

Maternal and Neonatal Outcomes of Delivery in Women with Preterm Prelabor Rupture of the Membranes (PPROM)

A Retrospective Comparison between Deliveries after Versus Before 34 Weeks of Gestation

Abd-Alaziz A (MD)

Department of Obstetrics and Gynecology – Ain Shams University

Email: manofegypt28@hotmail.com

Abstract

The aim of the current study was to retrospectively compare the maternal and neonatal outcomes of delivery in women with preterm prelabor rupture of the membranes (PPROM) who deliver before and after 34 weeks of gestation over a period of three years in Ain Shams University Maternity Hospital. This retrospective study included singleton pregnant women with a diagnosis of PPRM. Only women who were eligible for expectant management for at least 48 hours were included in the analysis. Neonatal outcomes included admission to neonatal intensive care unit (NICU) for neonatal sepsis or respiratory distress, neonatal jaundice, and perinatal mortality. Maternal outcomes included fever, chorioamnionitis, umbilical cord prolapse, and postpartum pyrexia. A total of 1721 eligible women were included in the final analysis. The mean age of included women was 24.22 ± 4.5 years (range: 18 – 38 years). The mean gestational age at delivery was 33.17 ± 3.8 weeks (range: 28.14 – 36 weeks). The included women were divided into 2 groups: group I (n=953) including women who delivered at < 34 weeks of gestation; and group II (n=768) including women who delivered at ≥ 34 weeks of gestation. The rate of chorioamnionitis was significantly higher in women of group II [39 (5.1%) vs. 28 (2.9%), respectively, $p=0.023$]. The rate of NICU admission for neonatal sepsis was significantly higher in women of group II [49 (6.4%) vs. 37 (3.9%)], respectively, $p=0.018$].

Keywords

Prelabor rupture of the membranes – Chorioamnionitis – neonatal respiratory distress syndrome

I. Introduction

Preterm prelabor rupture of the membranes (PPROM) complicates nearly 5% of all pregnancies; yet accounts for almost one-third of preterm deliveries [1]. PPRM is inherently linked to maternal and perinatal infection, which account for the majority of PPRM-related adverse sequelae [2]. The standard management for PPRM is hospital admission, antibiotic prophylaxis and corticosteroid administration to enhance the fetal lung maturation [3]. The elective universally-accepted timing for planned delivery for women whose pregnancies are complicated with PPRM is 34 weeks of gestation [4]. This recommendation was based on comparison of the neonatal outcomes before and after this cutoff gestation. In developed countries, the neonatal survival rate for neonates delivered at ≥ 34 weeks of gestation is comparable to those delivered at term if they have received antenatal corticosteroids and are comparable regarding other cofounders [5]. In Egypt, being a developing country, the neonatal facilities are not that good. Therefore, a specifically-tailored recommendation for extending the pregnancy for further 2 weeks (i.e. till 36 weeks of gestation) was developed. This latter recommendation was mainly based on senior obstetrician opinions. The aim of the current study was to retrospectively revise the neonatal and maternal outcomes of delivery before and after 34 weeks of gestation in women with PPRM.

II. Methods

The current retrospective study was conducted at Ain Shams University Maternity Hospital over the period between January 2011 and December 2013. The study protocol was in agreement to the Helsinki Declaration of the Principles of Ethical Medical Research [last updated in Korea, 2008]. The study included singleton pregnant women admitted at the casualties or the outpatient antenatal clinic of Ain Shams University Maternity Hospital during the specified period, with a diagnosis of PPRM. Prelabor rupture of the membranes (PROM) was defined in women who were not in labor within 24 hours after rupture of the fetal membranes [6]. Preterm PROM (PPROM) was defined when PROM occurred in women at gestation above 26 weeks and below completed 36 weeks of gestation [6]. Rupture of the fetal membranes was diagnosed when leaking amniotic fluid was objectively detected whether on sterile vaginal speculum examination or on vulval pads. Women who had persistently doubtful diagnosis were not included in the analysis. Only women who were eligible for expectant management for at least 48 hours were included in the analysis. Women were included, who had an indication for emergent, urgent or planned delivery within 48 hours for any obstetric reason (e.g. intrapartum fetal compromise, evidence of intrauterine infection, placental abruption, and severe hypertensive disorders). Data were retrieved from the Patient Record Department at Ain Shams University Maternity Hospital. Incomplete data were retrieved directly from patients through phone calls. Neonatal outcomes included admission to neonatal

intensive care unit (NICU) for neonatal sepsis or respiratory distress, neonatal jaundice, and perinatal mortality. Maternal outcomes included fever (temperature $\geq 38^{\circ}\text{C}$), chorioamnionitis, umbilical cord prolapse, and postpartum pyrexia (temperature $\geq 38^{\circ}\text{C}$ after the first 24 hours postpartum).

Statistical Methods

Statistical analysis was performed using SPSS for Windows version 20.0. Kolmogorov-Smirnov normality test was applied to all measured variables.

Parametric variables were described as mean and standard deviation, and compared using independent student's t-test. Non-parametric numeric variables were described as median and interquartile range, and compared using Mann-Whitney's U-test. Categorical variables were described as number and percentage, and were compared using chi-squared test. Yates' continuity correction was applied to the chi-squared test whenever one or more of the expected values were less than 5. Significance level was set 0.05.

III. Results

A total of 1721 eligible women were included in the final analysis. The mean age of included women was 24.22 ± 4.5 years (range: 18 – 38 years). The median parity was 1 (range: 0 – 4; interquartile range: 0 – 2). The mean gestational age at admission was 29.33 ± 5.4 weeks (range: 26.29 – 35.14 weeks). The mean gestational age at delivery was 33.17 ± 3.8 weeks (range:

28-14–36 weeks). The median latency period was 13 days (range: 5 –35 days; interquartile range: 7 – 12 days). The median birth weight of included neonates was 1150 g (range: 850 – 2400 g; interquartile range: 950 –1600g).

The included women were divided into 2 groups: group I (n=953) including women who delivered at < 34 weeks of gestation; and group II (n=768) including women who delivered at ≥ 34 weeks of gestation. There were no significant differences between women of both groups regarding the maternal age and parity. There was a significantly lower median birth weight of included neonates in women of group I (table-1).

Regarding maternal outcome, there were comparable rates of umbilical cord prolapse, intrapartum fever and postpartum pyrexia in both groups. The rate of chorioamnionitis, however, was significantly higher in women of group II [39 (5.1%) vs. 28 (2.9%), respectively, $p=0.023$](table-2).

Regarding the neonatal outcome, the rates of NICU admission for RDS and jaundice, as well as, the perinatal mortality rates were comparable in both groups. The rate of NICU admission for neonatal sepsis was, however, significantly higher in women of group II [49 (6.4%) vs. 37 (3.9%)], respectively, $p=0.018$] (table-3).

IV. Discussion

In order to overcome the relatively poor neonatal facilities at our developing country, it has been a common practice, in Ain Shams University Maternity Hospital, to have the planned delivery for women whose pregnancies complicated with PPRM at 36

weeks of gestation. This ‘tailored’ guideline goes against the universally-accepted gestation of planned delivery for such women, which is 34 weeks [6]. To the best of our knowledge, there were no studies to revise such a practice, so far.

The current study showed that women who delivered at ≥ 34 weeks of gestation, when compared to those who delivered at < 34 weeks of gestation, had comparable rates of the major neonatal prematurity sequelae, namely the RDS, jaundice and perinatal mortality; yet with significantly higher rates of maternal chorioamnionitis, neonatal sepsis and median birth weight.

These results agree with the current universal evidence that show no benefit of extending pregnancy complicated with PPRM beyond 34 weeks of gestation; and further show some potential harm regarding the potential risk of maternal and neonatal sepsis [7].

Chorioamnionitis is well-known to be associated with major adverse neonatal sequelae [8].

Despite being the first large published one revising such a practice, this study carries a major inherent point of weakness, which is that grouping of the patients to deliver before or after 34 weeks was not through random or quasi-random allocation. In the current study, women who delivered at < 34 weeks had to deliver at these gestations for obstetric reasons.

In a well-designed randomized trial conducted by van der Ham et al., women with PPRM were randomly allocated into either induction of labor at 34 weeks of gestation or expectant management between 34 and 37 weeks of gestation. This trial and the associated meta-

analysis of similar trials failed to show benefit from induction of labor at 34 weeks regarding the rates of chorioamnionitis, as well as neonatal sepsis and neonatal RDS [9]. Nevertheless, a prospective randomized controlled trial needs to be conducted in Ain Shams University Maternity Hospital, to truly compare the maternal and neonatal outcomes in women who deliver before and after 34 weeks of gestation, with local facilities and within local circumstances.

V. Conclusion

In women with PPRM, delivery beyond rather than before 34 weeks of gestation was associated with comparable rates of NICU admissions for neonatal RDS, jaundice and perinatal mortality; yet with significantly higher rates of maternal chorioamnionitis and neonatal sepsis.

VI. References

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Table-1 Difference between Groups regarding Age, Parity and Birth Weight

	Group I [Delivery at <34 weeks' Gestation] (n=953)	Group II [Delivery at ≥34 weeks' Gestation] (n=768)	P
Age (years)	28.91 ± 4.2	29.11 ± 6.1	
Parity	1 (0 – 2)	1 (0 – 3)	
Gestational Age at Delivery (weeks)	31.22 ± 1.9	35.18 ± 0.7	0.422*
Birth Weight (g)	1050 (952.5 – 1225.3)	1430 (1150 – 1752.5)	0.513**
			<0.001*
			0.001**

Data presented as mean ± SD; or median (interquartile range)

* Analysis using Independent Student's t-Test

** Analysis using Mann-Whitney's U-Test

Table-2 Difference between Groups regarding Maternal Outcomes

	Group I [Delivery at <34 weeks'	Group II [Delivery at ≥34 weeks'	P*
	Gestation] (n=953)	Gestation] (n=768)	
Umbilical Cord Prolapse	2 (0.2%)	5 (0.7%)	0.294
Chorioamnionitis	28 (2.9%)	39 (5.1%)	0.023
Intrapartum Fever	9 (0.9%)	15 (2%)	0.076
Postpartum Pyrexia	13 (1.4%)	18 (2.3%)	0.129

Data presented as number (percentage)

* Analysis using chi-squared test

Table-3 Difference between Groups regarding Neonatal Outcome Outcomes

	Group I [Delivery at <34 weeks'	Group II [Delivery at ≥34 week	
	Gestation]	Gestation]	P**
	(n=953)	(n=768)	
NICU Admission for Sepsis	37 (3.9%)	49 (6.4%)	0.018
NICU Admission for RDS	197 (20.7%)	144 (18.8%)	0.320
NICU Admission for Jaundice	27 (2.8%)	32 (4.2%)	0.131
Perinatal Mortality	24 (2.5%)	18 (2.3%)	0.815

NICU neonatal intensive care unit RDS respiratory distress syndrome Data presented as number (percentage)
* Analysis using chi-squared test

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