South Australian Perinatal Practice Guidelines

Preterm prelabour rupture of the membranes PPROM management

Introduction

- PPROM complicates only 2 % of pregnancies but is associated with 40 % of preterm deliveries and can result in significant neonatal morbidity and mortality
- The three causes of neonatal death associated with PPROM are:
    - Prematurity
    - Sepsis
    - Pulmonary hypoplasia
- Outcomes for preterm infants depend on place of birth and access to neonatal intensive care. Maternal transfer is generally safer than neonatal retrieval if delivery is not imminent

Definition

- Rupture of the fetal membranes before 37^{+0} completed weeks of pregnancy (i.e. preterm) and before the onset of labour (i.e. prelabour)

Associated risks of PPROM

- Preterm labour
- Cord prolapse
- Placental abruption
- Intrauterine infection / amnionitis
- Pulmonary hypoplasia
- Limb positioning defects
- Perinatal mortality

Initial assessment

- History and examination
- Abdominal palpation to determine fetal size and presentation
- Speculum examination to:
    - Exclude cord prolapse
    - Visualise pooling of liquor (note presence of vernix)
    - Collect cervical and vaginal microbiological swabs (including GBS)
    - Make a smear to look for ferning on microscopical examination
    - Estimate cervical dilatation
    - Amnicator (nitrazine yellow): a positive reaction results in a blue / purple colour on contact (false positive rate of 17 %)

Transfer or retrieval for access to specialised obstetric and neonatal services

- In units without neonatal facilities suitable for the gestation, consult with tertiary centre. Consider maternal transfer if delivery is not imminent or consult with neonatal retrieval service if delivery is anticipated

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Surveillance / Fetal assessment

- Cardiotocography (CTG) to assess fetal condition
- Ultrasound to assess liquor volume (and visualise presentation)
- Consider formal ultrasound for fetal number, weight, presentation, morphology and liquor volume

Laboratory investigations

- C-Reactive Protein – repeat daily for three days
- Complete blood picture – repeat daily for three days
- Low and high vaginal swabs for microscopy and culture
- Midstream specimen of urine for bacteriology

Antibiotic prophylaxis

- Studies show that prophylactic antibiotics prolong pregnancy and reduce maternal and neonatal sepsis (Kenyon et al. 2003)

If there is no evidence of chorioamnionitis

- Commence antibiotic prophylaxis:

1. Benzylpenicillin 3 g IV loading dose, then 1.2 g IV every four hours for 48 hours or until delivery if this occurs earlier
    - If allergic to penicillin, give lincomycin 600 mg IV in 100 mL over 1 hour every 8 hours or azithromycin 500 mg IV once daily for 48 hours or until delivery if this occurs earlier
2. Oral erythromycin 250 mg 4 times a day for 10 days or until delivery if this occurs earlier

- Further benzylpenicillin prophylaxis, as above, is indicated whenever labour recurs

If there are signs of chorioamnionitis:

Diagnosis of chorioamnionitis relies on the clinical presentation

- Maternal fever > 38° C with any 2 of the following:
    - Increased white cell count (> 15 x 10^9 / L)
    - Maternal tachycardia (> 100 bpm)
    - Fetal tachycardia (>160 bpm)
    - Uterine tenderness
    - Offensive smelling vaginal discharge
    - C-Reactive Protein > 40
- Histological examination of placenta and membranes with evidence of acute inflammation may confirm the diagnosis after birth

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If signs of chorioamnionitis

- Ampicillin (or amoxycillin) 2 g IV initial dose, then 1g IV every 4 hours,
- Gentamicin 5 mg / kg IV daily
- Metronidazole 500 mg IV every 12 hours
- If allergic to penicillin, give lincomycin 600 mg IV in 100 mL over 1 hour every 8 hours or clindamycin 450 mg IV in 50 – 100 mL over at least 20 minutes until delivery
- Do not inhibit labour, but consider hastening delivery under intravenous antibiotic cover
- Consider optimal mode of delivery (LSCS versus vaginal birth) on the basis of the findings and the anticipated duration until birth

Postnatal maternal antibiotics

- If chorioamnionitis, consider treatment with continued:
    - Ampicillin (or amoxycillin) 1g IV every 4 hours
    - Gentamicin IV 5 mg / kg as a single daily dose
    - Metronidazole 500 mg IV every 12 hours for 5 days
- May change to oral antibiotics once the woman is afebrile and tolerating oral medication e.g. amoxycillin 500 mg every 8 hours and metronidazole 400 mg every 12 hours or amoxycillin / clavulanic acid (Augmentin Duo Forte x 1 every 12 hours) for the rest of the 5 days

Tocolytics

- Where contractions are present, nifedipine may be commenced (refer to PPG 'nifedipine for preterm labour') to prolong pregnancy for 48 hours while corticosteroid cover is established if there are no other signs of chorioamnionitis
    - Give stat oral dose nifedipine 20 mg
    - Give second oral dose nifedipine 20 mg 30 minutes after first dose (maximum is 40 mg in the first hour)
    - Do not give any further nifedipine until 3 hours after the 2nd dose
    - Administer oral nifedipine 20 mg every 3 hours until contractions cease or the woman establishes in labour. Prescribe as written (do not prescribe as prn)
    - After 24 hours, medical review is required to determine the dose of maintenance treatment with controlled release nifedipine (Adalat® Oros) 2-3 times per day
- See PPG 'nifedipine for preterm labour' for more information

Corticosteroids

- Administer IM betamethasone in two doses of 11.4 mg (5.7 mg x 2) 24 hours apart to the woman if birth is likely to occur between 23 and 35 weeks
- If betamethasone is unavailable, IM dexamethasone in two doses of 12 mg, 24 hours apart may be used (Elimian et al. 2007)

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Repeat doses should only be considered in the absence of infection

- If birth does not occur, administer IM betamethasone 11.4 mg (5.7 mg x 2) one week after the initial dose
- Continue weekly dose IM betamethasone 11.4 mg (5.7 mg x 2) until delivery or 32 weeks of gestation
- If betamethasone is unavailable, give weekly dose of IM dexamethasone 12 mg until delivery or 32^{+0} weeks of gestation

Magnesium sulphate for neuroprotection of the fetus

Controlled trials

- Show that fetal exposure to magnesium sulphate given before preterm birth has a neuroprotective role. The number of women needed to be treated to benefit one baby by avoiding cerebral palsy is 63 (Doyle et al. 2009)
- This systematic review also showed a significant reduction in the rate of gross motor dysfunction in early childhood (Doyle et al. 2009)

Indications

- Neuroprotection of the fetus for women at risk of preterm birth who are at least 24^{+0} weeks of gestation and < 30^{+0} weeks of gestation
- When birth is anticipated within 24 hours or in cases of expected planned delivery as close to four hours before expected delivery time and regardless of;
    - plurality
    - why the woman is at risk of preterm birth
    - parity
    - anticipated mode of birth
    - whether antenatal corticosteroids have been given or not

Dosage and administration

- Refer to the PPG ‘Magnesium sulphate for women at risk of preterm birth for neuroprotection of the fetus’

Counselling

- The woman and her partner should be counselled by a member of the management team, which includes: obstetrician, neonatologist, midwife, and others as appropriate

Management

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PPROM < 23 weeks gestation

- Outcomes for extremely preterm infants depend on place of birth and access to neonatal intensive care.
- It is important to consult with neonatologists for up to date data to inform clinical decision making.
- Parental attitudes must be taken into account in formulating a management plan
- Continue antibiotic prophylaxis (as above)
- ***Active management (i.e. allow / encourage birth to proceed) when***
- In established labour
- Signs of chorioamnionitis are present
- Significant antepartum haemorrhage is present
- The woman requests it
- ***Expectant management***
- Is acceptable when the risk of amnionitis and pulmonary hypoplasia is less than the risk of extreme preterm birth and neonatal death
- If delivery does not occur, further benzylpenicillin prophylaxis is indicated when labour recurs
- Repeat high vaginal swab at weekly intervals; results may guide use of antibiotics in any subsequent labour
- Complete blood picture and C-Reactive Protein twice weekly

PPROM 23-34 weeks gestation

- Continue antibiotic prophylaxis (as above)
- Expectant management until 34 weeks of gestation if GBS positive
- ***Active management (i.e. allow / encourage birth to proceed) when***
- In established labour
- Signs of chorioamnionitis are present
- Significant antepartum haemorrhage is present
- Signs of fetal compromise
    - Consider caesarean section if birth is not imminent

Expectant management may be appropriate in the absence of the above. This management should include:

- Daily medical clinical assessment of the woman
- Clinical observations twice daily
    - Temperature, maternal pulse, fetal heart rate
    - PV loss
    - Assessment of uterine activity (abdominal pain or tenderness)
- Involving a neonatologist
- If delivery does not occur, further benzylpenicillin prophylaxis is indicated when labour recurs

- Facilitating education including:
    - Neonatology review

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- Neonatal intensive care tour
- Appropriate preterm birth video

Surveillance / fetal assessment

- CTG daily for the first 3-6 days, then twice per week if low risk inpatient or at home
- CTG should be reconsidered where regular fetal surveillance is required (RCOG 2006)
- Recommence CTG in the presence of:
  - Regular abdominal pains or tenderness
  - change in amount, colour of liquor
  - Antepartum haemorrhage

Investigations

- Complete blood picture (CBP), C- reactive protein (CRP) daily for 3 days
- Consecutive daily CRP values > 20 mg / L or isolated values > 40 mg / L are suggestive of infection
- Twice weekly after initial assessment
- *Vaginal swabs*
- Repeat high vaginal swab at weekly intervals; results may guide use of antibiotics in any subsequent labour

PPROM at 34-37 weeks gestation

- Continue antibiotic prophylaxis (see above)
- Studies are currently in progress to establish whether to recommend expectant or active management for women with PPROM between 34 to 36 completed weeks of gestation

Active management (i.e. allow / encourage birth to proceed) when

- In established labour
- Signs of chorioamnionitis are present
- Significant antepartum haemorrhage is present
- If GBS positive, active management after 36 completed weeks of gestation
- Signs of fetal compromise
  - Consider caesarean section if birth is not imminent

Expectant management consists of

- Await spontaneous onset of labour until 36 completed weeks of gestation
- Continue prophylactic antibiotic treatment
- Home care may be considered

Surveillance / fetal assessment

- CTG daily for the first 3-6 days, then twice per week if low risk inpatient or at home

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- CTG should be reconsidered where regular fetal surveillance is required (RCOG 2006)
- Recommence CTG in the presence of:
    - Regular abdominal pains or tenderness
    - change in amount, colour of liquor
    - Antepartum haemorrhage

Home care

- May be considered for all women after 72 hours of initial hospitalisation if:
    - Singleton pregnancy
    - Cephalic presentation > 23 weeks
    - Easy access to the hospital

Continue

- Daily temperature
- Twice weekly follow up CTG and investigations as an outpatient
- Return to hospital if reduced fetal movements

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References

1. Royal College of Obstetricians and Gynaecologists (RCOG). Preterm prelabour rupture of membranes. RCOG guideline No. 44, November 2006. Available from URL: http://www.rcog.org.uk/resources/Public/pdf/green_top44_preterm.pdf
2. Kenyon S, Boulvain M, Neilson JP. Antibiotics for preterm rupture of membranes. *Cochrane Database of Systematic Reviews* 2003, Issue 2. Art. No.: CD001058. DOI: 10.1002/14651858.CD001058 (Level I). Available from URL: http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001058/pdf_fs.html
3. Roberts D, Dalziel S. Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth. *Cochrane Database of Systematic Reviews* 2006, Issue 3. Art. No.: CD004454. DOI: 10.1002/14651858.CD004454.pub2 (Level I). Available form URL: http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD004454/pdf_fs.html
4. Crowther CA, Harding JE. Repeat doses of prenatal corticosteroids for women at risk of preterm birth for preventing neonatal respiratory disease. *Cochrane Database of Systematic Reviews* 2007, Issue 3. Art. No.: CD003935. DOI: 10.1002/14651858.CD003935.pub2 (Level I). Available from URL: http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD003935/pdf_fs.html
5. Doyle LW, Crowther CA, Middleton P, Marret S, Rouse D. Magnesium sulphate for women at risk of preterm birth for neuroprotection of the fetus. *Cochrane Database of Systematic Reviews* 2009, Issue 1. Art. No.: CD004661. DOI: 10.1002/14651858.CD004661.pub3 (Level I). Available from URL: http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD004661/pdf_fs.html
6. The Antenatal Magnesium Sulphate for Neuroprotection Guideline Development Panel. Antenatal magnesium sulphate prior to preterm birth for neuroprotection of the fetus, infant and child: National clinical practice guidelines. Adelaide: The University of Adelaide, 2010. ISBN Print: 978-0-86396-720-7. Available from URL: http://www.adelaide.edu.au/arch/
7. MIMS Online. MIMS Pharmaceutical Product Information. [online database] Full product information Adalat® tablets data version August 2010 [cited 2010 Aug 16]. Available: MIMS Online. (Level I).
8. Enkin M, Keirse MJNC, Neilson J, Crowther C, Duley L, Hodnett E, Hofmeyr J. A guide to effective care in pregnancy and childbirth. 3rd ed. Oxford: Oxford University Press; 2000 (Level I).
9. Ryan G, Oskamp M, Seaward PGR, Kitch T, Barrett T, Brennan B, Salenieks ME, O'Brien K. Randomized controlled trial of inpatient vs. outpatient management of PPROM. Am J Obstet Gynecol 1999; 180: S95 (Level II).
10. Segal S, Miles A, Clothier B, Parry S, Macones G. Optimal duration of antibiotic therapy after PPROM [abstract]. Am J Obstet Gynecol 2002; 187: S72 (Level II).

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Abbreviations

bpm	Beats per minute
CBP	Complete blood picture
C	Celsius
CRP	C- reactive protein
CTG	Cardiotocography
et al.	And others
g	Gram(s)
>	Greater than
GBS	Group B Streptococcus
IM	Intramuscular
IV	Intravenous
kg	Kilogram/s
<	Less than
mL	Millilitre/s
mg	Milligram/s
PPROM	Preterm prelabour of the membranes
i.e.	That is

Version control and change history

PDS reference: OCE use only

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1.0	10 May 07	10 Jan 07	Original version
2.0	10 Jan 07	26 Feb 07	Reviewed
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