

ORIGINAL RESEARCH

A Cross Sectional Prospective Study to Evaluate the Effect of Yoga on A Hospital Based Prospective Study to Evaluate the Maternal and Fetal Outcome of Preterm Premature Rupture of Membranes (pPROM) at District Hospital

Suman Meena¹, Rekha Jharwal², Vinod Kumar Meena³, Brij Mohan Meena⁴

^{1,2}MS (Obstetrics & Gynaecology Department), Government Hospital, Dausa, Rajasthan, India. ³MS (Otorhinolaryngology Department), Government Hospital, Dausa, Rajasthan, India. ⁴Medical Officer, Department of Pediatrics, JK Loan Hospital, Jaipur, Rajasthan, India.

Corresponding Author:

Dr. Brij Mohan Meena,
Medical Officer, Department of Pediatrics, JK Loan Hospital,
Jaipur, Rajasthan, India.
E mail id: brij86mohan@gmail.com

Received: 02 January, 2023

Accepted: 09 February, 2023

ABSTRACT

Background: Preterm prelabour rupture of membranes (pPROM) occurs in 2–3% of all pregnancies leading to 30–40% of preterm births. The latent period from membrane rupture to delivery is typically brief after pPROM. The present study undertaken is to identify the risk factors causing pPROM and to study fetal and maternal outcome associated with pPROM.

Materials & Methods: A hospital based prospective study done on 60 patients admitted with pPROM under the Obstetrics and Gynaecology department, at district Hospital during one year period. The onset of complications like fetal distress, fetal heart rate variations, chorioamnionitis were looked for. In cases of fetal jeopardy or any other obstetric complications, labour was cut short by the caesarean section. The babies were followed up in the postnatal period. Neonatal mortality and morbidity were noted. Neonates were monitored for the complications of birth injuries, signs of asphyxia, meconium aspiration and sepsis. Both mother and baby were followed up till their stay in the hospital. Statistical analysis was performed with SPSS statistical software with all the relevant data compiled and entered.

Results: Among the selected cases, pPROM was noted in 6 (10%) mothers in the age group of <20 years, 33 (55%) mothers in the age group of 21-25 years, 14 (23.33%) mothers were in the age group of 26-30 years, and 7 (11.66%) mothers above 30 years of age. Majority of cases belong to socioeconomic status V with a total of 39 cases (65%). Number of multigravida in the study was 22 (36.66%) and primigravida were 38 (63.33%). Out of 60 patients studied, 49 cases (81.66%) were booked and 11 cases (18.33%) were unbooked. Out of 20.58% of neonatal morbidity, complications were maximum in 35-36 weeks group. NICU admissions were more common in 28-31 weeks group. Risk factors were commonly found among 32-34 weeks group with 45%. Out of 13.33% who had latent phase of >3 days, 10% of them were of <34 weeks of gestational age.

Conclusion: We concluded that the most common age group to suffer from pPROM was

21-25 years. There were no risk factors in most of the mothers, but the risk of breech presentation can be avoided by coitus in the later weeks of pregnancy reduces the risk of pPROM. Neonatal care facilities can be improved to manage neonatal emergencies so as to reduce neonatal deaths.

Keywords: pPROM, Neonatal Morbidity, Maternal Complications, Pregnancy.

INTRODUCTION

Preterm premature rupture of membranes (pPROM) was commonly associated with difficult labour and overcome by the use of powerful shaking sternuateries, encouragement, holding of breath and bearing down and strong smelling things.¹ Rupture of membranes long before the labor may be called dry labor where gentle cervical dilatation is lost causing injury to the cervix and increased pain due to the hard head pressing on cervix.² The uterine wall applies itself to the fetal contour which irritates the muscle to cause irregular contractions and thereby forming contraction rings which leads to prolonged labour. Preterm prelabour rupture of membranes (pPROM) occurs in 2–3% of all pregnancies leading to 30–40% of preterm births.³ PROM occurs in approximately 5%–10% of all pregnancies, of which approximately 80% occur at term.³

pPROM is a multifactorial process including certain risk components such as pPROM in previous pregnancy, smoking, socioeconomic status, poor nutrition (e.g. body mass index below 19.8 kg/m², copper and ascorbic acid deficiencies), prior cervical conization, cervical cerclage, second- and third trimester bleeding, acute pulmonary disease and prior episodes of preterm contractions, infection (bacterial vaginosis), amniocentesis, polyhydramnios and multiple gestation but in most of the cases, the cause remains unknown and is not apparent at the time of membrane rupture.²

Fetal membrane rupture is a physiologic process at term, but when it occurs preterm, it results from abnormal structural weakening of the membranes in the region of the internal cervical os where it is initiated by membrane stretch and involves local inflammation and ascending bacterial colonization.¹ The weakening of membranes is directly caused by bacterial collagenases and proteases, but a number of other pathways are also involved like increased maternal cytokines or an imbalance in MMPs and TIMPs in response to microbial colonization, trauma, and uterine over-distension.⁴ Genital tract pathogens that have been associated with pPROM include *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, *Trichomonas vaginalis*, and group B β -hemolytic streptococcus (GBS). When fluid leakage occurs after amniocentesis, resealing of the membranes is usual (86-94%), but it is usually uncommon after preterm premature rupture of membranes.

The latent period from membrane rupture to delivery is typically brief after pPROM. If pPROM occurs before 34 weeks of gestation, more than 90% of women will deliver within 1 week. Near the limit of viability, about two thirds of women will deliver within 1 week of membrane rupture, but with expectant management, a latency of four weeks or more can be achieved in one in five cases.¹

Currently most authorities accept a plan of active management which includes prevention of infection, delay of delivery until fetal maturity is achieved and active intervention by induction if labor is no longer preventable or if early infection is suspected. According to Natale et al.,⁴ and Jairam et al.,⁵ expectant management of pPROM did not reduce the incidence of caesarean birth and newborn requirements for neonatal intensive care. Administration of antibiotics in pPROM patients also showed reduced neonatal and maternal mortality.⁶ The present study undertaken is to identify the risk factors causing pPROM and to study fetal and maternal outcome associated with pPROM.

MATERIALS & METHODS

A hospital based prospective study done on 60 patients admitted with pPROM under the Obstetrics and Gynaecology department, at district Hospital during one year period.

Inclusion criteria:

1. All pregnant women with pregnancy between 28-37 weeks of gestational age with preterm premature rupture of membranes.
2. Primi gravida/Multi gravida
3. Mal presentations
4. Polyhydramnios
5. Mother with diabetes mellitus & PIH/preeclampsia
6. Confirmation of pPROM by a speculum examination

Exclusion criteria:

1. PROM more than 37 weeks.
2. Congenital anomalies.
3. IUD.

Methodology

A detailed history was taken including age, booking, socio-economic status, parity, menstrual history, time of onset of draining, amount of fluid lost, its colour, odour, association with pain or bleeding per vagina and perception of fetal movements, history of previous similar episodes in other pregnancies and history suggestive of incompetent os.

General examination was done. Height and weight were noted. Pulse, BP, temperature was noted. Systemic examination included cardiovascular, respiratory systems and CNS systems. Depending upon the Bishop's score, they were allowed to progress spontaneously or induced with Cervi prime gel or misoprostol 25mcg according to RCOG guidelines.

The onset of complications like fetal distress, fetal heart rate variations, chorioamnionitis were looked for. In cases of fetal jeopardy or any other obstetric complications, labour was cut short by caesarean section.

Mothers were watched for third stage complications like PPH and retained placenta and followed up in puerperal period. Foul smelling lochia and febrile illness postnatally were specifically asked for. Episiotomy and caesarean section wounds were followed up regularly and wound infections are looked for. Maternal complications like puerperal sepsis, urinary tract infections and respiratory tract infections were noted.

The babies were followed up in the postnatal period. Neonatal mortality and morbidity were noted. Neonates were monitored for the complications of birth injuries, signs of asphyxia, meconium aspiration and sepsis. Both mother and baby were followed up till their stay in the hospital.

Statistical Analysis

Variables like age, parity, socio economic status, duration of pregnancy, mode of delivery, maternal and fetal outcomes are recorded. Conventional Chi squared test was used to analyze differences. $P < 0.05$ was considered significant. Statistical analysis was performed with SPSS statistical software with all the relevant data compiled and entered.

RESULTS

Among the selected cases, pPROM was noted in 6 (10%) mothers in the age group of <20 years, 33 (55%) mothers in the age group of 21-25 years, 14 (23.33%) mothers were in the age group of 26-30 years, and 7 (11.66%) mothers above 30 years of age. Majority of cases belong to socioeconomic status V with a total of 39 cases (65%). Number of multigravida in the study was 22 (36.66%) and primigravida were 38 (63.33%). Out of 60 patients studied, 49 cases (81.66%) were booked and 11 cases (18.33%) were unbooked (table 1).

Out of 20.58% of neonatal morbidity, complications were maximum in 35-36 weeks

Table 1: Demographic variables in pPROM patients

Demographic variables	Number (N=60)	Percentage
Age (yrs)		
<20 years	6	10%
21 - 25 years	33	55%
26 - 30 years	14	23.33%
>30 years	7	11.66%
Socioeconomic status		
III	4	6.66%
IV	17	28.33%
V	39	65%
Gravida		
Multigravida	22	36.66%
Primigravida	38	63.33%
Booked/Unbooked		
Unbooked	11	18.33%
Booked	49	81.66%

group. NICU admissions were more common in 28-31 weeks group. Out of 6, 5 had NICU admissions which were 83.33%. Maternal morbidity was more common in 28-31 weeks of gestation which was about 33.33%. Risk factors were commonly found among 32-34 weeks group with 45%. Out of 13.33% who had latent phase of >3 days, 10% of them were of <34 weeks of gestational age (table 2).

DISCUSSION

Preterm premature rupture of membranes is a fair complication of pregnancy that leads to various maternal and neonatal complications.

In the present study, 60 patients admitted with pPROM were evaluated. In this study, pPROM was present in 55% of cases in the age group of 21-25 years. Similar results were obtained in a study conducted by Akter et al.,⁷ (40.33%).

Patients belonging to socio economic status V were observed to be the most common class to get admitted with pPROM with 65% which is comparable with the study conducted by Swathi Pandey⁸ which is 61%. Studies have shown a correlation between low socio-economic status and defects in the amniotic membrane. The factors that lead to pPROM in low socio-economic status include poor hygiene, malnutrition, anemia, stress, over exertion, high parity, recurrent genitourinary infections etc. These factors lead to a decreased antibacterial activity in the amniotic fluid of patients that in turn leads to pPROM.

The major factor that leads to an increase in cases of pPROM among mothers belonging to

low socio-economic status is malnutrition. Malnutrition in turn leads to increased risk of infections that eventually leads to pPROM. Hence the cause of pPROM involves a vicious cycle of malnutrition and infections.

Table 2: Neonatal outcome and maternal outcome correlate with gestational age

	Gestational Age (in weeks)				P-value
	28-31 (N=6)	32-34 (N=20)	35-36 (N=34)	Total (N=60)	
Neonatal Morbidity					
No morbidity	4	14	27	45	$<0.05^*$
RDS	1	3	3	7	
Septicemia	0	1	2	3	
Jaundice	1	2	0	3	
IVH	0	0	2	2	
NICU admission					
No	1	13	32	46	0.001^{**}
Yes	5	7	2	14	
Maternal complication					
Nil complications	4	18	28	50	0.004^*
Chorioamnionitis	1	2	2	5	
Abruption	1	0	1	2	
Wound infection	0	0	3	3	
Risk factors					
No risk factors	4	11	27	42	$<0.005^*$
Breech	0	3	1	4	
History of recent coitus	1	2	1	4	
Previous history of PROM	1	1	3	5	
Polyhydramnios	0	2	1	3	
Twins	0	1	0	1	
UTI	0	0	1	1	
Latency (in hours)					
0-24	0	11	24	35	$<0.005^*$
25-72	3	6	8	17	
>72	3	3	2	8	

It was noted in the present study that 63.33% of the patients admitted with pPROM were primigravida. In a study conducted by Swathi Pandey⁸ (multigravida 48% and primigravida 52%), and Fatemeh Tavassoli⁹ (multigravida 44.1% and primigravida 55.9%), similar results were obtained.

The percentage of booked cases in the present study was found to be 81.66% while that of unbooked cases was noted to be 18.33%. These results are comparable to a study conducted by Shwetha Patil et al.,⁸ where the percentage of unbooked cases was accounting to 31% and booked cases to 69%. There was no significant correlation between the antenatal care and incidence of pPROM which was in contrast to a study done by Shweta Anant Mohokar et al.,¹⁰ where there was a strong correlation between the unbooked cases (84%) and the incidence of pPROM. The unbooked cases receive poor antenatal care that ultimately leads to increased risk of infection to the mother which is a major risk factor for pPROM.

Assessing the risk factors causing pPROM, 70% of the study population had no risk factors while the most common risk factor among others was found to be breech presentation (6.66%). Gunn et al.,¹¹ also showed similar results in his study where breech presentation was the most common risk factor. In the present study, previous history of pPROM was the second commonest risk factor with (8.33%), followed by history of recent coitus (6.66%), polyhydramnios (5%), twins and UTI (1.66% each).

24% of the babies born to pPROM mothers were admitted in NICU for various complications in this study. These results correlated with Shweta Patil et al.,¹² where the percentage of NICU admissions was 36%. NICU admissions of 24% included babies born by normal vaginal delivery and LSCS.

Out of the 25% babies admitted, the most common cause for neonatal morbidity was respiratory distress syndrome (11.66%), followed by septicemia (5%), jaundice (5%), IVH (3.33%).

Among 60 cases, maternal complications were present only in 16.66% of the population of which chorioamnionitis was predominating (8.33%). A study by Artal K⁷ showed the incidence of puerperal pyrexia to be 13% and chorioamnionitis to be 3%.

In the present study, 58.33% of the population had delivery within 24 hours, which was similar to the results obtained in a study conducted by Shweta Patil et al.,¹² (64%) and also in a study conducted by Russels¹³ (80%). Out of 13.33% who had latent phase of >3 days, 10% of them were of <34 weeks of gestational age.

CONCLUSION

We concluded that the most common age group to suffer from pPROM was 21-25 years. There were no risk factors in most of the mothers, but the risk of breech presentation can be avoided by coitus in the later weeks of pregnancy reduces the risk of pPROM. Neonatal care facilities can be improved to manage neonatal emergencies so as to reduce neonatal deaths.

REFERENCES

1. Gould GM & Pyle WL. Anomalies and curiosities of medicine. New York, 1937. The Julian Press Inc as cited by Ekvall.
2. Delee AM, Joseph and Greenhill. In: Principle & Practice of Obstetrics. WB Saunders co., London, 1943:666.
3. Duff P. Premature rupture of membranes in term patients: induction of labor versus expectant management. Clin Obstet Gynecol. 1998;41:883-891.
4. Natale R, Miline JK, Campbell MK, Pottis PG, Webster K, Halinda E. Management of premature rupture of membranes at term randomised trial. Am J Obstet Gynecol 1994;171(4):936-9.

5. Jairam VK, Sudha S. A Study of premature rupture of membranes- Management and Outcome. *Journal of Obstet and Gynec of India*. 2001; 51(2): 58-60.
6. Kenyon S, Boulvin M, Neilson J. Antibiotics for premature rupture of membranes. A systemic review. *Obstet and Gynecol* 2004; 104(5): 1051-7.
7. Akter SM1, Roy SK, Thakur SK, Sultana M, Khatun W, Rahman R, Saliheen SS, Alam N. Effects of third trimester counseling on pregnancy weight gain, birthweight, and breastfeeding among urban poor women in Bangladesh. *Food Nutr Bull*. 2012 Sep;33(3):194-201
8. Pandey Swati, Dave et al, Maternal and fetal outcome in cases of preterm premature rupture of membranes. *Journal of obstetrics and Gynaecology of India*. 2000; 50-63.
9. Tavassoli Fatemeh, Ghasemi Marziyeh, Ghomian Nayereh, Ghorbani Anahita, Tavassoli Samira; Maternal and perinatal outcome in nulliparous women complicated with pregnancy hypertension; *Oman Medical Journal* 2010, Volume 25, Issue 2, April 2010.
10. Shweta Anant Mohokar, Amarjeet Kaur Bava, Y.S. Nandanwar; Analysis of Maternal and Perinatal Outcome in Cases of Preterm Premature Rupture of Membranes. *Bombay Hospital Journal*, Vol. 57, No. 3, 2015.
11. Gunn GC, Mishell DR, Morton DG. Premature rupture of membranes, a review: *Am J Obstet Gynec* 1970; 106:469.
12. Shweta Patil, Vikram Patil. Maternal and Foetal Outcome in Premature Rupture of Membranes; *IOSR Journal of Dental and Medical Sciences*, Volume 13, Issue 12 Ver. VII (Dec. 2014), PP 56-83.
13. Russell KP, Anderson G et al. Aggressive management ruptured membranes. *Am J Obstet Gynecol* 1962; 83: 930-1962.