

Twin pregnancy outcome of our clinic: A three-year follow up

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Abstract

Aim: We aimed to present the obstetric and perinatal outcomes of twin pregnancies that were followed up by our clinic, for three years.

Material and Methods: The twin pregnancies, which were followed up during their whole gestational periods and delivered in our clinic, from the year 2016 to 2019, were observed retrospectively for their obstetric and perinatal outcomes.

Results: 56 twin pregnancies were enrolled in the study, 48 (85.7%) of which were conceived spontaneously, and 8 of which were conceived with assisted reproductive techniques. 48 (85.7%) of all twins were dichorionic (DC) diamniotic, 7 of them (12.5%) were monochorionic (MC) diamniotic, and 1 of them (1.78%) was MC monoamniotic. Ages of mothers, a gestational week at delivery, way of delivery, birth weights of newborns, and complications like preterm labor, the discordance of twin pairs, intrauterine fetal demise, twin to twin syndrome (TTTS), and twin anemia- polycythemia sequence were examined. Preterm labor was observed in 22 (39.3%) twin pregnancies, and the discordance rate was 21.4%. In 5 of them (8.9%), TTTS developed. One of the twin pair died in 5 (8.9%) of all. 1 (1.8%) conjoined twin was observed and delivered at term. Forty-eight of all twin pregnancies (85.7%) delivered by caesarian section, 6 of them (10.71%) by the vaginal route, and 2 of them (3.51%) ended with a miscarriage.

Conclusions: Twin pregnancies are high-risk pregnancies when the fetal and maternal outcomes are in concern. Chorionicity is the most important factor effective in perinatal outcomes. Early recognition of the complications, mainly belonging to MC twins, and frequent antenatal follow up will help to intervene at the correct time and decrease fetal and maternal complication rates.

Keywords: Twin pregnancies; chorionicity; obstetric; perinatal outcome

INTRODUCTION

The incidence of twin pregnancies has been increasing in recent years due to genetic factors, and an increase in advanced maternal age, and use of assisted reproductive technologies (ART) (1). The incidence of spontaneous twins is thought to be approximately 1 in 80 pregnancies(2); the total incidence of twin pregnancies is two times of it because of ART (3,4). Risks of maternal and fetal complications like preterm labor, preterm premature rupture of membranes, preeclampsia, placental abruption, postpartum hemorrhage, congenital anomalies, perinatal death, prematurity, and FGR increase in multifetal pregnancies (5).

The rate of the placental vascular anastomosis is especially increased in MC twin pregnancies when they are

compared to DC ones. As a result, the complications like the twin to twin transfusion syndrome (TTTS), selective FGR (sFGR), twin anemia-polycythemia sequence (TAPS), twin reversed arterial perfusion (TRAP) sequence, conjoined twins and single intrauterine death (IUD) occur more in MC twin pregnancies (6).

We aimed to investigate the obstetric and perinatal outcomes of twin pregnancies that were followed up by our clinic during the years 2016-2019, in this study.

MATERIAL and METHODS

A retrospective cross-sectional study was performed between August 2016 and June 2019 in the Perinatology Department of Konya Education and Training Hospital. A total of fifty-six twin pregnancies were included in the study. The diagnosis of twin pregnancy and chorionicity

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was made with the help of ultrasonography, in the first trimester. The observation of two gestational sacs, containing embryos, and having lambda or T- sign at the placental edge was needed for the diagnosis of DC diamniotic twins. Two embryos in one gestational sac were diagnosed as MC monoamniotic twins. The twins have two embryos in two sacs, and a thin membrane at the placental border, but without lambda or T sign was diagnosed as MC monoamniotic twins (7). The diagnosis was approved by visual and pathologic examination of the placentas and fetal membranes in the postpartum period. The diagnosis of TTTS was made during the gestational period.

Twin pregnancies which were obtained spontaneously or via ART (in-vitro fertilization (IVF), intracytoplasmic sperm injection (ICSI), gamete intrafallopian transfer (GIFT), intrauterine insemination (IUI)) were included in the study, and their chorionicity was evaluated via ultrasonography, and validated after delivery by macroscopic and histologic examination of the placentas.

The twin pregnancies having uterine anomalies (uterus didelphis, uterus unicornis), the triplets or quadruples reduced to twins due to fetal anomaly or selective termination, and the ones terminated due to maternal complications like preeclampsia and HELLP were not included in the study.

All of the patients were admitted to our hospital in their first trimesters, and the whole of their follow up and delivery periods occurred in our clinic. HS70ASamsung device was used in our study (Samsung Medision Diagnostic Ultrasound System, United States). We recorded maternal characteristics and medical history, including maternal age, body mass index (BMI) of the mothers were calculated according to the following formula: weight (kilogram)/body surface area (meter²), method of conception (natural or assisted conception requiring the use of ovulation drugs or by in-vitro fertilization, IUI, spontaneous twin pregnancy), cigarette smoking during pregnancy (yes or no) and parity (parous or nulliparous if no previous pregnancy \geq 24 weeks' gestation). The gestational weeks were calculated according to the last menstrual date and verified by first-trimester ultrasonography and chorionicity by examining the junction of the intertwin membrane with the placenta.

The diagnosis of TTTS in MC twins was made due to the differences in crown-rump length (CRL) and nuchal translucency (NT) of two fetuses in the first trimester (8). In the second trimester, the Quintero classification was used for the diagnosis of TTTS (9). Quintero classification is as follows: class 1: the urinary bladder of the donor twin can be visualized, and its Doppler parameters are normal, class 2: the urinary bladder of the donor twin cannot be visualized, but the Doppler parameters are normal, class 3: at least one fetus has abnormal Doppler parameters (loss of end-diastolic blood flow in umbilical artery, reverse flow in umbilical artery or ductus venosus, pulsative flow in umbilical vein, etc.), class 4; hydrops in the recipient fetus, class 5: death of one or two of the fetuses. Fetoscopic cord occlusion procedure was applied

to 2 of twins having class 2-3 TTTS. Fetoscopic laser photocoagulation was applied to 2 cases having class 1 TTTS. One of them developed TAPS after the procedure. The measurement made the diagnosis of TAPS of the middle cerebral artery (MCA) peak systolic velocity of the donor fetus, which was > 1.5 multiple of median (MOM); and the peak systolic velocity of MCA of the recipient was < 1.0 MOM(10).

The DC twins who were diagnosed to have two live embryos in the first trimester, but to lose one of them during the follow-up period was accepted as miss of twin. More than 20 % difference between the birth weights of the twins was accepted as discordance (8).

Other multiple pregnancies like triplets, the patients which have one live embryo but no or ex embryo in the other sac; and the ones having uterine anomalies (uterus unicornis, uterus didelphys, etc.); and heterotropic pregnancies are excluded.

The study protocol was performed according to the principles of the Declaration of Helsinki and was approved by the local Ethical Committee of our hospital (approval date: 04.07.2019/27-17).

Statistical data analysis was performed by using SPSS for Windows, version 22 (SPSS Inc., Chicago, IL, United States). Continuous variables were shown as median (minimum-maximum) and while the discrete data was presented as the frequency (percentage).

RESULTS

The baseline characteristics

A total of 56 twin pregnancies were enrolled in the study. The baseline characteristics and clinical features of twin pregnancies are given in Table 1. The means of maternal age, BMI, and gravity of the mothers were 29.32 (19-40), 29.01 kg/m² (22.83-43.52), 1.87 (1-4), respectively. The mean of the delivery week was 32.89 (14-39). Forty-eight of them (85.7%) were conceived spontaneously, and 8 of them (14.3%) were conceived with ART. Forty-eight of them (85.7%) were DC and diamniotic, 7 of them (12.5%) were MC and diamniotic, and the remaining 1 (1.78 %) was MC and monoamniotic.

Nine of the patients (16.1%) delivered at term, and 22 of them (39.3%) delivered at the preterm period. Twelve of them (21.4%) developed discordance and impaired Doppler parameters, which caused us to induce preterm labor. TTTS developed in 5 of the total group (8.9%). One of the patients (1.8%) had conjoined twins and delivered at term. 2 of the total group (3.6%) had a miscarriage, and 5 of them (8.9%) had experienced the death of one of the twins in utero. Forty-eight of the patients (85.7%) delivered by caesarian, and 6 of them (10.71%) by vaginal route (Table 1).

Two of the patients getting twin pregnancy spontaneously had a miscarriage; one of which was DC, and the other was MC. In the MC one, we observed CRL difference more than two weeks between the twin pairs, at the 12th week, and

their NT ratios were more than 2. TTTS was developing, and two of the fetuses died in the 14th week.

TTTS had developed in 5 of spontaneous twins. Fetoscopic cord occlusion was applied in 2 of them. Fetoscopic laser photocoagulation was applied in the other 2, and the remaining one was just observed clinically and ended in miscarriage. One of the patients having cord occlusion delivered by caesarian in the 39th week. The other one had simultaneous amnioreduction procedure until 32nd week. Venous thrombus had developed in the mother. After the acute stage of the disease had ended, the filter was applied to the vena cava, and the caesarian route was chosen for the delivery because of breech presentation. After fetoscopic laser photocoagulation; one of the twin pairs died. The other pair was delivered on the 28th gestational week by the caesarian route. TAPS had developed in this pregnancy, and the anemic fetus died just after delivery.

In 4 of the spontaneous twin pregnancies, one of the

twin pair died in the first trimester. Only one of these four patients had preterm delivery due to preterm premature rupture of membranes (PPROM), and rest of them delivered at term. The other patient, whose one of the twins died in utero, had previous ART and delivered by caesarian at term. Discordance developed in 8 of spontaneous twin pregnancies; 1 of them delivered at term, and the rest delivered at the preterm period. Omphalophagus was observed in one of the spontaneous twin pregnancies; delivery by caesarian section was made at the 37th gestational week. The fetuses who were sharing the same liver and cardiac ventricles died just after the operation.

Eight of the total patients had previous ART, 1 of the MC, and the rest was DC. The entire group delivered by caesarian section. The MC one delivered at the 27th week due to preterm labor. Only one of DC ones delivered at term; 2 had preterm labor and discordance developed in the rest 4, which caused induced preterm delivery.

Table 1. Demographic characteristics and clinical features

Characteristics (n= 56)	Values	
Age (year) [median (min-max)]	29.32 (19-40)	
BMI (kg/m2) [median (min-max)]	29.01 (22.83-43.52)	
Gravida (n) [median (min-max)]	1.87 (1-4)	
Gestational week [median (min-max)]	32.89 (14-39)	
Twin pregnancy formation	Spontaneous Twin	48 (85.7%)
	IVF	8 (14.3%)
Chorionicity n(%)	Dichorionicdiamniotic	48 (85.7%)
	Monochorionic diamniotic	7 (12.5%)
	Monochorionic monoamniotic	1 (1.78%)
Complication n(%)	Term delivery	9 (16.1%)
	Preterm delivery	22 (39.3%)
	Discordance twin	12 (21.4%)
	TTTS	5 (8.9%)
	Single twin demise	5 (8.9%)
	Conjoined twin	1(1.8%)
	Abortion	2 (3.6%)
	Cesarean	48 (85.7%)
Birth type n(%)	Vaginal	6 (10.71%)
	Abortion	2 (3.51%)
	Cesarean	48 (85.7%)
Birth type n(%)	Vaginal	6 (10.71%)
	Abortion	2 (3.51%)
	Cesarean	48 (85.7%)

Our data are expressed in mean \pm sd and in numbers.

ASA: American Society of Anesthesia; sd: Standard Deviation, Group L: Lateral Decubitus group, Group B: Beach Chair Group

Perinatal outcomes of twin pregnancies

The mean birth weights of the first- delivered neonates was 1742 grams (100-3800), and it was 1716 grams (130-3460) for the second- delivered ones. Neonatal intensive care unit (NICU) admission was needed in 32 of the patients (57.1%). Two of these twins were MC; the rest were DC. Twelve of the first newborns(21.4%) died; 2 of these were conceived by ART. 4 of the MC patients whose first delivered fetus died, had TTTS; 1 had conjoined twins, and 1 had a miscarriage.

Only one of the 12 of the patients whose first newborns did not need NICU admission had previous ART; the rest

of these had spontaneous twin pregnancies. Four of these delivered at the preterm period, and the rest delivered at term. 15 (26.8%) of the second- delivered newborns did not need NICU admission, 33 of them (58.9%) admitted to NICU, and 8 (14.3%) were dead. The values were demonstrated in table 2.

Our study has limits in the number of patients because it is a cross-sectional one, and this prevents the generalization of its results for the population. The multicenter origin of twins conceived by ART and the absence of genetical results of fetuses having FGR or which died after delivery (due to lack of consent of the families) are the other limits of our study.

Table 2. Perinatal outcomes of twin pregnancies

Perinatal outcomes	Values	
First baby birth weight (gr) [median (min-max)]	1716 (0-3800)	
Second baby birth weight (gr) [median (min-max)]	1716 (130-3460)	
Perinatal Outcomes n(%)		
First baby n(%)	Mother's side	12 (21.4%)
	NICU	32 (57.1%)
	Ex	12 (21.4%)
Second baby n(%)	Mother's side	15 (26.8%)
	NICU	33 (58.9%)
	Ex	8 (14.3%)

n; number, gr; gram. NICU; Newborn Intensive Care

DISCUSSION

Our study included 56 twin pregnancies whose follow up, and deliveries occurred in our clinic, during 2016- 2019. 85.7% of these twins were conceived spontaneously and 14.3% of them by ART. Nine of the patients (16.1%) delivered at term, and 22 of them (39.3%) delivered at the preterm period. Forty-eight of them (85.7%) were DC and diamniotic, 7 of them (12.5%) were MC and diamniotic, and the remaining 1 (1.78 %) was MC and monoamniotic. TTTS had developed in 5 of spontaneous twins. Fetoscopic cord occlusion was applied in 2 of them. Fetoscopic laser photocoagulation was applied in the other 2, and the remaining one was just observed clinically and ended in miscarriage. One of the patients having cord occlusion delivered by caesarian in the 39th week. The other one had simultaneous amnioreduction procedure until 32nd week. Venous thrombus had developed in the mother. Neonatal intensive care unit (NICU) admission was needed in 32 of the patients (57.1%). Two of these twins were MC; the rest were DC. Twelve of the first newborns (21.4%) died; 2 of these were conceived by ART. 4 of the MC patients whose first delivered fetus died, had TTTS; 1 had conjoined twins, and 1 had a miscarriage.

Twin pregnancy rate due to multiple embryo transfer in ART is 30- 35%, worldwide. (11) In our country, since 2010, only one embryo can be transferred to patients younger than 35 years of age; and at most, 2 can be transferred to older patients (12). The mean age of the patients in our study was 29.32, and it was 31.37 for the patients who had previous ART. Advanced maternal age causes an increase in twin pregnancy ratio and perinatal complications (13). In twin pregnancies of mothers older than 35 years of age, risks of preterm labor, chromosomal anomaly, fetal death, and maternal complication increase (14). It was suggested that twin pregnancies that were conceived after ART had less adverse outcomes when compared to the spontaneous ones; because of the lower MC twin rate (15). Erkan et al. observed increased neonatal morbidity and mortality rates, but no difference in maternal morbidity, in twin pregnancies of ART when they were compared to the spontaneous ones (16). In our study, the whole of the MC twins was conceived spontaneously, too. The complications of TTTS, conjoined twin, and death of one of the twins were observed only in spontaneous twins, in our study.

Approximately 30% of all twin pregnancies are MC (17).

In MONO MONO study, 390 MC and monoamniotic twins, without any anomaly or complication, were observed, and perinatal loss rate was found as 10.8%(18). Besides other perinatal complications, in MC twin pregnancies, specific obstetric complications like TTTS, TAPS, TRAP, and oligopoly sequence are more common (19). TTTS rate in MC twins is 10- 15%, and 70- 90% of these cases end with mortality if they remain untreated (20). The staging of TTTS is according to the Quintero classification. The Quintero stage is only partially associated with prognosis. Additional markers observed by sonography can be used to guide prognosis and risk of progression, particularly in cases where difficult decisions regarding fetal interventions (selective fetoscopic laser coagulation or amnioreduction) or delivery are being weighed.

The difference in amniotic fluid levels of twins starts at the 20th gestational week in TTTS (deepest pocket > 8 cm in one, and < 2 cm in the other). Bad prognostic sonographic criteria are as follows: fetal death including increasing estimated fetal weight percentage discrepancy, ascites or hydrops in the recipient, absent or reversed a-wave in the ductus venosus, global cardiac dysfunction, pericardial effusion and valvular regurgitation (21). Early fetal intervention in TTTS improves fetal prognosis and decreases complication risk of the procedure (22). The poor outcome of untreated TTTS leads to the development of some treatments, namely: repeated serial amnioreduction, endoscopic laser ablation of vascular anastomoses, amniotic septostomy, and selective feticide (23). The purpose of repeated amnioreduction is to prevent preterm labor and premature rupture of membranes (PROM) of the recipient fetus. This procedure was shown to improve fetal survey for 37-60% in TTTS (24) and decrease neurologic damage to 17-33% (23).

TAPS may occur spontaneously in 3-5% of monochorionic twins or after laser surgery for TTTS. The prevalence of post-laser TAPS varies from 2% to 16% of TTTS cases, depending on the rate of residual anastomoses (24). Expectant management is associated with high mortality in the pump twin, while survival after fetal laser therapy is around 80% in TAPS (25). Laser coagulation of the superficial blood vessels that cross the separating membrane of the placenta has been advocated as another method of managing TTTS (26). Neurologic damage risk is 3.6 % with laser coagulation (27). Septostomy has been suggested to prevent this, but the risk of cords getting tangled is another problem (28). In our study, one pair of twins died after laser coagulation and septostomy procedure. In the other one, the TAPS developed and caesarian section was needed on the 28th week. Fetoscopic cord ligation for selective feticide was shown to have better survey rates (29). When we evaluate the results of fetoscopic laser coagulation series of Yücel and Uygur, we find that 2 cases which had been interfered at 20th week, proceeded to 32nd gestational week without any fetal neurologic and maternal complications; and one ended during the procedure due to rupture of membranes (30). In our study, amnioreduction was applied to a twin pair suffering TTTS

during selective cord occlusion, simultaneously. Despite this, pregnancy was terminated at the 32nd week, due to development of a maternal complication. Only one twin pair suffering TTTS could reach the term period, after cord occlusion, in our study. Our study is consistent with the literature when the adverse outcome of TTTS cases is in concern. Although selective FGR rate is 10- 15 % in MC twins (31), we did not observe any case in our study.

The adverse gestational outcome is more common in twin pregnancies when they are compared to singleton ones. Luciana et al., studied 855 DC and diamniotic twin pregnancies, in 8- year period. Six hundred five of them ended the gestational period as twins, and 250 of them had embryo reduction in the first trimester (32). They observed that the group having embryo reduction could reach greater gestational weeks, and had significantly fewer rates of FGR, PROM, and gestational diabetes. On the other hand, Proctor et al. did not observe any significant difference in rates of hypertensive disorders or FGR, when singleton and twin pregnancies, which were matched for the same birth weights, were compared (33). Meyer et al. showed an increased risk of preeclampsia, gestational diabetes, FGR, and delivery before the 32nd week of gestation in twin pregnancies of mothers older than 45 years of age, when they were compared to ones' younger than 35 (16). Discordance rate was 24% in twin pregnancies of patients older than 35 years in our study. Preterm labor incidence was 40%, and the abortus rate was 4% in this group. On the other side, the patients younger than 35 years had a 19.4% incidence of discordance, 38.7% incidence of preterm labor, and a 3.2% incidence of abortus.

CONCLUSION

Twin pregnancies have an increased risk of adverse fetal and maternal outcomes. Chorionicity is the most effective factor in perinatal outcomes in twin pregnancies. Early recognition of the complications, especially belonging to MC twins, and frequent antenatal follow up will help to intervene at the correct time and decrease fetal and maternal complication rates.

Competing interests: Written informed consent was obtained from each patient included in the study.

Financial Disclosure: The authors declared that this study had received no financial support.

Ethical approval: The study protocol was performed according to the principles of the Declaration of Helsinki and was approved by the local Ethical Committee of our hospital (approval date: 04.07.2019/27-17).

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