SEPSIS IN PREGNANCY AND POSTPARTUM

This LOP is developed to guide clinical practice at the Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this LOP.

1. AIM
   • Diagnosis and early treatment of sepsis in pregnancy and in the early post-partum period

2. PATIENT
   • Pregnant, miscarrying or post-natal woman who is unwell

3. STAFF
   • Registered Midwives
   • Student Midwives
   • Registered Nurses
   • Medical staff

4. EQUIPMENT
   • Oximeter
   • Thermometer
   • Sphygmomanometer
   • Intravenous (IV) Cannula
   • Blood cultures bottles
   • Cardiotocograph
   • Doppler

5. CLINICAL PRACTICE
   • Consider the diagnosis of sepsis for woman presenting with miscarriage, in pregnancy, or postpartum who have any of the following symptoms:
     o Blood Pressure ≤ 90mmHg systolic
     o Temperature < 35.50°C or > 38.50°C
     o Respiratory Rate < 10 per minute or > 25 per minute
     o Heart Rate < 50bpm or > 110bpm
     o Any unexplained symptoms such as altered mental state, nausea or diarrhoea
     o Oxygen saturation < 95%
   • Follow the Sepsis Pathway - Maternity, activating a PACE call if required (refer to Appendix A)
   • Assess fetal wellbeing where appropriate
   • Take a thorough history specifically asking for symptoms of infection such as a sore throat and diarrhoea
   • Obtain IV access as a priority and perform the following blood investigations:
     o Full Blood Count (FBC)
     o Urea and Electrolytes (UEC)
     o Liver Function Tests (LFT)
     o Serum lactate on venous blood gas or grey topped tube on ice (≥4 mmol/L indicates tissue hypoperfusion)¹
     o Minimum two sets of blood cultures (same time, different sites) in all women with a fever or a history of fever of 38.5°C or more PRIOR to starting antibiotic therapy
   • Send MSU and Microbiology samples from the following areas according to the clinical picture: abdominal wound, perineal wound, placenta / products of conception, low vaginal swab, high vaginal swab, throat swab (using a blue topped bacterial swab), breast milk, stool specimen
   • Start fluid resuscitation with fluid bolus of 20ml/kg normal saline (0.9%)

¹: indicates tissue hypoperfusion
SEPSIS IN PREGNANCY AND POSTPARTUM  cont’d

- Start antibiotic therapy **within one hour**, as per RHW Antibiotics in Pregnancy and Postpartum table:

**RHW ANTIBIOTICS FOR SEPSIS IN PREGNANCY AND POST PARTUM**

<table>
<thead>
<tr>
<th>SUSPECTED SOURCE</th>
<th>RECOMMENDED THERAPY</th>
<th>MILD PENICILLIN SENSITIVITY*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown aetiology</td>
<td>Flucloxacillin 2g every 6 hours + Ceftriaxone  1g daily + Lincomycin 600mg every 8 hours***</td>
<td>Lincomycin 600mg every 8 hours + Cephazolin 2g every 8 hours + Gentamicin 5-7mg/kg (dosed to Ideal body weight)**</td>
</tr>
<tr>
<td>Perineal wound</td>
<td>Ampicillin 2g every 6 hours + Metronidazole 500mg every 12 hours +</td>
<td>Cefazolin 2g every 8 hours Metronidazole 500mg BD</td>
</tr>
<tr>
<td>Wound: abdominal, breast, other line related infection</td>
<td>Flucloxacillin 2g every 6 hours + Ceftriaxone 1g daily</td>
<td>Cephalothin 2g every 4 hours + Gentamicin 5-7mg/kg**</td>
</tr>
<tr>
<td>Chorioamnionitis Endometritis</td>
<td>Ampicillin 2g every 6 hours + Gentamicin 5-7mg/kg** + Metronidazole 500mg every 12 hours</td>
<td>Lincomycin 600mg TDS + Gentamicin 5-7mg/kg*</td>
</tr>
<tr>
<td>Group A, C &amp; G Streptococcal sepsis (toxic shock)</td>
<td>BenzylPenicillin 1.8g every 4 hours + Lincomycin 600mg every 8 hours***</td>
<td>Cefazolin 2g every 8 hours + Lincomycin 600mg every 8 hours</td>
</tr>
<tr>
<td>Intrapartum fever</td>
<td>Ampicillin 2g every 6 hours + Metronidazole 500mg every 12 hours + Gentamicin 5-7mg/kg**</td>
<td>Lincomycin 600mg every 8 hours + Gentamicin 5-7mg/kg**</td>
</tr>
<tr>
<td>Mastitis</td>
<td>Flucloxacillin 2g every 6 hours</td>
<td>Cephalothin 2g every 6 hours</td>
</tr>
<tr>
<td>Pyelonephritis / Urinary Sepsis</td>
<td>Ceftriaxone 1g daily + Gentamicin 5-7mg/kg**</td>
<td>Ceftriaxone 1g daily + Gentamicin 5-7mg/kg**</td>
</tr>
<tr>
<td>Pneumonia (see Pneumonia Score) if pregnant, consider Oseltamivir</td>
<td>Ceftriaxone 1g daily + Clarithromycin 500mg every 12 hours (orally)</td>
<td>Ceftriaxone 1g daily + Clarithromycin 500mg every 12 hours (orally)</td>
</tr>
</tbody>
</table>


**GENTAMICIN DOSING**: Give one dose of gentamicin 5-7mg/kg/pre-pregnant body weight and then determine dosing interval for a maximum of either 1 or further doses based on renal function (see [http://proxy9.use.hcn.com.au/tpc/abg/7823.html#7904ID_GL](http://proxy9.use.hcn.com.au/tpc/abg/7823.html#7904ID_GL))

***Lincomycin iv is given if patient has signs/symptoms of toxic shock syndrome. Please contact Infectious Diseases for advice.

- After diagnosis, observations are recorded hourly with accurate fluid balance.
- Consult anaesthetic team and obstetric physician
- Notify obstetric consultant and lactation consultant where appropriate
- Consider chest x-ray (CXR), abdominal ultrasound, CT scan or MRI according to the suspected focus of infection
- Consider delivery or evacuation of retained products of conception
SEPSIS IN PREGNANCY AND POSTPARTUM cont’d

- Consult the Infectious Diseases team for the following:
  o All cases of Group A (GAS), Group C and Group D Streptococcus sepsis
  o If symptoms have not improved within 24 hours
  o For all patients with severe sepsis
  o All patients with bacteremia
  o Any patient with significant underlying immuno-compromise
- Consider drainage of pelvic collections
- Consult with Surgical team urgently if necrotising fasciitis is suspected
- Nurse Manager to arrange admission to Acute Care Ward as per Acute Care Admission criteria, process and management guideline.
- Arrange review by Intensive Care (Prince of Wales Hospital) if hypotensive despite resuscitation, or altered mental state or suboptimal response to fluid resuscitation
- Inform Neonatologists where mother has invasive GAS to give prophylactic antibiotics to neonate
- Ensure family aware of patient condition

6. DOCUMENTATION
   - Medication Chart
   - Integrated Clinical Notes
   - Fluid Balance Chart
   - Maternity Observation Chart
   - ObstetriX

7. EDUCATIONAL NOTES
   - The importance of administering antibiotics within the first hour cannot be over emphasised. After prescription administer immediately. See correct administration chart in treatment rooms. Antibiotics are available in Acute Care or the After Hours Drug cupboard if not stocked on wards
   - GAS maternal disease has increased in frequency over recent years with an increase in maternal mortality rates
   - Cases of Streptococcal sepsis may be preceded by a sore throat or upper respiratory tract infection
   - Sepsis in pregnancy can be insidious in onset with subsequent rapid progression
   - Presentation may be atypical, eg. diarrhoea
   - Tachypnoea, neutropenia and hypothermia are ominous signs
   - Obesity, diabetes, impaired immunity, anaemia, history of infection, invasive procedures, cervical cerclage, prolonged rupture of membranes, GAS in close contacts and minority ethnic group origin are risk factors for sepsis
SEPSIS IN PREGNANCY AND POSTPARTUM  cont’d

8. RELATED POLICIES / PROCEDURES / CLINICAL PRACTICE LOP
   • Acute Care : admission criteria, process and management guideline
   • Antibiotic Guidelines eTG 14th Edition
   • Mastitis and Breast (Lactational) Abscess – readmission for Treatment
   • Mastitis (Lactational) Treatment SESLHNPD/36
   • NSW Health Dept. safety Notice 017/10 Group A Streptococcal Maternal Sepsis
   • Preterm Premature Rupture of Membranes
   • Patient with Acute Condition for Escalation (PACE): PD 208 Management of the Deteriorating Adult Inpatient

9. REFERENCES
   1 Bacterial Sepsis in Pregnancy 2012 Green-top Guideline No. 64a RCOG
   2 Saving Mothers' Lives: Reviewing maternal deaths to make motherhood safer: 2006-2008” CMACE BJOG 2011 118 (suppl. 1), 1-203
   3 Clinical Excellence Commission, Sepsis Kill Program

REVISION & APPROVAL HISTORY
Maternity Services LOPs Group March 2013
APPENDIX A

SEPSIS PATHWAY - MATERNITY

Does woman have risk factors, signs or symptoms of infection?

- Indwelling medical device
- Recent surgery / invasive procedure
- History of fever or rigors
- Red Flags in ambulance handover
- Breasts: pain, inflammation, lumps, mastitis / abscess
- Vaginal discharge: purulent, offensive

Does your patient have 2 or more yellow criteria?

- Respiration ≤ 10 or ≥ 25 per minute
- SpO₂ < 95%
- Systolic blood pressure ≤ 90 mmHg
- Pulse ≤ 50 or ≥ 110 per minute
- Altered LOC or change in cognitive status
- Temp ≤ 35.5 or ≥ 38.5°C

YES: Perform venous blood gas if available

NO: Re-assess

Does your patient have any red criteria?

- SBP ≤ 80 mmHg
- Lactate ≥ 4 mmol/L
- Base Excess < -5.0
- Immunocompromised

YES: This woman has SEVERE SEPSIS or SEPTIC SHOCK until proven otherwise:
  - Inform the doctor-in-charge
  - Expedite transfer to a resuscitation area or equivalent
  - Turn page for Resuscitation Guideline

NO: This woman may have SEPSIS:
  - Inform the doctor-in-charge
  - Monitor vital signs & fluid balance
  - Obtain blood cultures x 2 sets
  - Investigate source of infection: e.g., urinalysis, urine M/C/S, chest X-ray
  - Obtain IV access and start IV fluids
  - Administer empiric antibiotics within one hour unless another diagnosis is more likely. Refer to Therapeutic Guidelines: Antibiotic, version 14 http://proxy9.elsevier.com.au
  - Refer / communicate with admitting team

Respond and Escalate
MATERNITY SEPSIS PATHWAY: Resuscitation Guideline

- Assessment and treatment proceeds simultaneously
- Maintain $\text{SpO}_2 \geq 95\%$
- Monitor respiratory rate, $\text{SpO}_2$, heart rate and rhythm, blood pressure, temp, fluid balance
- Obtain intravenous access
  - Take two sets of blood cultures, FBC including lactate OR venous blood gas for lactate, EUC, LFT, coagulation and glucose (glucometer or formal)
- Fluid resuscitate
  - Give 20mL/kg of 0.9% sodium chloride STAT fluid challenge
  - If no response, repeat 20mL/kg once (unless there are signs of pulmonary oedema)
  - If no response, insert IDC and commence vasopressors (as per local protocol) to achieve a MAP of $\geq 65$mmHg in consultation with Doctor-in-Charge

Start IV antibiotics within 60 minutes
** Do not wait for results of investigations **
- Investigate source of infection e.g. urine M/C/S, chest x-ray, sputum, wound, vaginal swab
- Refer / communicate with admitting team and ICU

IS THE WOMAN RESPONDING TO RESUSCITATION?

<table>
<thead>
<tr>
<th>Signs of improvement</th>
<th>If improving take the following action:</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAP $\geq 65$mmHg</td>
<td>• Continue monitoring vital signs closely</td>
</tr>
<tr>
<td>Urine Output $&gt; 0.5$ mL/kg/hr</td>
<td>• Strict monitoring of fluid balance</td>
</tr>
<tr>
<td>$\text{SpO}_2 \geq 95%$</td>
<td>• Investigate and treat the source of infection</td>
</tr>
<tr>
<td>Decreasing serum lactate level</td>
<td></td>
</tr>
<tr>
<td>Improving LOC</td>
<td></td>
</tr>
</tbody>
</table>

IF NO IMPROVEMENT INTENSIVE CARE MANAGEMENT IS REQUIRED

1. Request review by ICU doctor to occur within 30 minutes
2. Pager # for ICU Registrar at the POW Hospital for Adults is 44181

Minimum requirements for patient monitoring:
- Continuous blood pressure, continuous urine output via IDC
- Repeat serum lactate every 4 hours