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ORIGINAL ARTICLE

Perinatal Outcomes of Single Intrauterine Fetal Death in Twin Pregnancies: A Tertiary Center Experience

İkiz Gebeliklerde Tek İntrauterine Fetal Ölümün Perinatal Sonuçları: Üçüncül Merkez Deneyimi

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ABSTRACT

Aim: Twin pregnancies are associated with increased perinatal mortality and morbidity compared with singleton pregnancies. Single intrauterine fetal death (sIUFD) is difficult to treat. This is because the twin who survives after sIUFD is at high risk for mortality, neurological damage, and other complications of preterm birth. Therefore, in this study, we aimed to determine the perinatal consequences for the surviving fetus. We also investigated the association between chorionicity, maternal characteristics, and fetal and maternal concomitant complications in these cases.
Methods: We conducted a retrospective case-control observational study that included twin births complicated by sIUFD followed up in the Department of Perinatology. Data, including demographic characteristics and prenatal invasive procedures, weeks of sIUFD, delivery time, fetal sex, interval between delivery and fetal loss, fetal distress, mode of delivery, birth weight, presence of placental pathology or umbilical cord abnormalities, neonatal Apgar scores in the first and fifth minutes, and need for neonatal intensive care unit (NICU), were obtained from obstetric records and hospital database.
Results: Fifty-three twin pregnancies with a single fetal death were included in the study. The mean age of the pregnants participating in the study was 30 (± 6) years. The mean body mass index (BMI) of the mother was 28.8 (22-43). Twenty-four (45.3%) cases were dichorionic (DC) diamniotic, 20 (37.7%) were monochorionic (MC) diamniotic, and 9 (17%) were monochorionic monoamniotic. The time between IUFD and birth of the live twin was 75 days in MCs and 105 days in DCs (p=0.150). The mean gestational age at birth of the surviving twin was 30 weeks' gestation in MCs and 34 weeks' gestation in DCs (p=0.030). In 23 (79.3%) MC pregnancies and 15 (62.5%) DC pregnancies, delivery occurred before 37 weeks (p=0.176). In addition, deliveries before 34 weeks occurred more frequently in 19 (65.5%) of MC pregnancies than in 8 (33.3%) of DC pregnancies (p=0.020).
Conclusion: We have shown that the birth of the live fetus in the MC group occurred at a significantly earlier time, and mortality and morbidity were observed more frequently in these fetuses. However, this research explaining the etiology of sIUFD is insufficient.

Key Words: Single intrauterine fetal death, twins, perinatal outcomes, monochorionic, dichorionic.

ÖZ

Amaç: İkiz gebelikler, tekil gebeliklere kıyasla artmış perinatal mortalite ve morbidite ile ilişkilidir. Tek intrauterin fetal ölüm (sIUFD)ise yönetilmesi zor bir durumdur. Çünkü SIUFD'den sonra hayatta kalan ikiz, mortalite, nörolojik hasar ve diğer erken doğum komplikasyonları açısından yüksek risk altındadır. Bu nedenle bu çalışmada hayatta kalan fetüsün perinatal sonuçlarını belirlemeyi amaçladık. Ayrıca bu olgularda koryonisite, maternal özellikler ve fetal ve maternal eşlik eden komplikasyonlar arasındaki ilişkiyi de inceledik.
Yöntemler: Perinatoloji Anabilim Dalı'nda izlenen sIUFD ile komplike ikiz doğumları içeren retrospektif bir vaka kontrollü gözlemsel çalışma yürüttük. Demografik özellikler ve prenatal invaziv prosedürler, intrauterine exitus gerçekleşitiği haftaları, doğum süresi, fetal cinsiyet, doğum ile fetal kayıp arasındaki süre, fetal distres, doğum şekli, doğum ağırlığı, plasenta patolojisi veya göbek kordonu anormallikleri varlığı, neonatal Apgar skorları dahil olmak üzere veriler birinci ve beşinci dakikalar ve yenidoğan yoğun bakım ünitesi (YYBÜ) ihtiyacı, obstetrik kayıtlardan ve hastane veri tabanından elde edildi.
Bulgular: Çalışmaya tek fetal ölümü olan 53 ikiz gebelik dahil edildi. Çalışmaya katılan hastaların yaş ortalaması 30 (± 6) idi. Ortalama vücut kitle indeksi (VKİ) 28,8 (22-43) idi. Yirmi dört (%45,3) vaka dikoryonik (DC) diamniyotik, 20 (%37,7) vaka monokoryonik (MC) diamniyotik ve 9 (%17) vaka monokoryonik monoamniyotik idi. IUFD ile canlı ikizin doğumu arasındaki süre MC'lerde 75 gün, DC'lerde 105 gündü (p > 0.05). Sağ kalan ikizin doğumdaki ortalama gebelik yaşı, MK'lerde 30 haftalık, DC'lerde 34 haftalık gebelik haftasıydı (p=0.03). 23 (%79,3) MC gebelikte ve 15 (%62,5) DC gebelikte doğum 37 haftadan önce gerçekleşti (p=0,176). Ek olarak, 34 haftadan önceki doğumlar, MC gebeliklerin 19'unda (%65,5), DC gebeliklerin 8'inden (%33,3) daha sık meydana geldi (p=0,02).
Sonuç: MC grubunda canlı fetüsün doğumunun anlamlı olarak daha erken gerçekleştiğini ve bu fetüste mortalite ve morbiditenin daha sık görüldüğünü gösterdik. Ancak SIUFD etiyolojisini açıklayan araştırmalar yetersizdir.

Anahtar Kelimeler: Tek intrauterin fetal ölüm, ikizler, perinatal sonuçlar, monokoryonik, dikoryonik.

Introduction

Twin pregnancies are associated with increased perinatal mortality and morbidity compared with singleton pregnancies. With the widespread use of assisted reproductive techniques, the prevalence of twin pregnancies and pregnancy complications have increased. Single intrauterine fetal death (sIUFD) occurs from 3.7% to 6.8% of all twin pregnancies, and its management is challenging [1]. After sIUFD, the surviving twin is at increased risk for mortality, neurologic damage, and other preterm birth complications. However,

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sometimes no complications occur in the twin who survives after sIUFD [2]. This unclear situation affects both the parents and the obstetrician who follows the pregnancy, because data are unclear about both the cause of sIUFD and the subsequent course of the pregnancy and timing of delivery after sIUFD. Many causes of twin death have been described in the literature, including twin transfusion syndrome (TTTS), chronic placental insufficiency, congenital anomalies, chromosomal abnormalities, abruptio placentae, umbilical cord entanglement, and fetal infections [3]. In the case of sIUFD, monochorionic pregnancies are known to be riskier because of the greater number of vascular anastomoses. Fetal and maternal pregnancy complications increase and range from neurological damage to loss of the live fetus. In addition, fetal and maternal pregnancy complications are known to increase across a broad spectrum from neurologic damage to fetal loss of the surviving fetus. The risk is also relatively high in cases diagnosed with TTTS [4].

Our study primarily aimed to determine the perinatal outcomes of the surviving fetus after a single intrauterine fetal death in twin pregnancies. We also examined the relationship between chorionicity, maternal characteristics, and fetal and maternal concomitant complications in these cases. In addition, we examined the relationship between the gestational weeks at which the twin died and pregnancy outcomes, as well as the risk factors that may lead to preterm birth below 34 weeks.

Materials and Methods

We conducted a retrospective case-control observational study that included twin births complicated by sIUFD followed up in the Department of Perinatology of Etlik Zübeyde Hanım Research and Training Hospital in Ankara, Turkey, between 2010 and 2020. Ethics committee for Noninterventional Studies of Etlik Zübeyde Hanım Research and Training Hospital approval was obtained before the start of the study (E-90057706-799 TUEK approval). Of the 1550 twin pregnancies, 62 twin pregnancies with fetal loss were achieved; however, nine pregnant women were excluded from the study because of insufficient data (e.g., birth at another center, inability to obtain patients from records, incomplete data for the study). Therefore, twin pregnancies with 53 IUFD were included in the study. In this study, we examined the total number of patients in this center between these dates. This center is one of the largest perinatology services in our city and also accepts patients referred from surrounding areas. Therefore, we can assume that the size of this study is comparable to the total number of patients in Ankara province. Data, including demographic characteristics and prenatal invasive procedures, weeks of sIUFD, delivery time, fetal sex, interval between delivery and fetal loss, fetal distress, mode of delivery, birth weight, presence of placental pathology or umbilical cord abnormalities, neonatal Apgar scores in the first and fifth minutes, and the need for neonatal intensive care unit (NICU), were obtained from obstetric records and hospital database. In addition, detailed data on concomitant maternal fetal complications such as fetal anomalies, co- twin's death, preeclampsia, twin-to-twin transfusion syndrome, intrauterine growth restriction, preterm premature rupture of membranes, and preterm delivery were collected. IUFD was defined as fetal loss after ultrasonographic diagnosis of twin pregnancy. Week of gestation was determined by measuring crown-rump length (CRL) in the first trimester [5]. Chorionicity was determined by fetal sex, number of placental masses, and intertwin membrane characteristics (lambda and T signs) and confirmed after birth [6]. Since this study was conducted in the same department and in a center where each team proceeds with the same management style, there is no interpersonal difference in the approach to the sIUFD situation. Patients were divided into three subgroups according to chorionicity and the trimester in which twin death occurred. Monochorionic (MC) and dichorionic (DC) pregnancies with IUFD in the first trimester were classified as group 1, MC pregnancies with IUFD after the first trimester as group 2, and DC pregnancies with IUFD after the first trimester as group 3. For reference, DC and MC pregnancies with IUFD in the first trimester were compared with MC and DC pregnancies with IUFD in subsequent trimesters. We have tried to summarize many confusing results with this grouping to show how much chorionicity affects this situation. Routine anomaly screening was performed between 18 and 22 weeks of gestation. After a single IUFD, the mother and surviving fetus were monitored every one to two weeks with maternal coagulation tests, Doppler velocimetry studies, biophysical profile values, amniotic fluid, and fetal biometric measurements were evaluated. All placentas underwent pathologic examination, and umbilical cord pathologies were detected after delivery.

Statistical analysis

All statistical analyzes were performed with the SPSS 25.0 package program (SPSS Inc, Chicago, IL). Conformity of continuous numeric variables to the normal distribution was checked with the Shapiro-Wilk test. Quantitative variables were expressed as mean ± standard deviation, median (minimum-maximum), and qualitative variables were expressed as relative frequency (%). The Kruskal-Wallis test was used to compare parametric variables without normal distribution for three groups. For normally distributed variables, a one-way comparison ANOVA between groups was performed. The Mann Whitney U test and Student's t test were used to compare parametric variables in two groups with and without normal distribution, respectively. Pearson's chi-square test was used for comparison of categorical variables between groups. A P-value <0.05 was considered statistically significant.

Table1. Patients' Characteristics

Characteristics	Monochorionic n(29)	Dichorionic n (24)	p
Age	29.3	30.5	0.52
Parity			
0	9 (31 %)	6 (25 %)	0.63
1-3	18 (62.1 %)	17 (70.8 %)	0.50
> 3	2 (6.9 %)	1 (4.2 %)	0.67
BMI (mean ± standard deviation)	28.4 ± 3.6	29.3 ± 5.3	0.44
Smoking (n (%))	4 (13.8 %)	3 (12.5 %)	1.0
Assisted Reproduction (n (%))	1 (3.4 %)	5 (20.8 %)	**0.04**
Gestational Weeks at a fetal loss(mean ± standard deviation)	20.2 ± 7.7	18.8 ± 8.8	0.56
1st trimester	7 (24.1 %)	10 (41.7 %)	0.17
2nd trimester	17 (58.6 %)	8 (33.3 %)	0.66
3rd trimester	5 (17.2 %)	6 (25 %)	0.49
The interval between delivery and fetal loss (days (mean ± standard deviation))	75.2 ± 75.8	105.6 ± 75.2	0.15
Gestational age at delivery (weeks ± standard deviation)	30.7 ± 6.1	34.1 ± 5.2	**0.03***
< 37 weeks	23 (79.3 %)	15 (62.5 %)	0.17
< 34 weeks	19 (65.5 %)	8 (33.3 %)	**0.02 ***
Fetal invasive testing (n (%))	8 (27.6 %)	6 (25 %)	0.83
Fetal sex			**NC***
Female – Female	16 (%55)	3 (12.5 %)	
Female – Male	0	18 (75 %)	
Male – Male	13 (%44)	3 (12.5 %)	
Cesarean delivery	19 (65.5 %)	16 (66.7 %)	0.93
Second fetal loss	11(37.9)	1(4.1%)	**0.006***
Umblical cord anomaly	7 (%24)	4 (%16)	0.50
Placental pathology	9 (%31)	4 (%16)	0.33

Table 2: Neonatal Outcomes of Surviving Twins

Characteristics	Monochorionic N(18)	Dichorionic n (23)	p
APGAR at 1. Mn <7	8 (%44)	7(%30)	0.35
APGAR at 5. Mn <7	5 /%27)	4 (%17)	0.47
NICU requirements	13 (%72)	9 (%39)	**0.03***
Fetal Distress rate	9 (%50)	4 (%17)	**0.04***

Results

Fifty-three twin pregnancies with a single fetal death were included in the study. The characteristics of the patients in each group are shown in Table 1. The mean age of the patients participating in the study was 30 (± 6) years. The mean body mass index (BMI) was 28.8 (22-43). The number of patients who used assisted reproductive techniques was 6 (%11). Twenty-four (45.3%) cases were dichorionic diamniotic, 20 (37.7%) were monochorionic diamniotic, and 9 (17%) were monochorionic monoamniotic. BMI was 28.4 (MC) and 29.3 (DC), and there was no significant difference between them (p =0.44). Assisted reproductive technology was used in 1 (3.4%) of the MC pregnancies and in 5 (20.8%) of the DC twin pregnancies (p=0.047). Fetal loss of one of the twins was most frequently observed in the first trimester (41.7%) in DC pregnancies and in the second trimester (58.6%) in MC pregnancies. No significant difference was found between the weeks of gestation when IUFD occurred in both groups (p =0.56). The time between IUFD and birth of the live twin was 75 days in MCs and 105 days in DCs (p =0.15). The mean gestational age at birth of the surviving twin was 30 weeks' gestation in MCs and 34 weeks' gestation in DCs (p=0.03). In 23 (79.3%) MC pregnancies and 15 (62.5%) DC pregnancies, delivery occurred before 37 weeks (p=0.176). In addition, deliveries before 34 weeks occurred more frequently in 19 (65.5%) of MC pregnancies than in 8 (33.3%) of DC pregnancies (p=0.02).

Second fetal mortality was statistically higher in MC pregnancies than in DC pregnancies (p=0.006). There was no significant difference between groups in prenatal invasive testing, cesarean delivery, umbilical cord abnormalities, or placental pathology (p =0.83, p=0.93, p=0.50, p=0.33). Regarding neonatal outcomes, although there was no difference between groups in APGAR scores at the first and fifth minutes, fetal distress (p=0.02) and neonatal intensive care unit (NICU) needs (p=0.04) were significantly higher in monochorionic pregnancies (Table 2).

The main characteristics of sIUFD, divided into 3 groups, are shown in Table 3. There were no significant differences between groups in the etiology of known fetal losses, whereas fetal losses of unknown etiology accounted for the majority of cases in all 3 groups. The rate of unexplained fetal death after the first trimester was 27% (n=6) at MC and 42% (n=6) at DC. After the first trimester, the number of unexplained fetal losses was lower in DC pregnancies than in MC pregnancies (p=0.007). The time between IUFD and the birth of a live fetus was significantly longer for fetal losses in the first trimester than in the other trimesters (p < 0.001). While the mean gestational age at delivery was 35 years in pregnancies with IUFD in the first trimester, it was 33 years in DC pregnancies with IUFD in the second and third trimesters (group 2) and 29 years in MCs in the second and third trimesters (group 3).

Table 3: First-trimester fetal loss and fetal loss in 2nd and 3rd trimester MC and DC pregnancies

Characteristics	1st-trimester loss (dichorionic & monochorionic) Group 1 (n: 17)	2nd and 3rd-trimester loss dichorionic Group 2 (n:14)	P 1 vs 2	2nd and 3rd trimester monochorionic Group 3 (n:22)	P 1 vs 3	P 2 vs 3
Etiology of fetal loss						
Fetal anomaly						
Spontaneous loss	4 (23 %)	2 (14.3 %)	0,66	4 (18.2 %)	0,70	1
Selective feticide	1 (5,9 %)	3 (21.4 %)	0,30	2 (9.1 %)	1	0,35
Selective IUGR	0	3 (21.4 %)	NC	4 (18.2 %)	NC	1
Following TTTS	0	0	NC	6 (27.2 %)	NC	NC
No identifiable cause	12 (70.6 %)	6 (42.8 %)	0.12	6 (27.2) %)	**0.007***	0.33
Interval between delivery and fetal loss (days) (mean(standart deviation))	176(35)	56 (55)	**<0.001***	42 (49)	**< 0.001***	0.26
Delivery within three days of loss of co-twin (n (%))	0	1 (7.1 %)	0.45	7 (31.8 %)	**0.01***	0.11
Gestational age at delivery (weeks)	35(5)	33 (5)	0.36	29 (5)	**0,003***	0.050
< 37 weeks	9 (52.9 %)	10 (71.4%)	0,46	19 (86.4 %)	**0.03***	0,39
< 34 weeks	5 (29.4 %)	6 (42.9 %)	0,43	16 (72.7 %)	**0.007***	0.07
Composite obstetric morbidity	6 (35 %)	5 (35.5%)	0.98	11 (50 %)	0.35	0.88
Preeclampsia	1 (5.9 %)	1 (7.1 %)	1	2 (9.1 %)	1	1
PPROM	2 (11.8 %)	1 (7.1 %)	1	1 (4.5 %)	0,57	1
Ablatio placenta	1 (5.9 %)	0	1	2 (9.1 %)	1	0,51
Intrauterine growth retardation (IUGR)	2 (11.8 %)	3 (21.4 %)	0,63	1 (4.5 %)	0,57	0,27
Loss of the second twin	2 (11.8 %)	0	0,48	10 (45 %)	**0.03***	**0,002***
Neonatal birth weight (gram)	2479(1067)	2233(989)	0,44	1552(1077)	**0,008***	**0,007**
< 2500 grams	7 (%41,2)	8 (%57,1)	0,37	18 (%81,8)	**0.02***	**0,01***
< 1500 grams	3 (%17,6)	4 (%28,6)	0,46	14 (%63,6)	**0,004***	0,08
Fetal anomaly in surviving fetus	1 (5.9 %)	1 (7.1 %)	1	2 (9.1 %)	1	1

NC: Not calculated; *: p<0.05

Table 4. Risk Factors for Delivery <34 weeks

Risk Factors	Odds ratio	95 % C.I.	P
TTTS	1.042	0.11-9.90	0.971
Fetal anomaly	0.289	0.03-2.62	0.270
Spontan fetal loss	1.088	0.21-5.56	0.919
Stillbirth	3.633	0.29-45.2	0.316
First-trimester fetal loss	0.346	0.04-2.60	0.303
Second-trimester fetal loss	1.495	0.28-7.90	0.636
Chorionicity	1.581	0.11-2.05	0.322

Gestational age at delivery was significantly higher in patients with single fetal loss in the first trimester than in MC pregnancies with single fetal loss outside the first trimester (p=0.003). The number of deliveries below 34 and 37 weeks of gestation was significantly higher in group 3 than in group 1 while there was no significant difference between the other groups. In DC pregnancies and MC pregnancies in which IUFD occurred after the first trimester, obstetric morbidity was similar to that in pregnancies in which IUFD occurred in the first trimester (p =0.98).

Newborn birth weight was significantly lower in MC pregnancies with a single fetal loss outside the first trimester than in the other groups (p=0.007. In addition, the rate of babies born weighing less than 2500 grams was significantly higher in MC pregnancies with a single fetal loss outside the first trimester than in the other groups (p=0.02 and p=0.01). The rate of babies born weighing less than 1500 grams was significantly higher in group 3 than in the other groups (p=0.004). There was no significant difference in fetal anomalies in fetuses that survived after IUFD (p=1.00).

A multivariable logistic regression of risk factors associated with deliveries less than 34 weeks is shown in Table 4. None of the factors were associated with births less than 34 weeks in the logistic regression model.

Discussion

Intrauterine loss of a single fetus is observed much more frequently in twin pregnancies compared with the frequency of intrauterine death in singleton pregnancies [1]. In addition, sIUFD can occur at any week of pregnancy. If it occurs in the first trimester, the likelihood of a normal pregnancy outcome increases because the other fetus is at a very early stage of development. However, if fetal death occurs after midgestational week (17 weeks), there is an increased likelihood of pregnancy-related preterm labor, IUGR, preeclampsia, and perinatal mortality [7,8,9]. Deaths in the 3rd trimester increase the chances of survival of the other fetus. In our study, sIUFD was more frequently observed in the first trimester in DC twins and in the second trimester in MC pregnancies. In addition, the birth of the live fetus in the MC group occurred at a significantly earlier time, and mortality and morbidity were observed more frequently in these fetuses. However, research explaining the etiology of sIUFD is insufficient. With this study, we have again shown the importance of early recognition of chorionicity and the advantage of being prepared for possible complications.

The incidence of single fetal death is higher in monochorionics than in dichorionics [10]. After sIUFD in a twin pregnancy, increased blood flow to placental anastomoses, transient hemodynamic fluctuations in the live fetus, emboli in the chorion, and coagulopathy are considered threatening conditions in the microenvironment of this fetus [11]. As highlighted in many previous studies, this suggests that chorionicity rather than zygosity determines the risk of complications in the surviving twin [12]. Arikan et al. found a 13-fold higher risk of preterm delivery in surviving twins and a seven-fold higher risk of placental abruption in monochorionic twins [13]. Therefore, it is important to determine the chorionic count by ultrasound as early as possible in twin pregnancies. The increased mortality in MC pregnancies can be explained by placental vascular anastomoses. However, in surviving twins, there are a variety of neural tube defects, optic nerve hypoplasia, hypoxic ischemic lesions, white matter lesions (multicytic encephalomalacia), microcephaly (cerebral atrophy), hydranencephaly, porencephaly, hemorrhagic white matter lesions, posthemorrhagic hydrocephalus, and bilateral structural necrosis of the renal cortex [14]. Therefore, it is important to ultrasound chorionicity as early as possible in twin pregnancies. The increased mortality in MC pregnancies can be explained by placental vascular anastomoses. Because TTTS does not develop before the second trimester and TTTS-related findings such as NT discordance rarely occur before week 12, it is reasonable to assume that fetal loss before this week will not affect the surviving twin in MC pregnancies [15].

As we saw in the literature review, the birth rate after an IUFD before 34 weeks was 68% in the MC group and 57% in the DC group [16]. A meta-analysis conducted by Mackie et al. found that preterm birth, the most common adverse outcome of pregnancies in which an IUFD occurs after the first trimester, affected 58.5% of MC pregnancies and 53.7% of DC pregnancies [17]. Our results are consistent with the literature in this regard. Similarly, Arinkan et al. found that the risk of delivery before 37 weeks increased 13-fold in twin pregnancies with a single IUFD in MCs compared with DC [13]. In contrast to these studies and our results, Shek et al. argued in their Cochrane analysis that the preterm birth rate did not increase in surviving twins after an IUFD [18]. They argue that this situation is relative because the detection and management of complications associated with twin pregnancies such as TTTS has gained popularity in recent years and chorionic differentiation can be performed [19].

Mortality or delivery of only the living fetus is not the end result. It has also been noted that there is an increased incidence of pregnancy-related complications in this fetus. Specifically, an increase in the incidence of PE and IUGR was observed. Giwnewer et al. [20] found that the average birth weight in the DC group was 1953 g, and they identified a low APGAR rate at the birth of 30%. In another study, they found that the need for NICU was much higher in the MC group [21]. However, in diamniotic pregnancies, the death of one fetus may not affect the other twin. Other conditions that may lead to complications for the surviving twin include maternal health and intrauterine infections responsible for the death of the first fetus. The most important maternal complication following fetal death is DIC. In rare cases, it occurs as a result of the release of fibrin and tissue thromboplastins from the dead fetus in the mother. In a study by Tunç et al., in which they

investigated 29 cases of IUFD, no cases of DIC were observed [22]. Moreover, studies have reported that coagulopathy occurs about 3-5 weeks after fetal death [23]. Therefore, the maternal coagulation profile redetermined 2 to 3 weeks after a single fetal death in a twin pregnancy is reassuring.

For the fetus that survives IUFD status in the womb, the burden on both the mother and the treatment team is enormous. Making decision, you should take into account the potential complications of prematurity and the harm to the fetus from pathophysiology in utero. Intensive and frequent fetal monitoring appears to be essential. In most twin pregnancies complicated by a single fetal death, birth occurs spontaneously in the following weeks. D'Alton et al. found that approximately 90% of cases were delivered within 3 weeks of fetal death [11]. Although single fetal death is not a sole indication in twin pregnancies, cesarean section is the delivery method most commonly reported in the literature [24]. In most cases, pathologic examination of the dead fetus and placenta after delivery does not reveal the possible cause of fetal death because the deceased fetus and placenta have already undergone tissue autolysis by the time of delivery. In singleton pregnancies, late miscarriages and stillbirths result in uterine emptying. However, in a twin pregnancy with fetal death, these events may not occur because the surviving co-fetus must continue to conceive. It is important to note that IUFD has not only a fetal multifactorial etiology, such as genetic disorders and congenital malformations, but also maternal infections and placental and umbilical cord complications. In dichorionic pregnancies, this situation is not as dramatic as in monochorionic pregnancies. It appears that the absence of a shared placenta may be a protective factor for the surviving fetus. In dichorionic pregnancies, the surviving twin has fewer complications. Of these complications, the risk of preterm birth is greatest in dichorionic pregnancies [25]. This is due to the fact that proinflammatory molecules that occur after fetal death increase uterine contractions. A greater risk of preterm delivery is observed in DC pregnancies, but delivery rates are lower because of the treatments we provide [25].

Limitations

Limitations of this study include the retrospective nature of the study and the availability of all data from only 53 pregnant women. In addition, we do not have adequate data on the long-term morbidity of the surviving fetuses. Because this is an observational study, we have no way to determine proinflammatory processes by biochemical evaluation. In this study, which focuses more on outcomes, the hypotheses presented previously are discussed under the assumption that they are correct. There is a need for multicenter studies on this topic.

Conclusion

In coclusion, sIUFD is a financial and moral challenge for both the parents and the health care team. It is important to determine chorionicity in the first weeks and to be prepared for a possible sIUFD situation in MC twins. Psychological and social support should be provided to the family to accompany preterm birth, prematurity and its possible complications. With this study, we have dealt in depth with the pregnancy complications that can occur in the face of this event, and we became a guide to help families in this regard.

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Conflict of interest

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Data Statement

Data are openly available in a public repository that issues datasets with DOIs.

Disclosures

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Author Contribution

MCI, BT, CI: Study idea, hypothesis, study design; KYY, SYE, AK: Material preparation, data collection and analysis; MCI, ES, CI: Writing the first draft of the article; AÇ: Critical review of the article finalization and publication process.

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