PERINATAL AND MATERNAL OUTCOME IN PRE-LABOUR RUPTURE OF MEMBRANES

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CERTIFICATE

This is to certify that the work presented in this dissertation in partial fulfilment of the degree **M.D. (Branch II) Obstetrics and Gynaecology** examination of the Tamil Nadu Dr. M.G.R. Medical University entitled "**PERINATAL AND MATERNAL OUTCOME IN PRE-LABOUR RUPTURE OF MEMBRANES"** is the bonafide work of **Dr. R. Mercy Rodrigo**, Post-graduate student in M.D. (OG).

It was carried out and prepared under the over all guidance and supervision in the Dept. of Obstetrics and Gynaecology, Govt. Raja Sir Ramaswamy Mudaliar Lying-In Hospital, Chennai-600 013.

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DECLARATION

I, **Dr. R. MERCY RODRIGO** solemnly declare that this dissertation titled, "**PERINATAL AND MATERNAL OUTCOME IN PRE-LABOUR RUPTURE OF MEMBRANES"** is a bonafide work done by me at Govt. RSRM Lying-in Hospital and Govt. Stanley Medical College during September 2005 to December 2005 under the guidance and supervision of my Superintendent **Prof. Dr. DEVAMBIGAI, M.D., D.G.O.**

The dissertation is submitted to The Tamilnadu, Dr. M.G.R. Medical University, towards partial fulfilment of requirement for the award of **M.D. Degree (Branch – II) in Obstetrics and Gynaecology.**

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CONTENTS

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1. INTRODUCTION

PROM is one of the most common complication of pregnancy that has a major impact in fetal and maternal outcome. It is also one of the commonest event where a traditional pregnancy can turn into a high risk situation for the mother as well as the fetus.

The obstetrician is invariably at a dilemma regarding the future plan of management apart from the diagnosis which may not be obvious at times. It is such an important event that it is surprising to find a tremendous divergence of opinion concerning its proper management as it is still remaining controversial and challenging.

The maternal problem associated with PROM are risks of infection, cord prolapse unfavorable cervix for induction. The latter is associated with high incidence of dysfunctional labour, chorioamnionitis, an increased rate of caesarean section, PPH and endomyometritis, while the problems for neonates includes problems of pre maturity (in PPROM) Sepsis, and postural deformities if the PROM to delivery interval is many weeks.

Gestation of less than 34 wks poses problems of bronchopulmonary dysplasia (if less than 26 weeks) hyaline membrane disease (leading to respiratory distress syndrome) intra ventricular hemorrhage, necrotizing enterocolitis and sepsis. Fetal wastage and neonatal mortality and morbidity is high when PROM occurs in pregnancies of less than 32 wks. The decision for appropriate management depends upon the assessment of gestational age, the likelihood of infection and the availability of neonatal intensive care facilities.

The aim of the modern obstetrics is to give best quality of life for the Child to be born. Much of the literature available is pertaining to studies in the developing countries where

neonatal salvage rates in preterm deliveries are very high and stringent asepsis is followed. The present study was undertaken to evaluate etiological factors, maternal and perinatal outcome and also to identify the critical areas of controversy relating to the management of PROM and to review the recent literature for clinical research.

DEFINITION

PROM : Amniorrhexis before the onset of labour.

PPROM : Amniorrhexis before 37 completed weeks of gestation.

Prolonged PROM : Amniorrhexis for more than 24 hrs.

INCIDENCE OF PROM

Incidence 4 – 12%

2 – 18% (Gunn et al 1970)

Incidence of pre term PROM – 2% accounts for 50% of pre term deliveries and consequently for 10% of perinatal mortality.

STRUCTURE OF AMNION AND CHORION

Amnion

The Amnion is an ectodermal derivative and is a single cell layer in thickness (0.08 to 0.12 mm). It is avascular and nerveless. The cells are cuboidal to columnar in shape and undergo squamous metaplasia at areas of mechanical stress. The single layer cell membrane is strengthened by the cell's surface desmosomes and microvillar interdigitations. The amnion overlies a basement membrane composed of type IV and V collagen that attaches to a collagenous extracellular matrix consisting predominantly of collagen types I and III, reticular fibrils and fibroblasts.

Chorion

The chorion is a mesodermal derivative that originates from the trophoblastic mass. The trophoblastic villi undergo atrophy as the embryo and gestational sac grow away from its implantation site towards the opposite wall of the intrauterine cavity. The cells are polygonal in shape and are stacked on one another in 2 – 10 cell layers. The chorion measures upto 0.4 mm in thickness. In contrast to the amnion the chorion is vascular, and nutrients carried in its vessels reach the amnion by diffusion.

ETIOPATHOGENESIS

The etiology of PROM is multifactorial.

It includes,

1. Maternal enzymes like collagenase and trypsin which are found in placenta and amniotic fluid works synergistically to disrupt the collagen matrix resulting in PROM.
2. Maturational changes
   - Decrease in Type – III collagen cause the membrane to lose their elasticity and strength.
   - Increased mechanical stresses from increasing uterine activity contributes to membrane weakness in 2 distinct ways.

   a) Cervical softening and effacement allow for greater downward distention of the chorioamniotic membrane.
   b) Increase in hydrophobicity of the amnion and chorion leading to decrease in phosphatidylinositol resulting in loss of membrane phospholipids leading to cellular fracture and PROM.
   c) Bacterial involvement

   - Group B Streptococci
   - N. Gonorrhoeae
   - E. Coli
   - Staphylococci
   - Pseudomonas aeruginosa
   - Bacteroids
   - Chlamydiae, mycoplasma and ureaplasma.

These are all the common organisms producing bacterial proteases, collagenases and elastases affecting the amniotic membrane directly.

4. HOST AND FETAL FACTORS

Without any host factor influence bacterial infection alone cannot weaken the membrane.

i. Peroxidase in amnion, chorion and placental macrophages produces free radicals along with bacteria.

ii. Smoking affects the nutritional factor and O_2 availability.

iii. Cervical integrity

iv. The amnion neutrophil itself produces cytokines like IL-6, IL-8 and also by fetal neutrophils.

v. Phospholipids of fetal membrane are destroyed by bacteria. The end products (PGE_2 & PGF_2) along with calcium can stimulate uterine contractions predisposing to PROM.

vi. Type V collagen in the basement membrane of amnion can be disturbed by bacterial collagenases.

All the above factors play major and interrelated roles in PROM. So, it is clear that products of prostaglandins formation is the major pathway leading to PROM.

RISK FACTORS

Risk factors associated with PROM are :

1. Overdistension of uterus resulting from multiple pregnancy, polyhydramnios
2. Cervical incompetence
3. Chorioamnionitis
4. Coitus especially with presence of chorioamnionitis.
5. Antepartum bleeding in early pregnancy
6. Prior preterm delivery

7. Bacterial vaginosis
8. Maternal diseases like α_1 AT deficiency and Ehlers – Danlos syndrome
9. Maternal deficiency of trace elements and vitamins especially Zinc and Vit. C.

DIAGNOSIS AND COMPLICATIONS

PROM is likely when there is h/o sudden gush of amniotic fluid from vagina followed by dribbling thereafter. Diagnosis is obvious when there is passage of meconium or vernix. Amniotic fluid must be differentiated from urine and vaginal secretions. There are a variety of tests developed for this purpose.

1. Changes in vaginal pH

   Nitrazine paper which is orange in colour turns blue and red litmus paper turns to blue colour.
2. Arborization test – formation of ferning seen under microscope confirms presence of amniotic fluid.
3. Microscopy test for vernix caseosa and lanugo hair.
4. Cytological methods for detections of fetal cell in the amniotic fluid – Nile blue sulphate test.
5. USG study for liquor volume.

COMPLICATIONS

Consequences of PROM depends upon;

1) Duration of PROM
2) Gestational age
3) Associated infection

MATERNAL COMPLICATION :

Mortality

Mortality should not occur due to PROM

Morbidity

Morbidity is negligible which is about 5.2% (Lebhery & Austia 1969)

Intra amniotic infection or chorioamnionitis can manifest as either of the following 3 groups.

i) Clinical evidence of intra-amniotic infection

ii) only positive amniotic fluid culture

iii) Only positive fetal blood culture

Infection can cause :

- Preterm labour
- Abnormal labour
- Increased operative delivery
- Uncontrolled infection can lead to septicemia and its complications which warrants delivery of the fetus irrespective of the gestational age.

FETAL / NEONATAL COMPLICATION

PN Mortality

- 6.7% in PROM (Singh et al 1990)
- Mainly due to sepsis and respiratory distress
- 55% is due to infection

PN Morbidity

1) Infection

- Risk of sepsis is inversely related to gestational age

(Seo et al 1985)

- Incidence of infection increases with prematurity and chorioamnionitis
- Septicemia
- Pneumonitis
- Meningitis
- Pyoderma

2) Perinatal asphyxia

Incidence of low Apgar and meconium staining occurs more in infection cases.

3) Prematurity

Prematurity contributes 50% to perinatal mortality. In PPROM poor neonatal outcome is caused by immaturity, neurological injury and infection. Meta analysis reported in 1996 showed incidence of sepsis and intraventricular hemorrhage decreases with antibiotic prophylaxis, but no change is noted in mortality.

4)Pulmonary hypoplasia

- Important complication with 70% mortality.
- It is related to gestational age at the time of rupture and the presence of oligohydramnios.

5) Developmental delay and cerebral palsy

- Increased incidence with prematurity and infection (Morphy et al)

6) Respiratory distress syndrome – more common in PPROM

7) Skeletal deformities

Prolonged PROM leads to 47% incidence of pulmonary hypoplasia and skeletal deformities (Normand et al)

CORTICOSTEROIDS IN PROM

Steroid Administration begs 2 questions.

1. Is steroid administration superfluous because ROM in itself accelerates fetal lung maturity ?
2. Is steroid administration hazardous as it increases the risk of maternal and fetal infection in the present of PPROM, especially if infection is already present as either the cause or result of ROM ?

It is clear that there is no unequivocal indications for the use of antenatal corticosteroid in the preterm gestation with PROM extrapolating the effects seen in gestations with intact membranes, however there are potential benefits in reduction of neonatal respiratory disease and intracranial hemorrhage at the expense of increased risks of maternal postpartum infection. Because the life time harm from the neonatal diseases is grave and the sequelae of infection in the mother are usually mild antenatal corticosteroids are administered to patients with PPROM between the gestational ages of 24 – 33 in the absence of frank maternal or fetal infection or fetal compromise (Bruce chen and Michael K. Yancey in clinical Obs & Gynaec Vol. 414; - 832 – 841 – 1998).

TOCOLYSIS IN PROM

The rationale for using tocolytics in the presence of PPROM is to forestall delivery either indefinitely or as long as signs and symptoms of fetal distress, chorioamnionitis and other complications are not present or for a short period of time to permit the action of corticosteroids. Expectant line of management is beneficial for preterm PROM patients, signs of infection warrants broad spectrum antibiotics and prompt delivery. Infection has to be excluded prior to inhibition of labour as it might be the cause.

Tocolysis, at least for a limited period of time (48 hrs) is beneficial after preterm

amniorrhexis. When begun after the onset of contractions following PPROM, tocolysis generally does not prolong latency period. Prophylactic tocolysis begun before the onset of labour increases the likelihood of delaying the onset of labour for 1 – 2 days but not beyond. Aggressive long term tocolysis may increase the maternal risk of chorioamnionitis and endometritis. None of the reviewed randomized studies demonstrated a significant neonatal risk. None of these studies showed an improvement in neonatal outcome, although they have not tested the combination of tocolysis and corticosteroid use with appropriate control. The hypothesis that PROM remote from term should be managed with 1 – 2 days of prophylactic tocolysis and corticosteroid to enhance fetal pulmonary maturity is attractive yet it remains inadequately evaluated (Steven R. Allen – Clinical Obs & Gynec Vol. 41, 842 – 848 – 1998).

ANTIBIOTICS IN PROM

With use of antibiotics, there is significant reduction in maternal and neonatal infection. This reduction in infection also is coupled with prolonged latent period which might be expected to increase neonatal survival and reduce morbidity due to RDS.

Gregory J. Locksmith – Clinical Obs & Gynec Vol. 41 – 864 –869–1998). Use of antibiotic therapy is beneficial in women with preterm PROM for whom expectant management is planned. The best evidence supports the choice of an extended spectrum agent or combination administered intravenously for 2 days followed by an extended spectrum or combination of oral agents for several more days. In the majority of cases, assuming the patient is a good candidate for expectant management, the benefits of antibiotic therapy outweigh the risks.

TABLE 1

SUMMARY OF RANDOMIZED CLINICAL TRIALS EVALUATING ANTIBIOTIC THERAPY IN PRETERM PROM

Clav = clavulanic, gent = gentamicin; clinda = clindamycin.
* Antibiotics were discontinued when cervical culture results became available.

MANAGEMENT OF PROM

Management of PROM has to be stratified according to gestation as the latter determines the relative risks of expectant management in terms of infection versus active management with risks of prematurity (in cases of PPROM) and failed induction of labour with subsequent operative delivery. In term PROM expectant management is initially justified as labour usually occurs spontaneously in 73 – 85% of cases within 24 hrs ,90% within 48 hrs. At 72 hrs only 2 – 5% remains undelivered.

Prior to 34 weeks gestation prolongation of pregnancy to achieve fetal pulmonary maturation through administration of corticosteroids (with or without antibiotics) is the aim. Prolongation of pregnancy requires careful surveillance of fetal and maternal well being using clinical, ultrasound as well as hematological and microbiological markers. There is an increasing tendency to manage patients with prolonged PPROM on an outpatient basis. Delivery may have to be expedited if there is evidence of fetal or maternal compromise or sepsis irrespective of gestation. After 34 weeks although the aim would be to reach 37 weeks the threshold to intervene is much higher as the potential benefits of pregnancy prolongation are less.

2. AIMS & OBJECTIVES

1. To know the incidence of pre labour rupture of membranes in Govt. RSRM lying in hospital.
2. To evaluate the risk factors of PROM.
3. To find out the etiology of PROM.
4. To assess the natural course of PROM.
5. To assess fetal and maternal outcome in PROM.

3. REVIEW OF LITERATURE

Prom is one of the common incidence in labour with various maternal and fetal morbidities. Extensive work has been done on it and a review of this literature will give an insight into the magnitude of this problem and will help to understand the management protocols.

HISTORY

The earliest known reference to PROM dates back to a long time ago when Ipsissims verha of Soranus Ephesus described this condition which we see today and the period is unknown. He was a Greek anatomist and Physician. Paul and Regina (625 – 690) outstanding Greek authors in Medicine stated the definition encountered in PROM in their article. Rosessline (1517 – 1527) wrote many articles in obstetrics. She attributed the definition of PROM in many of her articles. Gould & Pile (1815) reviewed many instances in dry labour related to PROM and the outcome of such a labour. It is only in the recent years that a better picture on the outcome of PROM has been noted and postulated. The changing opinion was heralded by the work of Kries and Shultz (1929, 1930) who advocated ARM in 1250 cases and stated that labour was shortened, need for intervention was less and maternal and fetal morbidity and loss was not increased. Van Rooy (1933) Essen Moller (1936) did not agree with the

view and were vehement in the protest against the principle of ARM for hastening delivery. However many authors including Fitzgibben (1931) and Gulfmacher and Doughlas (1931) Walter Dal (1935) have confirmed the opinion that ARM results in shortening rather than prolongation of labour so the idea of dry labour does not find favor anymore and the whole idea of PROM has undergone a sea of change.

DEFINITION

The definition for PROM is rupture of membranes before the onset of labour.

INCIDENCE

Varies from 4 – 12%. 2 –18%. (Gunn et al 1970). Bruzley (1959) gives an incidence of 15% where as Donald S.Greig (1943) talks about an 18% incidence. Mischell (1970) also gives 18% incidence. Grenshaw (1982) in recent times gives a very high incidence of 15 –45%. Incidence of PPROM is 1% (Gibbs and Blanco 1982).

AGE

Kalkins (1952) after a thorough study of 1168 patients with PROM found the occurrence is more in 25 – 35 years of age group where as Mary

Shultz described more number of PROM in the age group of 25. Though there are quite a good number of papers on the relevance of PROM to the age of patients, many papers have also come out which shows no relationship to age and PROM. Some of them are Danforth Maclean (1953) Mostyn and Embrey (1953) John I.Biskind (1957) Garden and Gunn et al (1970) who have shown the non-relationship of the 2 factors after extensive studies in their respective series.

PARITY

This has created many controversies. Demand and Lyon (1921) studied 270 cases of PROM and concluded that PROM was more in the Primi. This view has been confirmed by Mary Shultz (1929) and Donald S. Greig (1943). This has been denied by Margret B.Ballard (1936) who stated that there is no correlation between parity and PROM and the occurrence is irrespective and independent of the parity. The same view has been expressed by Danforth (1953) Mosty N.P, Embrey (1953) and others. Balkins (1952) Donnelly et al (1957) John I.Biskind (1957) Dyer (1961) are all of the opinion that the incidence of PROM is more in the multigravida than in Primi.

RISK FACTORS

There is no definite or specific cause for the PROM and probably where such an etiology could be identified, it will be much easy to identify and manage the PROM cases. Mary Shultz (1929) analyzed 600 cases of PROM and stated that primiparity with overdistension, malpresentation and lack of engagement were of considerable importance for the etiology of this condition. In addition to mechanical factors variation in tensile strength due to deficient development of connective tissue layer particularly the film sub amniotic layer was also an importance cause.

AETIOLOGY

Danforth (1953) who after a larger study concluded that PROM is not due to any of the till then thought of factors like the tensile strength. weakness of membrane or due to other factors like age, parity etc., He however could not postulate a theory which could threw some light on the reason for PROM in the absence of other known factors.

Skinner et al (1981) feels that the biochemical alteration in the supportive connective tissue of the amnion could affect its biophysical properties and thereby produce weakening resulting in PROM. Kanayama (1985) reported a decrease in type III collagen content in presence of

nutritional deficiencies in the lower strata of society is a leading cause for PROM and it also explains the more frequent occurrence in low socio-economic group than other groups.

Placental abnormalities and maternal diseases like PIH and anaemia were also considered to be a cause of PROM in the study done by Roth G.L (1955). Charles (1981) Bibby (1979) have shown the relationship between cervical incompetence, encirclage and PROM. Rayborn WF Wilson (1980) stated that the most frequent cause of PROM is sexual activity. Naeye et al (1982) proposed that increased frequency of coitus definitely plays a part in PROM. But Ekward et al (1961) studied 500 cases and stated that there is no possible relationship between PROM and coitus or any other trauma.

The cause for PROM is still elusive, even after extensive studies ever since it was first documented. John I Biskind (1957) Goplerad (1976) Koss (1981) and have shown that the cause for PROM is infection of maternal genital tract which has traveled up to infect chorioamniotic membrane. Van Franche, Schmidt and other (1925) concluded that the extension of infection to cervix and amniotic cavity causes PROM, by increasing the irritability of the tissues. The occurrence of PROM has been

described as due to various factors by different authors. The possible causes include age parity infection etc., But Donald (1943) is of opinion that the cause for PROM is malpresentations and multiple pregnancy etc.,

SOCIO-ECONOMIC STATUS AND NUTRITION

Nutritional deficiency were believed to be an important factor in the cause of PROM. Vit C deficiency which is necessary for the production of collagen has been implicated in PROM. Donnelly et al (1957) Giddler & Widemann (1954) have all believed that PROM is influenced to a great extent by socio-economic background.

DIAGNOSIS

A final diagnosis of rupture is not always easy to make, unless amniotic fluid is seen coming from Cx on speculum examination. Use of Nitrazine paper for diagnosis, was first suggested by Bapsti (1938) is based on vaginal Ph alteration by amniotic fluid. Abe (1940) in his study has shown that the accuracy is 98.9% Chopra et al (1980) shows an incidence of 32% false positive reaction in patients with absent membranes and accuracy of 96%. Gupta et al (1977) Tricomi et al (1966) Anjaneyalu et al (1967) have shown correlation rates between arborisation test and PROM is 92%, 96% & 87% respectively.

Accuracy of Nile Blue sulphate test in term PROM patients is 100% which is given by Garden & Brosens (1953), also by Safaf and Purandare (1980). But the incidence of false negativity was 36% in PPROM.

LATENCY PERIOD

Duff et al (1984) Gunn et al (1970) Kappy et al (1979) have shown that 80% of women with term PROM go into spontaneous labour within 24 – 48 hrs and only a minority of patients 10 – 25% have a latent period of > 24 hrs.

Margret B Ballard (1936) observed that average period of onset of labour was 9 hrs and shortest 3 hrs and longest was 25 hrs. Donald S. Greig observed that in 60% of patients labour started by 3 hrs after PROM and it varied from 3 – 12 Hrs. Calkins L.A (1952) observed that in 79% of cases labour commenced within 24 hrs. Clay and Burchell (1964) analyzed 1788 cases and found, in majority of patients spontaneous labour sets within 48 hrs. Akthar et al (1959) Breeze (1961) Russe and Anderson (1962) all noted onset of labour within 24 hrs in 80% of cases.

LSCS IN PROM

Rate varied from 2 – 8%. < 10% rate was shown by Granstrom et al

(1987) and Vander Walt & Venter (1989) (Hannah 1993) observed an incidence of 9.6 to 10.9% in his study.

CORTICOSTEROIDS AND PROM

Crowley (1994) reviewed nine prospective randomized trials published before 1989. Meta analysis showed a 49% reduction in the rate of RDS with corticosteroid administration Ohlsson performed a similar meta analysis of 5 prospective trials of antenatal corticosteroid in PPROM and observed same beneficial effect of steroids in reduction of RDS. Yoon (1973) Bauer CR (1974) are of the opinion that stress of labour itself would accelerate fetal lung maturation. Finally NICHD research network, found that antenatal corticosteroid use was associated with a reduction of 30% in the incidence of RDS.

Kenyon et al 2001 in a randomized multi center trial (ORACLE – 1) found, with antibiotics, there is reduction in delivery at 48 hrs, reduction in neonatal treatment with surfactant, reduction in Oxygen dependance at 28 days, fewer positive culture and fewer major cerebral abnormalities on USG prior to discharge from hospital.

TOCOLYTICS AND PROM

Christensen et al 1980, levy and Warsof (1985) has shown that tocolytics prolonged pregnancy for a period of 24 – 48 hrs but Garite et al 1987, Weiner et al 1988 did not show any prolongation of pregnancy. Keirse (1994) stated that tocolytics are effective in prolonging pregnancy in the presence of preterm PROM beyond the critical period of 24 hrs whether they are given prophylactically or during preterm labour.

MATERNAL MORBIDITY

Clinical manifestation of chorioamnionitis includes fever, fetal and or maternal tachycardia uterine tenderness, foul smelling Vaginal discharge, and maternal leucocytosis. The incidence of chorioamnionitis is directly related to the duration between rupture and time of delivery and it is inversely related to the period of pregnancy (Burchell 1964) Infection to both mother and fetus increases with each 12 hrs lapse of rupture and delivery (Burchell 1964, Breese 1961, Kieggler 1956). Various studies have shown different incidences of maternal morbidity Gibb et al 1978, 30.4% Grita 1980 – 17%). In more recently conducted studies maternal mortality is unknown (Yoder et al 1983).

NEONATAL MORBIDITY AND MORTALITY

Seo et al (1985) in his study has shown that risk of neonatal sepsis is inversely related to gestational age, both with and without PPROM (26.5% preterm Vs 6.7% term) also reported increased neonatal mortality rate in the presence of chorioamnionitis. Bain (1964) has shown that pulmonary hypoplasia is rare after 26 wks gestation, the so called oligohydramnios sequence. Meta analysis by Egartech, Leitech H, Karas H.et al (1996) has shown that antibiotic prophylaxis would reduce common complications of prematurity. There is significant reduction in neonatal sepsis and intra ventricular hemorrhage with antibiotics but the mortality rates were similar in both groups. Taylor et al (1961) has shown that the rate of infection is closely associated with birth weight.

MANAGEMENT OF PROM

Johnson et al 1981, Schubeck et al 1966) have shown ↑sed peri natal loss and maternal morbidity with expectant management which prompted a policy of immediate stimulation and delivery within 24 hours. Hannah (1993) in a study of 5041 women with PROM at term demonstrated expectant management upto 4 days or induction of labour by oxytocin resulted in similar low rates of neonatal infection (2.3%) and similar CS rates of 9.6 – 10.9%. Conservative management in patients with

unfavorable cervix is justified (Duff et al 1984, Kappy et al 1979, vader walt and venter 1989, Duncan and Beckley 1992, Grant et al 1992). Rydhstrom et al (1991) Wagner et al 1989, Arul Kumaran et al 1988) are in favour of immediate stimulation of labour, when the cervix is favourable.

Meta analysis of recent trials shows a tendency for a reduced CS rate with use of prostaglandins Hannah (1993). Mahmood et al 1992 showed the caesarean section is very much less with PG use when compared to Oxytocin. Chua et al (1991) did not find any such reduction in CS rate in PG group when compared to oxytocin.

Expectant management of PPROM does not appear to have significantly increased adverse effects on the incidence of maternal or neonatal sepsis (Daikoku et al 1981 Johnson et al 1981, Wilson et al 1982. Mead 1983 Veille (1988) For the women who is not in labour, is not infected with no evidence of fetal distress continuation of the pregnancy is likely to be more beneficial than harmful (Keirse 1989 Crowely 1994).

Despite exhaustive research most aspects of PROM remains enigmatic which contributes to ↑sed perinatal morbidity and mortality. But efforts to identify the cause for PROM, better management protocols

are continuing with the aim of delivering a healthy baby from a healthy mother.

4. MATERIALS & METHODS

This present prospective study was conducted in Govt. RSRM lying in hospital from September 2005 to December 2005. The cases were selected from labour ward. For selection of cases.

INCLUSION CRITERIA

1. Singleton pregnancy between 28 – 42 weeks of gestation.
2. Primi and multigravida
3. Age group 18 –40 years
4. 4. Confirmed cases of leaking with or without membrane.
   a) leaking from Cx confirmed by speculum examination
   b) H/O leaking per vaginam
   c) Cx dilatation < 3 cms
   d) No uterine contractions

EXCLUSION CRITERIA

1. Multiple gestation
2. Maternal complications interfering with active management of PROM like PIH, heart disease, previous LSCS.

100 patients were taken for study ,with PROM. Similar age group of patients were taken as controls.

ASSESSED WITH

I. HISTORY TAKING

1) Age

2) Socio-economic status

3) Obstetric history

4) Time of rupture

5) Amount of liquor drained

6) Any intervention outside

7) H/o coitus

8) H/o any infection

9) Any cervical surgery

CLINICAL EXAMINATION

1. Nutritional status / Anemia

2. Vital Signs

3. Abd. Examination for GA

   - liquor volume
   - Uterus acting or not
   - Fetal presentation
   - Fetal well being

4. Speculum examination

   - To confirm leaking
   - Cervical dilatation
   - Status of membranes

III. LAB INVESTIGATIONS

Amniotic fluid for C/S (by cervical swab) and other cultures for mother and fetus whenever necessary.

All the patients are admitted in labour ward and started 1gm of systemic Ampicillin and managed individually. Equal number of cases with no PROM and no complication are taken as controls. Progress of labour was carefully watched. Depends upon the maternal and fetal condition labour terminated by natural vaginal / instrumental / operative methods. Only for cases < 34 weeks corticosteroids were given before intervention. No tocolysis were used in this study. After delivery maternal and fetal outcome were studied. Fetal morbidity cases were admitted in neonatal care unit and subjected to investigation and followed till discharge. Mother also followed till discharge.

5. RESULTS AND OBSERVATIONS

Incidence in Govt. R.S.R.M. Lying-in Hospital – 9.06%

It varies from 2% to 18% (Gunn et al 1970)

Average incidence is 10%

According to Arias Incidence varies from 2.7 To 17%

TABLE - 1

AGE INCIDENCE IN PROM

Age in yrs	Study	Control
< 20	9	9
20 – 29	85	85
30 – 40	6	6
Total	**100**	**100**

Incidence of PROM is more in the age group of 20 – 29 yrs which is around 85%. Controls were also taken in the same age groups.

TABLE 2

SOCIO-ECONOMIC STATUS IN PROM

SE Class	Study	Control
Low (IV & V)	98	97
Middle (III)	2	3
Total	**100**	**100**

Many Studies (Artal et al 1976, Harger et al 1990) have shown that defects in the membrane may arise because of poor nutritional status ,which is significantly influenced by SE status. Since the study was taken in GH almost all the patients were belonging to Class IV and V SE status.

TABLE 3

ANTENATAL CARE & PROM

AN booking	Study	Control
Booked	38	60
Unbooked	62	40
Total	**100**	**100**

P < 0.001 – Significant

62 cases of PROM in this study did not have proper AN check-up. Poor antenatal booking could be one of the risk factors implicated in PROM.

TABLE 4
PARITY INCIDENCE IN PROM

Parity	Study	Control
G1	67	68
G2	17	18
G3	13	11
G4	3	3

P Value – 0.41 - NS

Distribution of cases with regard to parity was not significant in this study, and was comparable with the study of Margret B. Ballard.

TABLE 5

INCIDENCE OF PROM IN RELATION TO GESTATIONAL WEEKS

Gestation in wks	Study	Control
< 34	3	--
34 – 36	17	2
> 37	80	98
Total	**100**	**100**

Incidence of PROM is more in term pregnancies, which is about 80% in the study. (Allen et al 1991 shown 60 –80%) and 20% were preterm.

TABLE 6

MEMBRANE STATUS IN PROM

Membrane	Study	Control
Present	20	100
Absent	80	

In this study 20 cases were having membranes intact with high rupture had good prognosis.

TABLE 7

COLOUR OF LIQUOR IN PROM

Color	No. Of cases
Clear	96
Meconium	4
Blood stained	Nil
Total	**100**

Among 100 cases of PROM in this study 96 cases had come with clear liquor and 4 cases had meconium stained liquor with fetal distress which went for LSCS.

TABLE 8

FETAL PRESENTATION & PROM

Presentation	Study	Control
Cephalic	93	98
Breech	7	2
Unstable	-	-
Total	**100**	**100**

About 7 cases of mal-presentation in the study group could be one of the contributing factors to cause PROM.

TABLE 9

ETIOLOGICAL FACTORS IN PROM STUDY GROUP

Cause	No. of Positive cases
Infection	15
H/o coitus	20
Mal presentation	7
H/o cervical surgery	1
Not known	57
Total	**100**

Among the etiological analysis of PROM in the study group, infection which is evident by Amniotic fluid c/s was about 15% H/O recent coitus 20% and H/O cervical surgery 1%.

TABLE 10

BACTERIOLOGICAL STUDY OF AMNIOTIC FLUID IN PROM

Organisms grown	No. of cases	%
E. Coli	6	40
Streptococci	2	13.33
Klebsiella	4	26.66
Proteus	2	13.33
Pseudomonas aeruginosa	1	6.66
Total	**15**	**100**

Amniotic fluid culture showed 15 positive cases. Organisms grown were E-Coli, Streptococci, Klebsiella, Proteus, Pseudomonas aeruginosa and the remaining cases did not shown any organisms.

TABLE 11

LATENCY PERIOD IN PROM

Latent period In hrs	Study group		
	P	M	T
< 6	35	20	55
6 – 12	24	11	35
> 12	9	1	10
Total	**68**	**32**	**100**

Since in this study all the cases were intervened except 10 cases none of the others were allowed to go latency period of > 12 hrs. Out of which 7 cases were pre term. This shows, shorter the gestation, longer will be the latency period and vice versa.

TABLE 12
LATENCY PERIOD IN PRETERM PROM

latent period in hrs.	Gestation in wks		No. of cases	%
	< 33 wks	>33 wks		
< 6	2	6	8	40
6 – 12	-	5	5	25
> 12	1	6	7	35
Total	**3**	**17**	**20**	**100**

35% pre term PROM had > 12 hrs latency period in this study group.

One case was below 33 wks.

TABLE 13
INDUCTION IN PROM

Induction	Study			Control		
	P	M	T	P	M	T
Synto	41	13	54	2	5	7
Miso	7	6	13	--	--	--

No induction	20	13	33	66	27	93

67 cases in study group were given induction when compared to 7 cases in control group. Immediate stimulation policy with oxytocin / misoprostol appears to be beneficial in multiparae and nullipara with good cervical score.

TABLE 14
INDUCTION IN PROM & NATURE OF DELIVERY

	LSCS		**Vaginal labour**		**LMC**		**Ass. Br**		**Total**
	No	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	
Synto	11	20.3	41	75.9	2	3.7			54
Miso			13	100					13
No ind	13	39.39	19	57.57			1	3.03	33

In syntocinon induction group, out of 54 cases 43 cases delivered vaginally and 11 cases underwent LSCS. In misoprostol induction group, all patients delivered vaginally. In No induction group, only 11 cases delivered vaginally, remaining 13 cases underwent caesarean section mainly done for malpresentation and fetal distress.

TABLE 15

MODE OF DELIVERY

Mode of delivery	**Study**	**Control**
Vaginal Delivery	73	86
LSCS	24	12

LMC	2	--
Assisted Breech	1	2
Total	**100**	**100**

74 cases delivered vaginally with or without induction (Synto / miso) and 26 cases had gone for operative procedure or instrumental delivery.

TABLE 16
CAESAREAN SECTION IN TERM PROM & PRETERM PROM

Gestation	No. Of cases	LSCS	%
Pre-term	20	5	25%
Term	80	19	23 . 75%

LSCS in PPROM is 25% ,which is higher than term PROM due to cervical dystocia and fetal distress.

TABLE 17

MATURITY OF FETUS & PROM

Maturity	Study	Control
Term	80	98
Preterm	20	2
Total	**100**	**100**

This study of 80 cases of term PROM coincides with the previous study by Allen (1991) who also found that about 60 – 80% is of, term PROM.

TABLE 18

BABY BIRTHWEIGHT IN PROM

Wt. Of the baby in kg	Study	Control
< 2 KG	6	--
2 – 2.5 KG	51	6
> 2.5 Kg	43	94
Total	**100**	**100**

Since pre term & SGA babies were more in the study group the average birth weight of the babies in the study group were less when compared to control group.

TABLE 19

5' APGAR SCORE IN PROM

5' APGAR	Study	Control
2/10	1	-
6/10	1	-

7/10	10	5
8/10	71	66
9/10	17	29
Total	**100**	**100**

Low Apgar score in PROM in this study is mainly due to infection and meconium staining which contributes increased morbidity.

TABLE 20

MATERNAL MORBIDITY IN PROM

Morbidity	No. of cases
PPH	3
Clinical chorioamnionitis	--
Post partum fever	2
Wound infection	7

Clinical evidence of chorioamnionitis is nil, but bacteriological study showed positive culture for 15 cases. This may be attributed to intrapartum use of antibiotics.

TABLE 21
PERINATAL MORTALITY IN PROM

Maturity	No. of cases	%
Term	1	1.25

Preterm	2	10

PN mortality in the study group was about 3%.

TABLE 22
CAUSES OF PN MORTALITY IN PROM

Causes	**Study**	
	No. of cases	**%**
Pre maturity	2	66.66%
Birth Asphyxia / RDS	1	33.33%

Pre-maturity was the cause for 66.66% of PN mortality in this study group.

TABLE 22

PERINATAL MORBIDITY IN PROM

Morbidity	No. Of cases
Pre maturity	11
Neonatal sepsis	5
BA	4
Resp. Distress	10
SGA	5
Meningitis	1
Total	**36**

36% of the study group had various morbidities like pre maturity, sepsis, birth asphyxia, respiratory distress, meningitis. But only 4 cases had morbidities in control group.

TABLE 23
PERINATAL MORBIDITY IN TERM PROM & PRETERM PROM

Morbidity	Preterm		Term	
	No. of cases	%	No. of cases	%
Sepsis	1	2.7	4	11.11
RDS	6	16.66	4	11.11
Birth asphyxia	-		4	11.11
Prematurity / SGA	11	30.55	5	13.88
Meningitis			1	2.7
Total	**18**	**50%**	**18**	**50%**

Even though PPROM is only 20% in this study, it contributes 50% to perinatal morbidity.

6. DISCUSSION

PROM is associated with significant maternal and neonatal morbidity and or mortality. It presents the obstetrician with a management dilemma. Despite the amount of research done in this area, there is still no universally accepted policy for management and it has gone through various cycles of masterly inactivity to immediate intervention. It is the constant source of distress not only to the fetus, but also to the obstetrician.

Though the problem of PROM was identified centuries ago, the exact etiology is not known, and it involves poorly understood infective, biochemical and mechanical path ways.

This study was done in Govt. RSRM lying in Hospital taking into account of 100 patients with PROM (both Term and pre term) and 100 patients as control without PROM in the same age group and parity. Overall incidence at RSRM hospital was found to be 9.06% General Incidence varies from 2-18% (Gunn et al 1970) 2.7 to 17% (Arias).

High incidence of PROM occurs in low SE group. In this study 98% of patients are in low SE group only. Many studies (Artal et al 1976,

Harger et al 1990) have shown that decreased antibiotic activity in amniotic fluid could be the reason and defects in the membrane may arise because of poor nutritional status which significantly influenced by low SE status.

38 cases of PROM patients were getting proper antenatal care among 100 cases of PROM, when compared to 60 cases getting proper antenatal care in control group. This study gave the P Value < 0.001 which is very significant showing that poor antenatal booking has got significant role in the risk factors on PROM.

In this study 67% were primi and 33% were multi. Distribution of cases with regard to parity was not significant in this study and was comparable with the study of Margret B. Ballard who didn't find any difference in parity distribution. But Calvin from his extensive studies showed increased incidence in multigravida.

80% of patients had term PROM which coincides with reports by Allen (1991) who also found about 60 – 80% of cases were in term pregnancies. 20% belongs to preterm gestation. In control group pre term delivery was only 2%.

Among 100 patients in the study group 80 patients were with absent

membranes and leaking liquor and 20 patients had intact membranes with leaking liquor (HROM). In control group all patients had intact membranes and with no leaking. In study group who had leaking 96% had clear liquor and 4 had meconium stained liquor and none of them had blood stained liquor.

Taking malpresentation as one of the risk factor for PROM in the study group, 7 cases were presented with breech presentation while only 2 cases of mal presentation that is breech in control group.

Coitus being one of the major risk factor for PROM, coitus within the preceding one month was found to be 20% in the study group (Rayburn & Wilson 1980) Naeye (1987) reported that preterm delivery due to PROM were 11 times more frequent with coitus.

In 57% of PROM the cause and risk factors could not be elicited. The remaining 15 cases had bacteriological evidence of infection. They showed positive cultures for E.coli, Klebsiella, Streptococci, pseudomonas aeruginosa and proteus. Specific culture for chlamydial infection could not be done due to lack of facility and cost effects.

Regarding the latency period about 10 cases in study group had >

12 hrs latency, out of which 7 cases were preterm and 3 cases were in term PROM group. This shows shorter the gestation longer will be the latency period and vice versa.

The mean total duration of labour in multipara in study group was almost more than 12 hrs while in control group it was < 12 hrs. No significant differences on the total duration of labour in nullipara in both groups.

Induction of labour forms the integral part of PROM. The management of PROM at term lies somewhere in the continuum of immediate stimulation of labour and expectant management for 24 – 48 hours. Immediate stimulation policy with oxytocin infusion appears to be a reasonable approach in multi parae and nulliparae with a good cervical score in term PROM.

After taking into consideration of parity, gestational age, cervical favourability, presence of signs / risk factors for chorioamnionitis and by exclusion of fetal distress, CPD- policy of immediate stimulation of labour is beneficial for term PROM patients .Policy of expectant line of

management is appropriate for preterm PROM patients.

For induction, syntocinon is used for 54 patents and vaginal misoprostol is used for 13 patients. Surprisingly all the patients in misoprostol induction group delivered vaginally. Meta analysis of recent trials also shows a tendency for a reduced caesarean section rate with the use of vaginal prostaglandins compared with oxytocin at 37 + weeks (Hannah 1993).

The incidence of operative deliveries was high in PROM group when compared to control group. In contrast to control group, where no instrumental deliveries were noted, 2 patients in study group delivered by LMC forceps. Failure of secondary powers was the major indication. Caesarean delivery in study group is 24% when compared to control group, where LSCS incidence was only 12%. Among 24 cases of LSCS 19 was done in nulliparous women. Mainly LSCS was done for cervical dystocia, protracted labour, fetal distress etc., In induction group, among 12 cases, 6 cases is for breech, 4 cases for fetal distress and the remaining for other indications.

Among 24 cases of caesarean section in study group 5 patients were

preterm while there is none in control group and it was done for fetal distress and failed induction.

The mean age of patients with PROM was significantly higher compared to controls which is similar to the studies done earlier. It was shown that advanced maternal age, low pregnancy weight gain and recent coitus are associated with PROM (Naeye & Peter 1980). In this study 33 cases were more than 25 yrs of age while in control it was only 16%.

The major maternal complication of PROM is chorioamnionitis. Clinical evidence of infection has not been noticed in any of the patients in study group, but bacteriological, evidence of infection showed 15%, 2 patients in study group had fever in the immediate postpartum period and 7 cases had wound infection. Complications due to infection is reducing now a days. This may be attributed to regular use of intrapartum antibiotics.

High perinatal loss in PROM is attributed to prematurity in this present study. Among 3 cases of perinatal mortality 2 babies died due to prematurity and its complications.

Among 36 cases of perinatal morbidity 5 cases of sepsis 10 cases of respiratory distress, 4 cases of birth asphyxia 5 cases of SGA has been

documented. Total morbidity incidence is 50% in PPROM, 50% in term PROM.

With tertiary neonatal care and prophylactic antibiotics in this study mortality and morbidity due to infection has been very much brought down.

7. SUMMARY AND CONCLUSION

Even though the problem of PROM was identified centuries ago yet the management is controversial and the outcome is equivocal. This study shows that careful antenatal monitoring for risk factors and etiology detection and prompt treatment of infection and pelvic examination under aseptic precautions and appropriate therapy are important factors in the prevention of PROM.

- Management of PROM lies somewhere in the continuum of immediate stimulation of labour and expectant management.

- Immediate stimulation policy with oxytocin / Misoprostol appears to be a reasonable approach in multi parae and nulliparae with a good cervical score in term PROM.

- Abnormal labour and operative procedures have increased in PROM. Failed induction and fetal distress are the common indications for caesarean section in induction group. Use of Vaginal prostaglandins offered better results in this study, but this needs further evaluation.

- Expectant line of management is beneficial for preterm PROM patients, signs of infection warrants broad spectrum antibiotics and prompt delivery.

- PPROM is the cause for 20% of pre maturity and it is an important

cause for perinatal morbidity and mortality.

- Early intervention with proper care and with prompt delivery and with good neonatal setup mortality due to sepsis, respiratory distress and birth asphyxia have been decreased.

- Neonates treated with prophylactic antepartum and intrapartum antibiotics definitely has fewer complications and an improved long term outcome.

- Use of corticosteroid helps to improve the outcome.

- Even though PROM occurs more at term the perinatal morbidity and mortality is mainly due to PPROM and more work needs to be done to identify the etiologies and prevention of PROM especially in the pre term gestation.

- This study coincides with other studies and shows that the most important risk factors associated with PROM are low SE status, nutritional deficiency and improper antenatal care.

- To conclude, with improvement in SE status, nutritional supplement and proper antenatal care will definitely reduce the incidence

8. PROFORMA FOR PROM

Name : Age : Occupation IP No.
Income Unit
SE Class

Address : Education : D.O.A :
Date of Delivery :
D.O.D :

Complaints

Menstrual His

Obstetric His G P L A LMP
EDD

LCB Abortion (Last)

No.of Preg.	Abortion	Preterm	Term	Type of Delivery	Sex & Age

Time of Rupture Amount of Fluid Booked / Un Booked

Any intervention H/o recent coitus Immunized / Not

His suggestive of infection

Past His Medical Surgical
HT
DM Any cervical Surgery

GENERAL EXAMINATION

(Nutritional Status)	Anemia	PR
CVS	HT	BP
RS	Weight	

OBSTETRIC EXAMINATION :
P/A

SPECULAM EXAMINATION :
P/V

LAB INVESTIGATION : HB % Urine - Alb, TC DC
Sugar

Cervical Swab C/S Urine – C/S (Selected) Fetal Blood C/S
(Amniotic Fluid) (Selected)

LABOUR : INDUCED / NO INDUCTION
NATURE OF LABOUR

OUTCOME :

MATERNAL : Date and time of delivery

Mode of delivery

Any complication

FETAL : Preterm / term

Wt. Of baby

Apgar – 1 min 5 min

Any complication

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