

## Original Article

# Comparison of maternal and fetal outcomes of IVF and spontaneously conceived twin pregnancies: three year experience of a tertiary hospital

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**Abstract:** Objectives: The aim of this study was to compare maternal and fetal outcomes of spontaneously conceived and in-vitro fertilization (IVF) twin pregnancies that were admitted to our obstetric clinic and delivered between January 1, 2011 to November 1, 2014. Material method: A total of 84 twin pregnancies were enrolled for the study and divided into two groups: group 1 as IVF (n = 19) and group 2 as spontaneously conceived (n = 65) twin pregnancies. Data of neonatal various morbidities needs neonatal intensive care unit (NICU) such as necrotizing enterocolitis (NEC), bronchopulmonary dysplasia (BPD), sepsis, retinopathy of prematurity (ROP), and intraventricular hemorrhage (IVH) and maternal morbidities such as preeclampsia, eclampsia, postpartum bleeding, gestational diabetes mellitus (GDM) were collected by hospital records. Results: There were no statistical difference between two groups regarding hypertension related to pregnancy, intrauterine growth retardation, Apgar scores, NICU needs, birth weight and height ( $P > 0.05$ ). The rate of premature rupture of membranes, maternal age, antenatal anemia and premature birth were detected higher in IVF group when compared with the other group ( $P < 0.05$ ). Conclusion: Although twin pregnancies, regardless of conception method are high risk pregnancies in terms of obstetric and perinatal outcomes, premature rupture of membranes, maternal age, antenatal anemia and premature birth risks are higher in IVF twin pregnancies.

**Keywords:** IVF, twin, maternal outcome, fetal outcome, NICU

## Introduction

Multifetal gestations are high-risk pregnancies with higher perinatal morbidity and mortality rate. They also involve higher perinatal complications including fetal anomalies, fetal demise, intrauterine growth restriction, prematurity, polyhydramnios and oligohydramnios [1]. There are some unique complications such as twin oligohydramnios-polyhydramnios sequence (TOPS), twin-to-twin transfusion syndrome (TTTS), acardiac twins, conjoined twins, co-twin demise, and heterotopic pregnancies which are affecting both maternal perinatal outcomes negatively [2].

With the commonly use of ovulation induction methods (OI) and assisted reproduction techniques (ART) in conjunction with the increasingly aging maternal population has resulted in an increased incidence of multiple gestation pregnancies [3]. Women who use OI have an

approximately 6% chance of having twins or higher order multiples [4]. Those who use ART have a 35% chance or more for conceiving multiples [5]. Although the use of IVF has increasing over the years, there are many questions are still present about the outcomes of pregnancies obtained with the aid of IVF and the reliability of this method [6]. There are many studies in the literature including the comparison of the pregnancies obtained with IVF and spontaneously conceived pregnancies [7].

In this trial we aimed to compare maternal and fetal outcomes of IVF and spontaneously conceived twin pregnancies who were admitted to our obstetric clinic and delivered between January 1, 2011 to November 1, 2014.

## Materials and methods

From January 1, 2011 to November 1, 2014, we conducted a retrospective study of mothers

## Outcomes of twin pregnancies

**Table 1.** Comparison of groups in terms of age, gestational weeks, gravidity and parity

	IVF twins n = 19	Spontaneous conceived twins n = 65	P
Age	31.4 ± 3.2	28.1 ± 2.02	P < 0.05
Gestational weeks	33 w ± 3 d	34 w ± 2 d	P > 0.05
Gravidity	1 ± 1.02	2 ± 1.6	P < 0.05
Parity	0.4 ± 0.6	1.6 ± 1.0	P < 0.05

and infants born from twin pregnancies after 24 weeks at the Obstetrics Department, Ümraniye Medical Hospital, İstanbul, Turkey, to compare maternal and fetal outcomes of IVF and spontaneously conceived twin pregnancies.

Both dichorionic and monochorionic twin pregnancies were considered. Pregnancies resulting in singleton, triplet or delivering before 24 weeks, pregestational diabetes mellitus and hypertension history were excluded from this study. After selection, a total of 84 pregnancies were included in the study of which 19 were IVF and 65 were spontaneously conceived twin pregnancies.

Data of neonatal various morbidities of prematurity such as NEC, BPD, sepsis, ROP, and IVH and maternal morbidities such as preeclampsia, eclampsia, postpartum bleeding, GDM were collected by hospital records.

The diagnosis of chorionicity was based on B-ultrasound before 14 weeks gestation. Preeclampsia was diagnosed after 20 weeks gestation persistent blood pressure was  $\geq 140/90$  with proteinuria  $\geq 300$  mg/24 h. GDM was diagnosed according to IADPSG (International Association of Diabetic Pregnancy Study Group) criteria (fasting glucose < 5.1 mmol; 1 hour glucose < 10.0 mmol; 2 hours glucose < 8.5 mmol) after 24 weeks gestation. Placenta praevia was diagnosed by using ultrasound and premature rupture of membranes was diagnosed with the seen of pooling of amnion fluid by speculum application. Preterm birth was defined as delivery before 34 weeks gestation. Birth weight discordance (BWD) between twins was defined as a birth weight difference greater than 20% between twins. Fetal mortality was calculated by dividing the sum of stillbirths and perinatal deaths by the total number of births. The diag-

nosis of NEC, BPD, sepsis, ROP and IVH were according to standards in Practice in Prematurity [8].

These pregnancies were managed by the same group of obstetricians according to the same obstetric protocol to prevent potential bias.

Statistical analyses were performed using SPSS software (Statistical Package for the Social Sciences, version 15.0; SPSS Inc., Chicago, IL, USA). Continuous variables with normal distribution were presented as mean  $\pm$  SD. Categorical variables were presented as numbers and percentages. The data collected for the study was statistically analyzed using  $\chi^2$  test.

### Results

In the study, 19 (22.6%) out of 84 twin pregnancies were IVF pregnancies. The mean gestational weeks of IVF and spontaneously conceived pregnancies at time of delivery were 34 w  $\pm$  2 d and 33 w  $\pm$  3 d, respectively. Although there was no statistical difference about the gestational week between two groups, the mean maternal age was significantly higher in the IVF group than in the spontaneously conceived group (31.4  $\pm$  3.2 vs. 28.1  $\pm$  2.02, respectively). The mean age of IVF pregnancies was more significant than the other group ( $P < 0.05$ ) (Table 1).

Presentation of the fetuses were investigated and shown in Table 2. There were no significant differences detected among groups in terms of presentation of the babies ( $P > 0.05$ ).

In the investigation of chorionicity, we obtained that the percentage of dichorionic gestations was 85% (72/84) while the percentage of monochorionic gestations was 14.2% (12/84) (4.7% monochorionic-monoamniotic, 9.5% monochorionic-diamniotic). There were no significant differences detected among groups according to chorionicity ( $P > 0.05$ ).

The number of the pregnancies terminated with cesarean section in the spontaneously conceived pregnancy group and IVF group were 42 and 17, respectively. Cesarean section rate (89% vs. 64.6%) was significantly higher in IVF group ( $P < 0.05$ ). The most common reason was detected as non-reassuring non-stress test and lower biophysical profile. Previous

## Outcomes of twin pregnancies

**Table 2.** Comparison of neonatal outcomes

	IVF twins n = 19	Spontaneous conceived twins n = 65	P
Mean birth weight of first baby	2408 ± 453	2418 ± 554	P > 0.05
Mean birth weight of second baby	2284 ± 541	2194 ± 783	P > 0.05
Mean birth height of first baby	42 ± 4	42	P > 0.05
Mean birth height of second baby	42 ± 2	41 ± 5	P > 0.05
Mean first minute Apgar score of first baby	7 ± 2	6.8 ± 1.6	P > 0.05
Mean fifth minute Apgar score of first baby	8 ± 2	7.2 ± 2.04	P > 0.05
Mean first minute Apgar score of second baby	7 ± 1.2	7.4 ± 1.4	P > 0.05
Mean first minute Apgar score of second baby	6.8 ± 2	8 ± 1	P > 0.05

**Table 3.** Comparison of maternal outcomes

	IVF twins n = 19	Spontaneous conceived twins n = 65	P
Mean hospital stay	2 ± 1	2 ± 1.4	P > 0.05
Hemoglobin levels	11.8 ± 1.9	9.1 ± 1.2	P < 0.05
Preterm birth rate	36.8%	26.8%	P < 0.05
PPROM rate	15.7%	10.7%	P < 0.05
Preeclampsia rate	5.2%	4.6%	P > 0.05
IUGR rate	10.5%	9.2%	P > 0.05
Postpartum bleeding rate	0.00%	4.6%	P < 0.05

cesarean section history, abnormal presentations, preterm rupture of membranes were other common indications for cesarean section decision. Indication of PPRM was statistically higher in IVF twin group ( $P < 0.05$ ).

The mean birth weight of the first babies in spontaneously conceived pregnancies was 2318 ± 554 grams and 2408 ± 453 grams in IVF group. The mean birth weights of the second babies in two groups were 2194 ± 783 grams and 2284 ± 541, respectively. There were no birth weight discordance detected. In IVF group, the average of the height of first delivered babies were 42 cm and 42 ± 4 cm in spontaneously conceived group. The values for second delivered babies were 41 ± 5 cm and 42 ± 2 cm respectively. There was no statistical difference between groups according to birth weight and height ( $P > 0.05$ ) (Table 3).

While the first and fifth minute Apgar scores of the first baby delivered in IVF group were 7 ± 2 and 8 ± 2 respectively, the Apgar scores of the second baby were determined as 6.8 ± 1.6 and 7.2 ± 2.04, respectively. In spontaneously conceived group, the mean first and fifth minute

APGAR scores first baby 7 ± 1.2 and 7.4 ± 1.4 and second baby were 6.8 ± 2 and 8 ± 1. The values for second delivered babies were 41 ± 5 cm and 42 ± 2 cm respectively. According to Apgar scores of two groups, there was no significant difference among groups.

When the groups were compared for the needs of neonatal intensive care there were no significant differences detected. The reasons for babies needed neonatal intensive care were

NEC, BPD, sepsis, ROP and IVH, hyperbilirubinemia. There was no anomaly detected among all babies.

Maternal outcomes were listed in Table 3. The most common maternal morbidity detected was antepartum anemia. The mean hemoglobin concentration were significantly higher in the IVF women than in the spontaneously conceived pregnancies (11.8 ± 1.9 vs. 9.1 ± 1.2 respectively). The rate of premature rupture of membranes was detected higher in IVF group when compared with the other group (15.7% vs. 10.7%). Also the rate of preterm birth was detected higher in IVF group when compared with the other group (36.8% vs. 26.8%). There was no statistical difference between two groups regarding hypertension related to pregnancy and intrauterine growth retardation. Postpartum bleeding was occurred in only 3 patients of group 2 and one of them was due to placenta previa. There was no postpartum bleeding detected in group 1.

### Discussion

The literature comparing maternal and perinatal outcome in ART and SC twins is conflicting

## Outcomes of twin pregnancies

[9]. Although in some studies it was concluded that the maternal and perinatal outcomes of the IVF pregnancies were worse than spontaneously conceived pregnancies, there are some many studies in which no statistical difference was determined. When considering the mean age of pregnant women, it was found higher in the IVF pregnancies than spontaneous conceived pregnancies. The mean age of the IVF and spontaneously conceived pregnancies were found  $31.4 \pm 3.2$  vs.  $28.1 \pm 2.02$ , years, respectively and a statistical difference was found [10].

The most common maternal morbidity detected was antepartum anemia (no = 19). The mean hemoglobin concentration were significantly higher in the IVF women than in the spontaneously conceived pregnancies ( $11.8 \pm 1.9$  vs.  $9.1 \pm 1.2$ , respectively). There was no difference among two groups when preeclampsia, eclampsia, postpartum bleeding and gestational diabetes mellitus were compared. This result was similar to the findings in which the studies of Baxi et al and Vasario et al [11, 12].

In the study included the data based on 2014, the rate of preterm delivery in spontaneous twins was 57.0% and 69.1% in IVF pregnancies when threshold was specified on 37 weeks of gestation. In our study, similarly the rate of preterm delivery was 26.8% and 36.8% in spontaneous pregnancies and IVF pregnancies, respectively. Our findings are consistent with current obstetric data on the subject [13].

The rate of the intrauterine growth retardation (IUGR) was 10.5 % in spontaneous pregnancies and 9.4% in IVF pregnancies in our study and we found no statistical difference between two groups. Similarly, no significant difference was found in the study of Baxi et al [12]. We found a significant difference among groups regarding the cesarean delivery rate (89% vs. 64.6%) ( $P < 0.05$ ) and this finding is consistent with the results of similar studies in the literature [14].

There was no difference between two groups when compared the birth weight, height, Apgar scores and need of neonatal intensive care unit. Although studies in the literature that suggest the need of neonatal intensive care unit of the IVF twin pregnancy are high, Aslan et al found no statistically significant difference in accordance with our results [15].

Although in many meta-analysis of IVF babies, the rate of congenital anomalies in IVF pregnancies compared to normal pregnancy has been shown to have increased by 29-41%, there were no anomalies detected in our study. This may be due to small number of subjects.

Twin pregnancies, regardless of conception method are high risk pregnancies in terms of obstetric and perinatal outcomes. Although IVF pregnancies can be obtained in older age, preterm birth and cesarean delivery are seen more often in IVF pregnancies.

### Disclosure of conflict of interest

None.

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## Outcomes of twin pregnancies

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