

Delayed Interval Delivery of the Second Twin: Obstetric Management, Neonatal Outcomes, and 2-Year Follow-Up

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About the Author



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Abstract

Objectives To evaluate the obstetric management and neonatal outcomes in twin pregnancies with delayed delivery of the second twin, including follow-up.

Methods This study is a review of four cases of delayed delivery of the second twin in our hospital from 2009 to 2012. The obstetric management of the cases from the expulsion of the first twin to the delivery of the second twin is analyzed. The neonatal outcomes including follow-up for 2 years were reviewed.

Results The first twins were delivered between 15 and 25 weeks (average 21 weeks) and the second twins were delivered between 25 and 31 weeks (average 27 weeks). One first twin (25 %) survived, while three (75 %) second

twins survived. Two out of the three second twins delivered after 28 weeks were in satisfactory condition.

Conclusions The delayed delivery of the second twins which occurred in the third trimester is associated with favorable outcome, however, the risks should not be ignored.

Keywords Delayed interval delivery · Twin Pregnancy · Preterm delivery · Multiply Pregnancy

Introduction

The occurrence of spontaneous multiple gestations in the human species is infrequent, estimated at approximately 1/80 pregnancies. In recent years, this rate has increased notably due to the use of assisted reproduction techniques (ART), being nowadays the first cause of multiple gestation [1].

Multiple pregnancies are associated with a rise in morbidity of the mother, increasing the incidence of

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Table 1 Obstetric background with correlation and evolution between the first and second twin

	Age	ART	First twin delivery (week)	Outcome first twin	Second twin delivery (week)	Second delivery	Interval (days)	Outcome second twin
CASE 1	34	IVF	15 + 3	Abortion	31	Caesaeen section	109	Satisfactory
CASE 2	32	IVF	25 + 3	CP	26 + 6	Vaginal	10	CP
CASE 3	35	Clomiphene	19 + 6	Abortion	22 + 3	Vaginal	18	Abortion
CASE 4	38	IVF	24 + 2	Abortion	28 + 2	Caesaeen section	28	Satisfactory

CP cerebral palsy

preeclampsia, thromboembolism, or mother hemorrhage (placenta abruptio and placenta previa). Mortality rates of mothers are higher when compared to those for mothers with single pregnancies [2].

There is also an increase in neonatal mortality, which is five times more frequent in twin births as compared to single births. Neonatal morbidity rates are also higher, especially because of prematurity and low birth weight [3].

Generally, the delivery of the second twin follows that of the first within a short period of time. In recent years, a large number of cases with the outcome of the delayed birth of the second twin have been published, with good results in the majority of the cases.

We present the outcome of four pregnant women with delayed delivery of the second twin including a detailed description of the obstetric outcomes and neonatal follow-up for 2 years of these newborns (newborn period).

Materials and Methods

Study Design

From 2009–2012 period, we managed four cases of twin pregnancies with delayed delivery of the second twin at the University Hospital La Fe, Valencia, Spain. We have evaluated the pregnancy, complications, blood tests, ultrasounds, and the method of delivery. We have also included the follow-up of the newborn from birth, admission to Neonatal Intensive Care, and later outpatient follow-up (2 years), evaluating psychomotor development and neurological aftereffects.

Obstetric Variables

Obstetrical background. Weeks of gestation at the delivery of the first twin and period of time until the delivery of the second twin. Development of obstetric complications during the follow-up, as well as blood tests, with particular focus on acute-phase reactants (CRP, Procalcitonin).

Neonatal Outcomes and Follow-Up

Evolution of the newborn during their time in Neonatal Intensive Care, including weight, Apgar score, and leukocytosis at birth. Follow-up through medical imaging techniques of complications arising from prematurity (cerebral ultrasound, eye fundus, renal ultrasound). Description of after effects.

Outpatient follow-up according to protocol 1 month, 3 months, and 1 year after discharge from hospital. Clinical evaluation of neonatal morbidity in 2 years, cognitive and development situation.

Results

Obstetric Variables

Pregnancies were in women who had undergone ART, all of them dichorionic diamniotic. The average age of the mothers was 34 years [30–38 years]; all were nulliparous. The delivery of the first twin took place between weeks 15 and 25 (Table 1).

Blood tests including acute-phase reactants, cervicovaginal cultures, and Ultrasounds were performed. When viability was reached (24 weeks), fetal lung maturity was achieved.

Empiric broad spectrum antibiotic treatment (Ampicillin + Erythromycin) was used from the delivery of the first twin until the results of the cervicovaginal culture were known (7 days).

The control cervicovaginal cultures were positive in 3 of the 4 pregnancies, with *Klebsiella pneumoniae* being the most common bacteria. They received culture-directed antibiotic therapy according to the antibiogram, until negative cultures were confirmed.

The only complication was the development of chorioamnionitis caused by *K. pneumoniae* (positive cavity culture during the cesarean section), which forced the end of the pregnancy in week 28 + 2. This patient was the only one who had significantly altered parameters in blood tests (maximum leukocytosis 23.290/mm³ with 84 %

neutrophilia) with elevated acute-phase reactants (CRP 94 mg/mL and Procalcitonin 17 ng/mL).

In the birth of the second twin, except for chorioamnionitis, the labor pain had naturally and the cervicovaginal culture and blood test were normal too. There was no relation between membrane rupture and labor.

The average time between the delivery of the first and second twin was 41 days [10–109 days]. In two cases vaginal delivery, while in the other two cases it was through a cesarean section due to breech presentation.

We did not find any problem with the timing of delivery of placentae. The placentae were intact after delivery of the first twin. After the second twin delivery, vaginal delivery in two cases, the timing was normal (less than 30 min), while in the cesarean section, manual removal of the placenta was performed with no complications.

Pathological study of the placentas was performed in all cases, only leukocyte infiltrates were found in the patient diagnosed of chorioamnionitis. In all cases, puerperal evolution was normal.

Initial Neonatal Outcomes

Summary of cases studied: in the first case, the first twin aborted at week 15, while the delivery of the second was delayed to week 31. In the second case, both twins survived, with the first being born at week 25 + 3 and the second being born a week later. In the third case, neither twin survived because they did not reach viability (weeks 19 and 22, respectively). In the fourth case, the first was delivered at week 24 (dead fetus) and the second was delivered alive at week 28 + 2.

Given this, we had three delayed delivery second twins to study, with gestational ages between 26 and 31 weeks, with a range of weight at birth from 740 to 1,600 grams. Average Apgar score at 1 min was 6 [3–7] and at 5 min was 9 [7–10], with a leukocytosis at admission of 16.825/mcl [7.500–32.100/mcl] (Table 2).

They needed respiratory support with nasal CPAP from birth, achieving spontaneous respiration in the first days of life in all cases. All of them had their own symptoms related to their prematurity (anemia, apnea syndromes...).

With regards to serious complications during the hospital stay after birth, it is notable that two of the newborns

had a difficult and slow evolution, both from the same pregnancy in which both twins survived after being born a week apart (week 25 + 3 and 26 + 6, respectively).

The male, who was born at week 25 + 3, had serious respiratory complications, with the development of Hyaline membrane disease and recurring pneumothorax. Regarding neurological complications, a cerebral ultrasound 3 days after birth revealed an intraventricular hemorrhage, grade IV left and grade I right.

The female, who was born at week 26 + 6, had significant neurological complications. An ultrasound, the day she was born showed an intraventricular hemorrhage, grade IV right and grade II left. Fifteen days after birth a posthemorrhagic tetraventricular hydrocephalus developed, requiring external ventricular drainage and later a ventriculoperitoneal shunt, with multiple interventions due to it malfunctioning.

Neonatal Follow-Up

In the two cases in which the newborns had a satisfactory evolution, the long-term outpatient follow-up during the newborn period was satisfactory, with normal cognitive and neurological development for their age. Physical examinations also showed normal development 2 years later.

This was not the case with the other. The male newborn had significant aftereffects; results from the Pulmonary Function Test suggested a restrictive-obstructive pattern. Neurological complications included cerebral palsy due to intraventricular hemorrhage with a left frontoparietal porencephaly. As a result of this, the physical examination revealed a significant disability, with hypertonia in the right side of the body, poor posture and right club foot and a Bayley test of MDI: 80, PDI: 70. The female had complications related to intraventricular hemorrhage and a subsequent obstructive hydrocephalus. Severe disability was discovered upon physical examination, hypertonia, and generalized hyperreflexia with cortical blindness. Bayley test was not applicable.

Discussion

Delayed interval delivery is becoming more and more common, especially because of the increase in multiple

Table 2 Neonatal outcomes for the second twins with complications presence during hospital stay

	Gender	Weight (grams)	Apgar score (5–10 min)	Average hospital (days)	NIC (days)	Weight at discharge	Complications
Newborn 1	Male	1,600	7–10	31	24	3,350	No
Newborn 2	Female	740	3–7	123	89	3,090	Yes
Newborn 3	Female	1,280	7–9	46	22	2,210	No

NIC neonatal intensive care

pregnancies for the use of ART, given that between 10 and 15 % of couples in the general population have problems with sterility [4].

According to a prospective study published by Arabin et al. in 2009 with obstetric follow-up of 50 cases of multiple pregnancies, the delayed birth of the second twin is associated with better perinatal results if the birth of the first twin happens between weeks 20 and 29, however, when the birth of the first twin happens before week 20, neither of the fetuses survive [5, 6].

Regarding management after the delivery of the first twin, it is recommended that it can be done with antibiotic therapy avoiding episiotomy. Subsequent vaginal washes with 0.5 % aqueous solution of chlorhexidine should be done, due to its bacteriostatic effectiveness on the vaginal flora [5, 7].

After the delivery of the first fetus, the patient must have clinical follow-up and blood tests for clinical complications like chorioamnionitis, placenta abruptio, or changes in coagulation [9]. Cervicovaginal control cultures must be taken. If it is necessary to reevaluate cervical conditions, the best method is the measurement of cervical length by vaginal ultrasound. If the pregnant woman is Rh negative, anti-D immunoglobulin must be administered.

The management of the antibiotics involves some controversy. Some authors defend the constant use of culture-directed antibiotics until the birth of the second twin [8, 10], but the current tendency is toward obstetric management similar to that used in the case of preterm premature rupture of membranes, administering broad spectrum prophylaxis (Ampicillin + Erythromycin, Ampicillin + Gentamicin) for 5–7 days until cervical cultures are negative [5]. Once week 24 is reached, achieving fetal lung maturity with steroids is indicated in all cases, due to the improvement in fetal prognosis [7, 10, 11].

The most controversial issue is whether cervical cerclage is necessary under these circumstances. Arabin et al. [5], did not perform it at all in their 17-year study, due to the potential risk that this invasive technique represents to the potentially infected gestational sac. However, Ariad et al. did it systematically to reduce the exposure of the ovular membranes to the septic environment of the vagina [12]. Fayad et al. [7] only did it when there were changes in the cervix during follow-up. None of these three options have caused a significant improvement in survival, prolongation of delay or maternal complications. In our study it was not carried out.

There are times when the delivery of the second twin must not be delayed, as in the case of membrane rupture in the remaining twin, congenital malformation, severe pre-eclampsia, monochorionic twins, gestational age greater than 30 weeks, severe metrorrhagia, or suspected chorioamnionitis.

Our study attempts to evaluate, on the one hand, the obstetric evolution and especially the follow-up of morbidity of these newborns 2 years later. We use the Bayley Scales of Infant Development (BSID) a measure of development in three domains: cognitive, motor, and behavioral. It assists in diagnosis and treatment planning for infants with developmental delays or disabilities.

From the initial neonatal point of view, one consistent thing was the large number of days spent in the Neonatology Department. None of them had any clinical or analytical parameters that support the theory that a delayed delivery is associated with a greater risk of infection for the second twin after the delivery of the first because of the hypothetical connection between the uterine cavity and the vagina, even when three out of the four pregnant women tested positive in control cervicovaginal cultures. Although it is positive in most cases, it is not associated with increased infection markers in the newborn.

With our study we try to evaluate the obstetric evolution and especially the follow-up of the morbidity of these newborns 2 years later, given that there is no experience about the cognitive and psychomotor development of these newborns in the perinatal term.

The follow-up for 2 years is a short-time period, but if you have a normal psychomotor and neurological development in this time, probably you can use them as predictors of patient growth during childhood and adult life. But, longer term pediatric studies are necessary to ensure it.

We did not find prognostic factors besides an improvement with a longer delay of the delivery of the second twin. At the same time, the management of delayed birth is probably similar to the management of PROM with small modifications.

The delayed delivery of the second twin reached to third trimester might result in favorable outcomes; however, the risks should not be ignored, but in some cases appears to severe neonatal morbidity.

Disclosure The authors declare no conflicts of interest.

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