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## Clinical course of preterm premature rupture of membranes

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**Objective** : *To evaluate the incidence, clinical course and outcome of preterm premature rupture of membranes (PPROM).*

**Setting** : *Department of Obstetrics and Gynecology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand.*

**Design** : *Retrospective descriptive study.*

**Subjects** : *Ninety five PPRM parturients who were managed expectantly and delivered between January 1, 1997 and December 31, 1997.*

**Method** : *Obstetric chart records of PPRM parturients were reviewed. Maternal demographic data and pregnancy outcome (latency period, maternal and fetal outcome) were extracted.*

**Results** : *There were a total of 13,206 deliveries in the year 1997, whereas PPRM occurred in 95 cases. The mean maternal age and gestational age were  $25.6 \pm 5.1$  years and  $33.5 \pm 2.5$  weeks, respectively. Sixty eight (71.6 %) cases delivered within 48 hours following PPRM. The mean latency period was  $41.8 \pm 65.8$  hours. Twenty four (25.4 %) cases delivered by cesarean section whereas 61 (64.2 %) cases completed a normal delivery. Maternal complications occurred in 7 (7.4 %) cases, comprising 6 cases of chorioamnionitis and 1 case of postpartum endometritis, but there was no maternal mortality. Neonatal complications occurred in 37 (39 %) cases. The most common complication was pneumonia. There were 2 (2.1 %) cases of neonatal mortality during the study period. The causes were respiratory distress syndrome.*

**Conclusion** : *The incidence of PPRM in the year 1997 was 7.2 per 1,000 deliveries, most of which delivered within 7 days. Maternal morbidity was low, but neonatal morbidity was still high despite expectant management in this study.*

**Key words** : *Preterm, Premature rupture of membranes, Pregnancy, Clinical course.*

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วรพงศ์ ภู่งศ์. การดำเนินโรคของภาวะถุงน้ำคร่ำแตกก่อนการเจ็บครรภ์คลอดที่การตั้งครรภ์ไม่ครบกำหนด. จุฬาลงกรณ์เวชสาร 2543 พ.ย; 44(11): 859 - 66

- วัตถุประสงค์** : เพื่อหาอุบัติการณ์การดำเนินโรค และผลการตั้งครรภ์ของภาวะถุงน้ำคร่ำแตกก่อนการเจ็บครรภ์คลอดที่การตั้งครรภ์ยังไม่ครบกำหนด
- สถานที่ที่ทำการศึกษา** : ภาควิชาสูติศาสตร์- นรีเวชวิทยา คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย กรุงเทพฯ
- รูปแบบการวิจัย** : การศึกษาย้อนหลังเชิงพรรณนา
- ผู้ป่วยที่ได้ทำการศึกษา** : การศึกษานี้ได้เลือกหญิงตั้งครรภ์ที่มีภาวะถุงน้ำคร่ำแตกก่อนการเจ็บครรภ์คลอดที่การตั้งครรภ์ยังไม่ครบกำหนด ที่ได้รับการดูแลรักษาแบบประคับประคองระหว่างวันที่ 1 มกราคม 2540 ถึง 31 ธันวาคม 2540 จำนวน 95 ราย
- วิธีการศึกษา** : ศึกษาย้อนหลังจากทะเบียนประวัติของหญิงตั้งครรภ์ที่มีภาวะถุงน้ำคร่ำแตกก่อนการเจ็บครรภ์คลอดที่อายุครรภ์น้อยกว่า 37 สัปดาห์ ที่ได้รับการดูแลรักษาแบบประคับประคอง โดยดูถึงข้อมูลพื้นฐานของหญิงตั้งครรภ์ และผลลัพธ์ของการตั้งครรภ์ได้แก่ ระยะเวลาที่มีภาวะถุงน้ำคร่ำแตกจนถึงคลอดบุตร ภาวะแทรกซ้อนของมารดาและทารก
- ผลการวิจัย** : มีผู้คลอดทั้งหมด 13,206 รายในปี 2540 พบว่ามีหญิงตั้งครรภ์ที่มีภาวะถุงน้ำคร่ำแตกก่อนการเจ็บครรภ์คลอดที่การตั้งครรภ์ยังไม่ครบกำหนดเท่ากับ 95 ราย อายุเฉลี่ยและอายุครรภ์ของมารดาเท่ากับ  $25.6 \pm 5.1$  ปีและ  $33.5 \pm 2.5$  สัปดาห์ตามลำดับ มีหญิงตั้งครรภ์ 68 ราย (71.6 %) คลอดภายใน 48 ชั่วโมง โดยที่ระยะเวลาเฉลี่ยตั้งแต่ถุงน้ำคร่ำแตกจนถึงคลอดบุตรเท่ากับ  $41.8 \pm 65.8$  ชั่วโมง มีหญิงตั้งครรภ์ 24 ราย (25.4 %) คลอดโดยการผ่าตัดคลอดบุตรทางหน้าท้อง ในขณะที่ 61 ราย (64.2 %) คลอดปกติทางช่องคลอด ภาวะแทรกซ้อนในมารดาพบได้ 7 ราย (7.4 %) ซึ่ง 6 รายมีการติดเชื้อในถุงน้ำคร่ำและ 1 รายมีการติดเชื้อของเยื่อโพรงมดลูกหลังคลอด แต่ไม่พบอัตราตายในมารดา ภาวะแทรกซ้อนในทารกพบได้ 37 ราย (39 %) โดยภาวะแทรกซ้อนที่พบบ่อยคือภาวะปอดบวมในการศึกษานี้พบมีอัตราตายของทารกเท่ากับ 2.1 % ซึ่งสาเหตุการตายคือภาวะหายใจลำบากจากการที่ถุงลมในปอดขาดสาร Surfactant

- วิจารณ์และสรุป** : อุบัติการณ์ของภาวะถุงน้ำคร่ำแตกก่อนการเจ็บครรภ์คลอดที่การตั้งครรภ์ยังไม่ครบกำหนด ในปี 2540 เท่ากับ 7.2 ต่อการคลอด 1,000 ราย ซึ่งส่วนใหญ่จะคลอดภายใน 7 วัน อัตราทุพพลภาพของมารดาจะต่ำ แต่อัตราทุพพลภาพของทารกยังคงสูง แม้ว่าจะให้การดูแลรักษาโดยการประคับประคอง
- คำสำคัญ** : การตั้งครรภ์ก่อนกำหนด, ภาวะถุงน้ำคร่ำแตกก่อนการเจ็บครรภ์คลอด, การตั้งครรภ์, การดำเนินโรค

Preterm premature rupture of membranes (PPROM) is defined as the rupture of membranes before the onset of labor and before 37 completed weeks of pregnancy.<sup>(1,2)</sup> This condition accounts for 1 % of pregnancies<sup>(3)</sup> and 10 – 40 % of PROM cases.<sup>(3,4)</sup> Many reports have demonstrated that 50 – 93 % of PPRM deliver within 48 hours.<sup>(5-8)</sup> Maternal complications reported include chorioamnionitis, metritis and abruption which occur in 10 – 40 %, 10 – 30 % and 4 - 8 % of cases, respectively.<sup>(3)</sup> Neonatal complications such as respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH), necrotizing enterocolitis (NEC) and sepsis are also common.<sup>(3)</sup> The purpose of this study was to investigate the incidence, clinical course and outcome of PPRM in Department of Obstetrics and Gynecology, Faculty of Medicine, Chulalongkorn University.

#### Materials and Methods

The cases were selected from obstetric chart records at Department of Obstetrics and Gynecology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand from January 1, 1997 to December 31, 1997. Patients included PPRM cases (pregnancies between 28 and 37 completed weeks with rupture of membranes before the onset of labor) under expectant management. The expectant management consists of bed rest and periodical assessment for evidence of infection or labor. Neither antibiotics nor corticosteroids were used in these cases.

The following variables were extracted from the chart records: maternal age, gravida, parity, gestational age, total antenatal care (ANC) visits, total weight gain, number of fetuses, serology, route of delivery and pregnancy outcome. The pregnancy

outcome was differentiated as latency period, maternal and neonatal outcome.

The latency period was defined as the time from rupture of membranes to delivery.<sup>(9)</sup> A diagnosis of chorioamnionitis was made on the basis of clinical criteria of maternal fever or at least two of the following: tachycardia, uterine tenderness, foul smelling amniotic fluid, fetal tachycardia, with or without maternal leukocytosis.<sup>(10)</sup>

Data were summarized and descriptive statistics were used to calculate mean, standard deviation, range and percent.

#### Results

In the year 1997, there were a total of 13,206 deliveries. Total PROM occurred in 766 cases whereas 95 cases were PPRM. The incidence of PPRM was 7.2 per 1,000 deliveries and comprised 12.4 % of the PROM cases. Maternal age of PPRM cases was  $25.6 \pm 5.1$  (range 17 - 38) years. The median of gravida, parity and total ANC visits were 1, 0 and 6, respectively, and the mean gestational age was  $33.5 \pm 2.5$  (26 - 36) weeks. Total weight gain was  $10.1 \pm 3.6$  (2.7 - 19) kgs. Eighty-nine (93.7 %) cases were singleton and 6 (6.3 %) were twins. There were 3 (3.2 %) cases of positive serology for HBsAg and 3 (3.2 %) cases of positive serology for anti HIV. All cases were negative for VDRL. Routes of delivery were normal in 61 (64.2 %) cases, forceps extraction in 6 (6.4 %) cases, breech assisting in 4 (4.2 %) cases and cesarean section in 24 (25.4 %) cases.

The clinical course of PPRM is shown in Table 1. The mean latency period was  $41.8 \pm 65.8$  (13 - 344.1) hours. Examination of maternal outcomes showed the total maternal hospital stay days was

Table 1. Clinical course of PPROM.

	Cases (%)
Total PPROM	95 (100)
Delivered within 24 hours	50 (52.6)
Delivered within 48 hours	68 (71.6)
Delivered within 7 days	90 (94.7)
Delivered after more than 7 days	5 (5.3)

7.6 ± 4.5 (3 - 26) days. The major maternal complications recorded were chorioamnionitis and postpartum endometritis that occurred in 6 (6.3 %) cases and 1 (1.1 %) case, respectively. There was no maternal death during the period of this study.

Neonatal outcome is shown in Table 2. Eight (8.4 %) and 2 (2.1 %) cases had an Apgar score less than 7 at 1 and 5 minutes, respectively. There were 3 (3.2 %) cases of neonatal abnormalities and 37 (39 %) cases of neonatal complications. The most common neonatal complication was infection, especially pneumonia.

Table 2. Neonatal outcome.

Birth weight (grams)	2098 ± 369 (Mean ± SD)	1050 - 2950 (Range)
Apgar score at 1 min	8.4 ± 1.6 (Mean ± SD)	0 - 9 (Range)
Apgar score at 5 min	9.6 ± 1.3 (Mean ± SD)	0 - 10 (Range)
NICU admission (days)	3.8 ± 11.9 (Mean ± SD)	0 - 67 (Range)
Total newborn admission (days)	12.8 ± 18.9 (Mean ± SD)	2 - 85 (Range)
Neonatal complications	37 cases	39 %
• Infection	21 cases	22.1 %
Sepsis	8 cases	8.4 %
Pneumonia	11 cases	11.6 %
• RDS	5 cases	5.3 %
• NEC	2 cases	2.1 %
• IVH	1 case	1.1 %
• Stillbirth	1 case	1.1 %
• Death	2 cases	2.1 %

NICU : neonatal intensive care unit

RDS : respiratory distress syndrome

NEC : necrotizing enterocolitis

IVH : intraventricular hemorrhage

## Discussion

In the present study, the incidence of PPRM was 7.2 per 1000 deliveries, accounting for 12.4 % of PROM cases, in accordance with previous studies.<sup>(3,4)</sup>

This study reviewed 95 PPRM cases who were managed expectantly, without the use of antibiotics or corticosteroids. The usual outcome of PPRM is labor. The mean length of latency period was 41.8 hours (1.7 days) which was within the range of 1.5 – 4.6 days that has been previously reported.<sup>(6,8)</sup> Sixty eight cases (71.6 %) and 90 cases (94.7 %) delivered within 48 hours and 7 days, respectively, which was compatible with previous reports of ranges of 50-93 % and 69.3-97.3 %, respectively, for these times.<sup>(5-8)</sup>

The maternal complications of chorioamnionitis and postpartum endometritis occurred 6.3 % and 1.1 % of cases, respectively, which are similar to previous studies (13 - 60 % and 2-13 %, respectively).<sup>(3,11-15)</sup> Alexander and Cox<sup>(3)</sup> described abruption occurring in 4 - 8 % of cases, but none was found in this study. Women with PROM are at a higher risk for a cesarean delivery. Cox et al reported the risk of cesarean delivery was nearly 40 %, <sup>(7)</sup> but the rate in this study was only 25.4 %. This difference may be due to the different gestational age between the two studies. There was no maternal mortality in this study, which is explained by more effective hospital services being available at the present time.

Neonatal morbidity and mortality in PPRM are related to prematurity. The most significant causes of morbidity include RDS, IVH, NEC, patent ductus arteriosus, retinopathy of prematurity and sepsis.<sup>(3)</sup> Neonatal morbidity was 39 % in this study; RDS, IVH NEC and sepsis were found in 5.3 %, 1.1 %, 2.1 %,

and 8.4 % cases, respectively, consistent with a previous report.<sup>(16)</sup> In the present study, infection, especially pneumonia, was the most common neonatal complication, which is in contrast with previous reports that RDS has been seen most commonly.<sup>(12,17)</sup> A neonatal mortality of 2.1 % was found in this study, consistent with a report from Robertson et al.<sup>(16)</sup>

In conclusion, most PPRM cases under expectant management delivered within 7 days and neonatal morbidity was still high even with expectant management. Data should be further analyzed to find what gestational age group had poor clinical course and pregnancy outcome.

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