PRETERM PREMATURE RUPTURE OF THE MEMBRANES (PPROM)

Introduction

Preterm Premature Rupture of the Membranes (PPROM) is the rupture of the membranes **prior to 37 completed weeks gestation** and **prior to the onset of labour.** [2]

Pre-labour rupture of membranes at term (PROM) is defined as spontaneous rupture of the membranes before the onset of labour **at or after 37 weeks gestation**. PROM is *prolonged* when it occurs more than 18 hours before the commencement of labour, (and is associated with an increased risk of ascending infection).

All women with actual or suspected **PPROM** should be referred urgently to the Obstetric Unit.

All women should be observed in hospital under the Obstetrics Unit for at least 72 hours in the first instance.

In general terms, once the membranes rupture, delivery is recommended when the risk of ascending infection outweighs the risk of prematurity.

Exact management will depend on a number of factors including:

- Gestational age
- Clinical evidence of infection
- The group B streptococcus status of the patient.

Some patients may be suitable for subsequent outpatient management under close ongoing supervision and regular review.

History

Traditionally the presence of amniotic fluid leakage was uncertainly confirmed by:

- An alkaline pH of the cervicovaginal discharge, demonstrated by seeing whether the discharge turned yellow nitrazine paper to blue (i.e. the **nitrazine** test).

  The pH of the vaginal secretions is generally 4.5-6.0, whereas amniotic fluid usually has a pH of 7.1-7.3.

- Evidence "ferning" (i.e. microscopic crystallization) of the cervicovaginal discharge on drying.
- Alpha-fetoprotein (AFP)
- Evidence of diminished amniotic fluid volume on ultrasound examination.

None of these investigations however were very reliable, with low sensitivities and specificities.

Today testing is done for the amniotic fluid protein **PAMG-1**

Pathophysiology

PPROM complicates 2% of pregnancies.

It is associated with 40% of preterm deliveries and therefore makes a significant contribution to neonatal morbidity and mortality through prematurity, infection and pulmonary hypoplasia.

Risk factors for PPROM:

These include:

1. History of previous PPROM
2. History of previous preterm labour
3. Lower socioeconomic groups
4. Smoking
5. Infections:
    - Sexually transmitted infections
    - Intra-amniotic infection (chorioamnionitis)
6. Previous cervical surgery
7. Uterine distension (twins or polyhydramnios)
8. Cervical cerclage
9. Amniocentesis
10. Antepartum vaginal bleeding

11. Placental abruption

12. Direct abdominal trauma.

Complications:

These include:

1. Infection:

   - The fetal membranes serve as a barrier to ascending infection. Once the membranes rupture, both the mother and fetus are at risk of infection.

   - In *general terms* there is a higher (potential) risk of infection (about 2%) for the baby and mother if you wait for labour to start, compared to being induced shortly after the membranes have ruptured (0.5%).

2. Premature labour: [1]

   An inverse relationship exists between gestational age at the time of ROM and latency.

   At **term** (in the absence of obstetric intervention):
:

   - 50% of pregnancies complicated by PROM will go into labour spontaneously within 12 hours

   - 70% within 24 hours

   - 85% within 48 hours

   - 95% within 72 hours

   In women with **PPROM** remote from term:

   - 50% will go into labour within 24 - 48 hours

   - 70% - 90% within 7 days.

   In general women with preterm PROM at 24 to 28 weeks of gestation are likely to have a longer latency period than those with preterm PROM closer to term.

3. PPROM remote from term:

   - PPROM at < 22 weeks poses special problems.

     The survival rate in these fetuses is about 20%. While the latency period is usually increased, the fetus is at risk of pulmonary hypoplasia. There is no

reliable method for predicting this outcome. Immediate delivery is a reasonable option to discuss in these circumstances at consultant level.

Clinical assessment

Preterm PROM is largely a clinical diagnosis.

It is typically suggested by a history of watery vaginal discharge and confirmed on sterile speculum examination.

In unclear situations a test for **PAMG-1** can be done, (see below).

Important points of History:

The patient complains of fluid leaking from the vagina ("waters breaking").

Rupture of the membranes typically presents as a large gush of clear vaginal fluid or as a steady trickle.

The differential diagnosis includes:

1. Leakage of urine (urinary incontinence)
2. Excessive vaginal discharge, such as:
    - Physiologic discharge
    - Infection - bacterial vaginosis
3. Cervical mucus (show) as a sign of impending labour.

Important points of Examination:

The diagnosis can usually be made on clinical grounds by a combination of history and the identification of amniotic fluid in the vagina on speculum examination.

1. Vital signs
2. Abdominal examination:
    - A fundal height less than expected for is suggestive of PPROM
    - **Exclude preterm labour, i.e. contractions.**
3. **Sterile** speculum examination

    Note that digital vaginal examination should **not** be performed

- Confirm the diagnosis visually if possible:
    - ♥ There is pooling of clear fluid in the posterior fornix of the vagina or leakage of fluid from the cervical os.
- Collect cervico-vaginal (i.e. a high vaginal swab) swabs for microscopy and culture.
- Collect a low vaginal (and ano-rectal) swabs for GBS

Investigations

Blood tests:

1. FBE
2. CRP
3. U&Es/ glucose.

Amniotic fluid testing:

PAMG-1 testing:

- When the diagnosis is unclear from clinical assessment, the presence of amniotic fluid can be confirmed by testing for the presence of the protein, **PAMG-1 (placental a-1 microglobulin).**

  This protein has a sensitivity of 96% and specificity of 98.9% for amniotic fluid.

  The test can be easily done with the use of monoclonal antibody testing kits such as "**AmniSure**".

Amniocentesis testing:

- An amnio-dye test (tampon test) may be recommended if conventional tests for preterm PROM are equivocal and if the pregnancy is remote from term. This test involves amniocentesis and instillation of dye into the amniotic cavity. Indigo carmine is preferred because of the association between methylene blue dye and fetal methemoglobinemia. Leakage of blue stained fluid into the vagina within 20 to 30 minutes as evidenced by staining of a tampon is regarded as a *definitive* diagnosis of preterm PROM, however it is now rarely required.

Urine M&C:

A screening MSU should be taken in all women with suspected PPROM

Swabs for M&C

As mentioned above swabs are taken for routine culture, including for GBS

CTG:

Perform a CTG to assess fetal wellbeing and to look for signs of established labour.

Ultrasound:

Ultrasound to assess fetal size and wellbeing.

An ultrasound examination showing markedly reduced liquor volume in the presence of normal fetal kidneys and the absence of IUGR is highly *suggestive* of ROM, however normal liquor volume on ultrasound does **not** exclude the diagnosis.

Management

1. Immediate attention to any ABC issues

2. Steroids:

   Steroids may be required for prophylaxis for neonatal respiratory distress syndrome.

   All women with PPROM < 34 weeks gestation should be administered corticosteroids

   Give:

   - Betamethasone injection 11.4mg IM daily - 2 doses, 24 hours apart.

3. A cervical suture, if present, should be removed immediately and submitted for culture.

4. Tocolysis:

   - Where there is no evidence of infection, the gestation is < 34 weeks and corticosteroids have not been completed, if contractions are occurring, tocolysis in order to complete the corticosteroids is reasonable.

5. Antibiotics:

   Antibiotic treatment after PPROM reduces the risk of:

   - Ascending infection
   - Chorioamnionitis

- Delivery within 7 days.

For the neonate, maternal antibiotics reduce major cerebral abnormalities, neonatal infections and the duration of neonatal intensive care unit admission.

Women presenting with PPROM should be screened for urinary tract infections, sexually transmitted infections, and group B streptococcus carriage, and treated with appropriate antibiotics if positive.

The benefit of antibiotic treatment is greater at earlier gestational ages and more aggressive treatment with intravenous antibiotics is justified.

Infections are more commonly polymicrobial. Aggressive antibiotic treatment is not associated with increased rates of necrotizing enterocolitis or stillbirth.

Prophylactic Broad-Spectrum Antibiotics to Prolong the Latency Period:

- The following two regimens may be used - these two regimens were used in the largest PPROM randomized controlled trials that showed a decrease in both maternal and neonatal morbidity:

  - ♥ This regimen is preferred for PPROM ≤ 32 weeks.

    Amoxycillin 2 gram IV every 6 hours and erythromycin 250 mg oral every 6 hours for 48 hours followed by amoxycillin 250 mg orally every 8 hours and erythromycin 500 mg orally every 8 hours for 5 days.

  - ♥ Erythromycin 250 mg orally every 6 hours for 10 days.

  Amoxycillin/clavulanic acid should not be used because some studies suggest an increased risk of necrotizing enterocolitis in neonates exposed to the combination antibiotic. Amoxycillin without clavulanic acid is safe.

GBS prophylaxis:

- GBS carriers and those delivering before culture results are available still require intrapartum prophylaxis.

  For GBS positive patients on swab or risk factors for GBS (previous infant with early onset GBS disease or GBS bacteruria in current pregnancy):

  - ♥ Benzylpenicillin 1.2 gm stat, followed by 600 mg 4 hourly for a total of 6 doses

  - ♥ If allergic to penicillin, give Clindamycin or Lincomycin 600 mg IV TDS

6. Magnesium sulphate:

- Magnesium sulphate should be given to women at risk of imminent, preterm (<30 weeks gestation) birth to provide neuroprotection to the fetus (NHMRC: grade A recommendation)

- When birth is planned, commence magnesium sulphate as close to 4 hours before birth as possible.

7. Delivery:

- Where the gestation is > 36 weeks at presentation, induction of labour (if there are no contraindications to vaginal delivery) should be commenced at the next convenient opportunity.

- If the woman is GBS positive, consideration should be given to prompt induction of labour from 32 weeks.

- In women who are being managed conservatively (see below), delivery should be effected if there is evidence of intrauterine infection, or when the gestation reaches 36 weeks.

Disposition:

All women should be observed in hospital for 72 hours.

If they are remote from delivery, remain well and are not in labour, they may be suitable for discharge and ongoing outpatient management.

These women should have close ongoing supervision and regular review.

Women should clearly understand when to seek medical review. Instructions to re-present for review should include:

- Temperature is 37.2 or higher, (temperature should be taken 3 times day).

- The colour of the fluid changes e.g. becomes green or brown

- The fluid develops an offensive odour

- Any vaginal bleeding

- Any abdominal pain or contractions

- Concern about fetal movements

- Feeling unwell

- Any other concerns in general

References

1. Aaron B. Caughey et al. Contemporary Diagnosis and Management of Preterm Premature Rupture of Membranes. Rev Obstet Gynecol. 2008; 1 (1): 11-22.

2. Preterm Premature Rupture of the Membranes (PPROM): RWH Clinical Guidelines April 2014.

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