mode of birth.

Although the literature is controversial, inter-twin weight discordance >20% was found to be a risk factor for increased perinatal morbidity of second twins [25]. However, Peaceman et al. [26] emphasized that the route of birth does not influence neonatal outcomes when assessing weight discordance above 20%. In our study, there were no differences in terms of weight discordance in twin birth according to the mode of birth.

As a limitation, the small number of study population and retrospective collection of the data may be considered as weakness of our study. The strength of our study is that it evaluates a controversial issue.

In conclusion, the neonatal outcomes between VB and CB were similar in term pregnancies with first twin cephalic presentation, whereas adverse neonatal outcomes were increased in the VB group in preterm second twin. Our results could help obstetricians and midwives inform women with twin pregnancies and make decisions about management during their labor. More research is needed to confirm our results and focus on the mode of delivery.

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Disclosure

Authors have no potential conflicts of interest to disclose.

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