Original Article

Twin in Compared with Singleton Pregnancies Complicated by Preterm Premature Rupture of Membranes (PPROM)

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Abstract

Background: Our purpose was to compare the latency periods of preterm premature rupture of the membranes (PPROM) in twin compared with singleton pregnancies from 24 to 34 weeks' gestation and assessment of respiratory distress syndrome (RDS) between twins and singletons.

Materials and Methods: Between 2010 and 2014 in Mahdieh Hospital, Tehran, Iran, data on all women with singleton and twin gestations complicated by PPROM were reviewed. Latencies between singleton and twin pregnancies were compared. An additional comparing according to PPROM at under, equal and above 30 weeks' gestation was surveyed in these groups. In addition, their latencies compared among them. Use of surfactant consumption and need for intubation were measured during hospitalization between twins and singletons.

Results: The mean latencies of singleton and twin pregnancies were statistically significant without comparing the gestational age at PPROM (8.22±7.4 vs. 5.54±3.36 days, p=0.001). When PPROM occurred at < 30 weeks' gestation, latency in twins was not statistically significant (8.24±9.81 vs. 8.24±4.71 days, p=0.07) but at > or = 30 weeks' gestation, latency was significantly different in singleton and twin pregnancies (6.3±5.85 vs. 2.42±2.60 days, p=0.002). There were significant differences in the use of surfactant and intubation between twin and singletons (p<0.05).

Conclusion: This study provides the basis for effective patient counseling and managing pregnancies with PPROM. Overall, in pregnancies with PPROM at > or = 30 weeks' gestation, latency in twins was significantly shorter than in singleton pregnancies. For fetal lung maturity, the use of surfactant and intubation increased in twins compared with singletons.

Keywords: Pregnancy, Twin, Singleton, PPROM, Latency period

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Introduction

Over the last 30 years, the incidence of twin pregnancy has enhanced in several countries[1-3]. Most of the twin pregnancies were related to modern technology of in vitro fertilization but race might be another factor leading to the difference in prevalence in each country[4]. Twin pregnancy has remarkable effects on the adaptation of maternal physiology. In mothers, physiological adaptations occur during pregnancy in response to its demands including support and protection of the fetuses and helping mothers for

delivery[5,6]. There are several common complications in multiple pregnancies includes maternal anemia, premature rupture of membrane, preterm birth and postpartum hemorrhage[7]. Therefore, twin pregnancies related to high rates of maternal and perinatal disease and death.

In 3% of pregnancies, preterm premature rupture of membranes (PPROM) increased in all gestational weeks and is responsible for almost one-third of all preterm births. PPROM is more common in a twin pregnancy associated with high risk of chorioamnionitis, dysfunctional labor, unfavorable cervix, increase in cesarean rates, postpartum hemorrhage and endometritis in mother and in fetus increase occurrence of hyaline membrane disease, sepsis, cord prolapse fetal distress, intraventricular hemorrhage and increased fetal wastage[8].

Preterm PROM related to the brief latency from membrane rupture until delivery, perinatal infection, and umbilical cord compression because of oligohydramnios[9]. The term latency is defined as the time between membrane rupture and delivery that is a major factor for the survival of newborn[10]. Studies indicated that the latency period after PPROM related to a high rate of infant mortality and pulmonary disease, which is the main reason for death[11,12]. There are some researches that directly compare outcomes PPROM of the twin with the singleton[13,14].

Respiratory distress syndrome (RDS) is one of the important causes of respiratory distress and death in newborns. The pathogenesis of RDS contributes to the immature development of lungs, causing insufficient pulmonary production of surfactant[15]. Previously, it mentioned that the most significant factor for RDS is the prematurity. In this study, we aimed to compare the clinical characteristics and latency periods (latencies) of preterm premature rupture of the membranes in twin vs. singleton pregnancies. In addition, we assessed the use of surfactant and intubation between twin and singleton premature complicated by PPROM.

Methods

It is a descriptive study conducted between 2010 and 2014 in Mahdieh Hospital, Tehran, Iran. The Shahid Beheshti University of Medical Sciences (IR.SBMU.MSP.REC.1395.25) financially supported this study. Samples were those women aged 25-34 years. They admitted with PPROM in labor room between 24 and 34 weeks of gestation. The diagnosis of PPROM was determined based on history, sterile pelvic speculum examination displaying amniotic fluid draining from the cervix and test of a pad. Ultrasonography performed on every case to evaluate gestational age, parameters of growth and liquor columns for an amniotic fluid index. Overall, 206 patients were qualified for our survey and their documents were assessed for risk factors, epidemiological data, antepartum and post-delivery care, and maternal or babies outcomes.

Patients had sterile speculum examination and detection of membrane rupture admitted by visualization of amniotic fluid that passed from the endocervical canal into the vagina. Vaginal and blood cultures were obtained quickly if needed. After hospitalization, in the lack of a symptom for immediate delivery, all patients had expectant management over standard protocol. This consisted of a precise follow-up status of patients, infrequent fetal heart rate monitoring (EFM) and analysis of blood per week. All women took a single course of betamethasone therapy and two doses of 12 mg were administered intramuscularly 24 hours after the first injection. In addition, for antibiotic prophylaxis, oral erythromycin was given 250 mg every 12 hours for 10 days.

Respiratory distress syndrome (RDS) was determined as progressive acute respiratory distress that happening in a neonatal at first four hours of age introducing with the classical signs of tachypnea, retraction, expiratory grunting and cyanosis in room air, with related alterations in blood gases and radiological features[16]. In these situations, administration of exogenous pulmonary surfactant needed. In this study, variables of surfactant consumption and need for intubation were recorded during hospitalization between twins and singletons. In addition, we investigated the effects of singleton and twin varieties on gestational age and latency period. A further division according to PPROM at under, equal and above 30 weeks' gestation was assessed in both groups and their latencies were compared. This study used the Chi-square test for categorical variables and Independent two-sample for continuous variables. Statistical analysis was performed using SPSS software version 18.0 (SPSS

Inc., Chicago, IL, USA).

Results

As displayed in Table 1, the mean of maternal ages for the twin and singleton deliveries were 2.29±years and 30.36±2.40 years respectively (p=0.93) (Figure 1).

A total of 148 singleton and 58 twin pregnancies with PPROM between 24 and 34 weeks' gestation were included in this series. Regardless of the gestational age at PPROM, the mean latencies of singleton and twin pregnancies were statistically significant (8.22±7.4 vs. 3.36±5.54 days, p=0.001). When PPROM occurred at < 30 weeks' gestation, latency in twins was not statistically significant (8.24±9.81 vs. 8.24±4.71 days, p=0.07). In addition, in pregnancies with PPROM at above and equal 30 weeks' gestation, latency in singleton and twin pregnancies were significantly

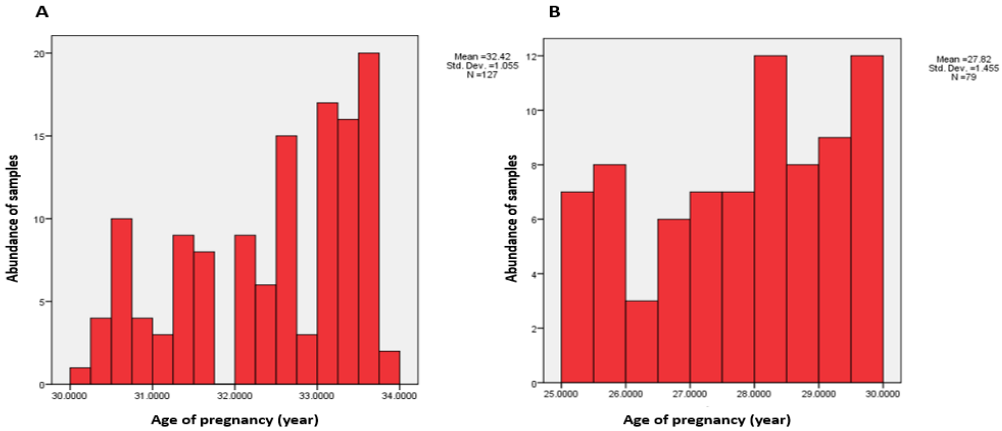

Figure 1. Distribution of maternal age at delivery in groups of (A) at < 30 weeks' gestation and (B) at > or = 30 weeks.

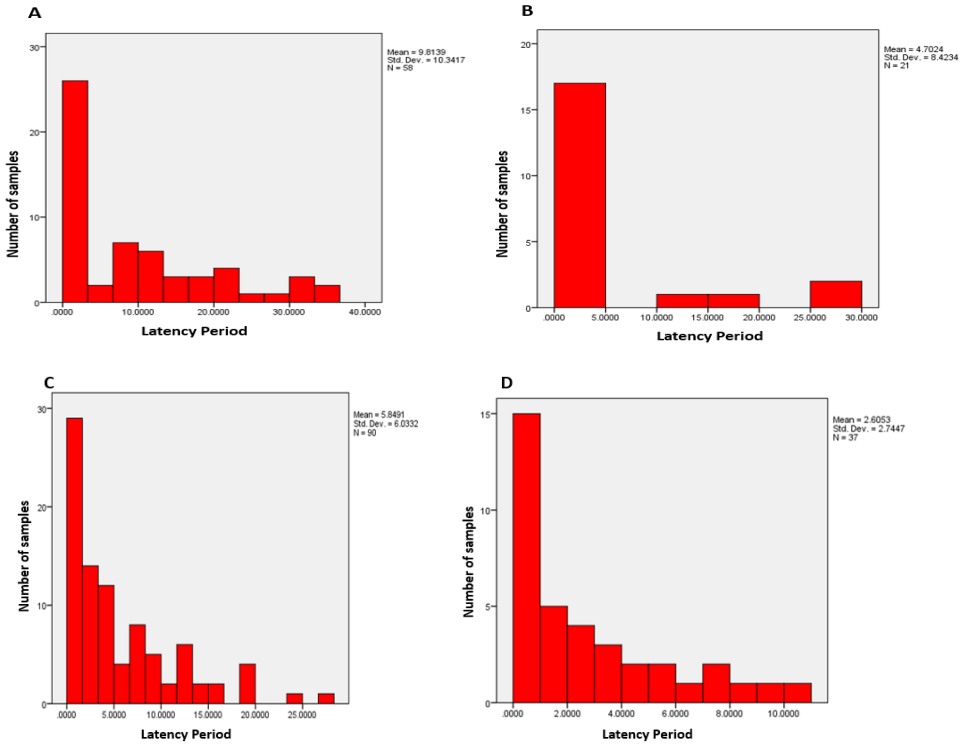

Figure 2. Latency tends when PPROM occurs (A) Before 30 weeks of gestation in Singletons (B) Before 30 weeks of gestation in twins (C) After 30 weeks of gestation in Singletons (D) After 30 weeks of gestation in twins.

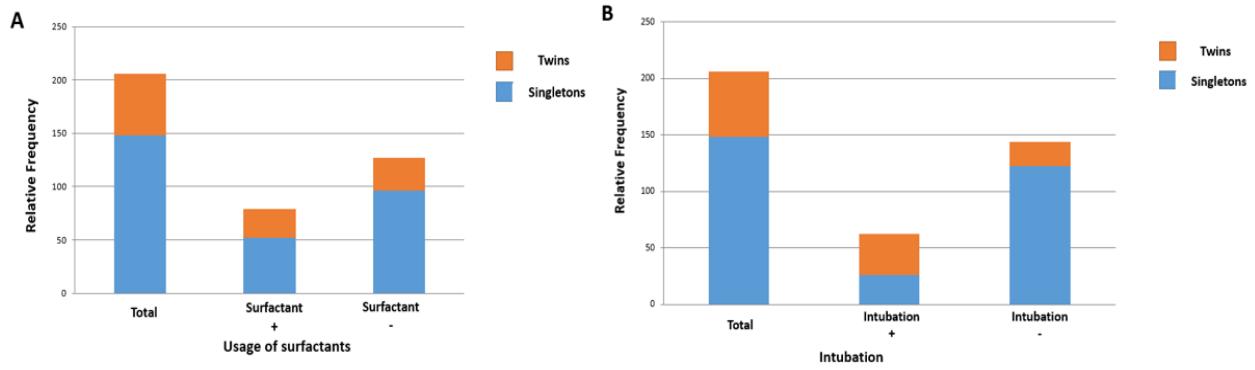

Figure 3. The relative abundance of using surfactant and intubation in twins and singletons.

Table 1: Maternal characteristics of the singleton and twin groups.

Characteristics	Singleton gestation	Twin gestation	*p*-value
Mean maternal age (years)	2.29±30.36	30.66±2.404	>0.05
Mean gestational age (weeks)	8.22±7.4	5.54±3.36	<0.05

Table 2: Use of surfactant and intubation in twins versus singletons.

	Total	Surfactant +	Surfactant –	Intubation +	Intubation _
Singleton	148	52	96	26	122
Twin	58	27	31	36	22

different (6.3±5.85 vs. 2.42±2.60 days, p=0.002) (Figure 2). Of those born alive who admitted to the NICU, 52 of singletons and 27 of twins received surfactant and 36 of twins and 26 of singletons were intubated. Because of that 72% of all newborns were singletons and only 28% of them were twins, it can be determined that the use of surfactant and intubation in twins were significantly more than singletons (Table 2) (Figure 3).

Discussion

In this study, we reviewed 206 samples of PPROM between 24 and 34 weeks' gestation compared between singleton and twin pregnancies. One-third of preterm births are the consequence of PPROM. Preterm premature rupture of membranes considered as the main reasons for preterm deliveries and adverse neonatal outcomes. The etiology of PPROM is unclear and multifactorial[17,18]. A high incidence of twin gestations complicated by premature rupture of membranes has been explained by many authors[19,20]. Our data demonstrated that 28% of patients with preterm premature rupture of membranes have twin gestations. Mean latency interval for the twin was 3.36 versus 7.4 in singleton gestations, which was significantly different between two groups and confirmed that twin or singleton gestations have critical roles in latency period and multiple gestations might cause decreasing in latency period. Also Bianco et al in 1996 determined that the median latency period was significantly decreased in the twin group versus the

singleton group[21].

After further division according to PPROM at under, equal and above 30 weeks' gestation in twin pregnancies and compared them with coordinated singleton group we did not recognize any significant differences statistically in the latency period at <30 weeks. This was specifically accurate at early ages of gestational but we did discover that after 30 weeks of gestation, twins showed a significantly smaller latency period. Our results were completely consistent with Sieh et al in 1999[22]. The research by Mercer et al, was unsuccessful to represent a significant difference in the latency period for their whole study population. They assigned that the latency period was contrary to gestational age in twins[23]. Their data was not against the currently known data in singleton pregnancies. In the study of Kurzel for latency period length, a significant difference was recognized. But in his study, women who undertake likely induction of labor for chorioamnionitis were not involved, reducing the clinical efficiency of his data[24].

Despite the improvement made in antenatal and neonatal care, RDS maintains the main cause of morbidity and mortality in preterm newborns[25]. After the diagnosis of PPROM in twin and multiple pregnancies prompt newborn and maternal care are necessary that included giving corticosteroids to the mother through pregnancy, administrating surfactant and intubation and taking neonatal intensive care unit (NICU) for minimizing the risk of some lung diseases and breathing-related conditions in premature babies. Donovan et al, in 1998 explained that twins were more likely to have respiratory disease and to receive surfactant[26]. In our study, we showed that the rate of using surfactant significantly enhanced in twin versus singleton. Consistent with the rate of surfactant, the rate of intubation in twins enhanced in compared with singletons and twins that had PPROM.

Conclusion

We showed that in pregnancies with PPROM at under, equal and above 30 weeks' gestation, latency in twins was shorter than in singleton pregnancies but we did not reveal a significant difference in latency period at PPROM at early gestational ages. In pregnancies with PPROM gestations, prompt use of surfactant and intubation for fetal lung maturity should be considered that was significantly increased in twins versus singletons. We expect that the information achieved in this investigation will provide the basis for patient counseling and management subsequent to PPROM gestations.

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