

S Sallam\*

Department of Obstetrics and Gynecology, Al-Arish General Hospital, Egypt

**Dates:** Received: 12 August, 2016; Accepted: 12 September, 2016; Published: 13 September, 2016

\*Corresponding author: S Sallam, Department of Obstetrics and Gynecology, Al-Arish General Hospital, Egypt.

[www.peertechz.com](http://www.peertechz.com)

**Keywords:** Prelabor rupture of the membranes; Chorioamnionitis; Neonatal respiratory distress syndrome

## Research Article

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

### Abstract

**Objective:** This study was done to evaluate the maternal morbidities and perinatal outcomes of delivery in women with preterm pre-labor rupture of the membranes who delivered before and after 34 week along a period of five years in Al-Arish General Hospital.

**Methods:** This retrospective study involved pregnant women with a singleton pregnancy who suffered from preterm pre-labor rupture of the membranes. Maternal morbidities included chorioamnionitis and febrile reaction, umbilical cord prolapse, and puerperal pyrexia, while, neonatal outcomes comprised neonatal intensive care unit (NICU) admission as in case of neonatal sepsis or respiratory distress syndrome, neonatal jaundice, or eventual mortality.

**Results:** A total of 443 eligible women were involved. The mean age of included women was  $23.11 \pm 3.8$  years (range: 18 – 38 years). The mean gestational age at delivery was  $23.17 \pm 4.2$  weeks (range: 21 – 36 weeks). The included women were divided into 2 groups: group I (n=232) including women who delivered at < 34 weeks of gestation; and group II (n=211) including women who delivered at  $\geq 34$  weeks of gestation. The rate of chorioamnionitis was significantly higher in women of group II [21 (9.95%) vs. 11 (4.74%), respectively,  $p=0.023$ ]. The rate of NICU admission for neonatal sepsis was significantly higher in women of group II [32 (15.2%) vs. 19 (8.2%), respectively,  $p=0.018$ ].

**Conclusion:** In case of PPRM, delivery after rather than before 34 weeks of gestation was linked to comparable rates of NICU admissions for neonatal RDS and jaundice with no statistically significant difference in perinatal mortality; yet with significantly higher rates of maternal morbidities as chorioamnionitis and neonatal sepsis.

## Introduction

PPROM occurs in only 2% of gestations but is linked to 40% of preterm births and can produce a considerable rate of neonatal morbidity and mortality [1]. The three etiologies of neonatal deaths linked to PPRM are namely; prematurity, sepsis and lung hypoplasia. Women with chorioamnionitis deliver before non-infected women and infants born with sepsis have a high mortality rate about four times higher than those without sepsis [4]. Also, there are maternal hazards linked to intrauterine infections. There is a rising evidence revealing a linkage between ascending infection from the cervix or vagina and PPRM. In women with PPRM, nearly one-third of gestations had positive amniotic fluid cultures [5,6] and studies had revealed that bacteria had the capability to cross even intact membranes [2]. The routine treatment for PPRM is admission in the hospital, antibiotic prophylaxis and corticosteroid intake to increase the fetal lung maturation [3]. The elective timing for planned delivery for women with PPRM is 34 weeks of pregnancy [4]. This recommendation was built on a comparison of the neonatal outcomes prior to and beyond this cutoff gestation. In developed nations, the survival rate for neonates delivered  $\geq 34$  weeks of pregnancy is comparable to term neonates if they had received antenatal corticosteroids and are comparable regarding other cofounders [5]. In Egypt, the neonatal

supplies are not that good. So, a specifically-tailored recommendation for extending the pregnancy for more 2 weeks (i.e. till 36 weeks of pregnancy) was advised. This latter recommendation was principally built on senior staff opinions. The goal of the current article was to retrospectively evaluate the neonatal and maternal outcomes of delivery prior to and beyond 34 weeks of pregnancy in women with PPRM.

## Methods

The current retrospective study was conducted at Al-Arish General 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 involved singleton pregnant women who were admitted at the casualties or the outpatient antenatal clinic of Al-Arish General Hospital during the above-mentioned period, with a diagnosis of PPRM. Prelabor rupture of the membranes (PROM) was known 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 before completed 36 weeks of gestation [6]. ROM was established when leaking amniotic fluid was objectively seen whether on sterile vaginal speculum or on vulval pads. Women who had

persistently doubtful diagnosis were excluded in the analysis. Only women who were candidates for conservative management for at least 48 hours participated in the analysis. Women were involved, who had an indication for planned delivery within 2 days for any obstetric cause (e.g. intrapartum fetal distress or death, evidence of chorioamnionitis, abruptio placentae, and severe hypertensive diseases). Data were retrieved from the Patient Record Department at Al-Arish General 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 pyrexia (temperature  $\geq 38^{\circ}\text{C}$ ), intrauterine infection, umbilical cord prolapse, and postpartum pyrexia (temperature  $\geq 38^{\circ}\text{C}$  after the first 24 hours after delivery).

### 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.

### Results

A total of 443 eligible women were included in the final analysis. The mean age of included women was  $23.11 \pm 3.8$  years (range: 18 – 38 years). The median parity was 1 (range: 0 – 4; interquartile range: 0 – 2). The mean gestational age at admission was  $29.33 \pm 5.4$  weeks (range: 26.29 – 35.14 weeks). The mean gestational age at delivery was  $33.17 \pm 3.8$  weeks (range: –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=232) including women who delivered at < 34 weeks of gestation; and group II (n=211) including women who delivered at  $\geq 34$  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 [21 (9.95%) vs. 11 (4.74%), 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 [32 (15.2%) vs. 19 (8.2%), respectively,  $p=0.018$ ] (Table 3).

### Discussion

To overcome the considerably poor neonatal facilities at our developing country, it had been a common practice, in Al-Arish General Hospital, to have the planned delivery for women with PPRM at 36 weeks of pregnancy. This 'tailored' recommendation doesn't go with the universally-accepted guidelines of planned delivery for these women, which is 34 weeks [6]. As far as we know, there were no studies to reassess such a practice.

This study reported that women who delivered at  $\geq 34$  weeks of pregnancy, when compared to those who delivered at < 34 weeks of pregnancy, had a comparable rate of the major neonatal prematurity complications, as RDS, jaundice and perinatal mortality; but with a significantly higher rate of maternal chorioamnionitis, neonatal sepsis and median birth weight.

These results go with with the current universal supporting evidence that show no value of extending gestations complicated

**Table 1:** Difference between Groups regarding Age, Parity and Birth Weight.

	Group I [Delivery at <34 weeks' Gestation] (n=232)	Group II [Delivery at $\geq 34$ weeks' Gestation] (n=211)	P
Age (years)	23.11 $\pm$ 3.8	23.17 $\pm$ 4.2	0.422*
Parity	1 (0 – 3)	1 (0 – 2)	0.513**
Gestational	31.22 $\pm$ 1.9	35.18 $\pm$ 0.7	<0.001*
Birth Weight (g)	1121 (977.2 – 1391.1)	1321 (1144 – 1628.1)	0.001**

Data presented as mean  $\pm$  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' Gestation] (n=232)	Group II [Delivery at $\geq 34$ weeks' Gestation] (n=211)	P*
Umbilical Cord Prolapse	2 (0.2%)	5 (0.7%)	0.294
Chorioamnionitis	11 (4.74%)	21 (9.95%)	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' Gestation] (n=232)	Group II [Delivery at $\geq 34$ weeks' Gestation] (n=211)	P*
NICU Admission for Sepsis	19 (8.2%)	32 (15.2%)	0.018
NICU Admission for RDS	96 (20.7%)	82 (18.8%)	0.32
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.

with PPROM after 34 weeks; and further show some possible risk regarding the potential harm of maternal and neonatal sepsis [7]. Intrauterine infection is well-known to be linked to major adverse neonatal complications [8].

In spite of being one of first large ones revising such a practice, this study carries an inherent point of weakness, which is that grouping of women to deliver beyond or before 34 weeks was not performed through quasi-random or random allocation. In this study, women who delivered before 34 weeks, had to deliver at these dates for obstetric cause. In a previous well-designed randomized study performed by van der Ham et al. 2012, they performed an open-label randomized controlled multi-centric study in 60 hospitals in Netherlands, which comprised non-laboring women with >24 h of PPROM between 34(+0) and 37(+0) weeks of pregnancy. Women were randomly allocated in a 1:1 ratio to induction of labor (IoL) or expectant management (EM) utilizing block randomization. The principal outcome was neonatal sepsis. Secondary outcomes comprised mode of delivery, respiratory distress syndrome (RDS), and intrauterine infection. Women and caregivers were not blinded to randomization status. They updated a prior meta-analysis on the impact of both interventions on neonatal sepsis, RDS, and cesarean birth rate. From 1 Jan 2007 to 9 Sept 2009, 776 women in 60 hospitals were eligible for the study, of which 536 women were randomized. Four women were excluded for the study after randomization. They allocated 266 patients (268 neonates) to IoL and 266 women (270 neonates) to EM. Neonatal sepsis happened in seven (2.6%) newborns of women in the IoL group and in 11 (4.1%) neonates in the EM group (relative risk [RR] 0.64; 95% confidence interval [CI] 0.25 to 1.6). RDS was detected in 21 (7.8%, IoL) versus 17 neonates (6.3%, EM) (RR 1.3; 95% CI 0.67 to 2.3), and a cesarean section was done in 36 (13%, IoL) versus 37 (14%, EM) women (RR 0.98; 95% CI 0.64 to 1.50). The risk for intrauterine infection was decreased in the IoL group. No serious harmful events were reported. They reported that in women whose pregnancy is complicated by late PPROM, neither our trial nor the updated meta-analysis indicates that IoL substantially improves pregnancy outcomes compared with EM [9].

## Conclusion

In case of PPROM, delivery after rather than prior 34 weeks of pregnancy was linked to comparable rates of NICU admissions for neonatal RDS, jaundice and perinatal mortality; but with a significantly higher rate of maternal morbidities namely chorioamnionitis and neonatal sepsis.

## References

1. Maxwell GL (1993) Preterm premature rupture of membranes. *Obstet Gynecol Surv* 48: 576–583.
2. Merenstein GB, Weisman LE (1996) Premature rupture of the membranes: neonatal consequences. *Semin Perinatol* 20: 375–380.
3. Mercer BM (2003) Preterm premature rupture of the membranes. *Obstet Gynecol* 101: 178–193.
4. ACOG Committee on Practice Bulletins-Obstetrics (2007) ACOG Practice Bulletin No. 80: premature rupture of membranes. Clinical management guidelines for obstetrician-gynecologists. *Obstet Gynecol* 109: 1007–1019.
5. Gouyon JB, Vintejoux A, Sagot P, Burguet A, Quantin C, et al. (2010) Neonatal outcome associated with singleton birth at 34–41 weeks of gestation. *Int J Epidemiol* 39: 769–776.
6. ACOG Committee on Practice Bulletins-Obstetrics (2013) ACOG Practice Bulletin: premature rupture of membranes. Clinical management guidelines for obstetrician-gynecologists.
7. Yu H, Wang X, Gao H, You Y, Xing A (2015) Perinatal outcomes of pregnancies complicated by preterm premature rupture of the membranes before 34 weeks of gestation in a tertiary center in China: A retrospective review. *Biosci Trends* 9: 35–41.
8. Lau J, Magee F, Qiu Z, Hoube J, Von Dadelszen P, et al. (2005) Chorioamnionitis with a fetal inflammatory response is associated with higher neonatal mortality, morbidity, and resource use than chorioamnionitis displaying a maternal inflammatory response only. *Am J Obstet Gynecol* 193: 708–713.
9. van der Ham DP, Vijgen SM, Nijhuis JG, van Beek JJ, Opmeer BC, et al. (2012) Induction of labor versus expectant management in women with preterm prelabor rupture of membranes between 34 and 37 weeks: a randomized controlled trial. *PLoS Med* 9: e1001208.

**Copyright:** © 2016 Sallam S. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Citation:** Sallam S (2016) Maternal Morbidities and Perinatal Outcomes of Delivery in Women with Preterm Prelabor Rupture of the Membranes (PPROM). *J Gynecol Res Obstet.* 2(1): 072-074. DOI: <http://dx.doi.org/10.17352/jgro.000024>