INTRAUTERINE INFLAMMATION, INFECTION, OR BOTH (TRIPLE I)

SUMMARY: Reassessment of terminology, definitions and management of maternal fever, suspected and confirmed infection aim to improve accurate diagnosis and treatment in order to reduce maternal and neonatal morbidities while avoiding unnecessary maternal and neonatal interventions.

Rationale: The term chorioamnionitis refers to a heterogeneous group of conditions that encompass infection and inflammation of varying severity and duration. The designation often infers intrauterine infection and is based on varying combinations of clinical criteria that may not actually indicate the presence of intrauterine infection. Some providers make this designation based solely on maternal fever. The NICHD workshop (1) sought to develop new terminology to better describe various scenarios associated with fever or infection in the intrapartum period to more accurately convey clinical concerns, guide clinical management of the patient, and give neonatal providers more specific information that can be used to guide treatment of the newborn. ACOG then adapted this terminology for their most recent Committee Opinion (2). Based on review of these two documents, the following is proposed terminology to be used in documentation and communication regarding obstetric patients. We have chosen Intrauterine Inflammation or Infection (Triple I) given its more accurate reflection of the heterogeneous group of processes that these diagnoses encompass.

Terminology:

1. **Isolated maternal fever ("documented" fever):**
   a. Oral temperature between 38.0˚C (100.4˚F) and 39.0˚C (102.2˚F) if temperature remains elevated above 38.0˚C on repeat in 30 minutes

2. **Suspected Triple I:**
   a. Oral temperature ≥ 39.0˚C (102.2˚F) on any one occasion without another suspected or confirmed source*
   b. Documented fever without a clear alternative source plus any one of the following:
      i. Fetal tachycardia
      ii. Maternal WBC > 15,000 mm$^3$ in absence of recent steroid administration
      iii. Purulent fluid from cervical os

3. **Confirmed Triple I:**
   a. Any of above criteria for suspected Triple I plus:
      i. Findings of infection in amniotic fluid on amniocentesis (low glucose, positive gram stain, high WBC count in the absence of bloody tap, positive culture)
      ii. Histopathologic evidence of infection or inflammation or both in placenta, fetal membranes, umbilical cord vessels (funisitis)

*We have adopted the ACOG CO definition given the higher likelihood that markedly elevated temperatures in the absence of a suspected alternative source are most likely due to infection and not to spurious measurements, transient external heat or other factors that can be associated with more modest temperature elevations (dehydration, epidural).
Maternal Management Recommendations:

1. **Isolated Maternal Fever:** It is appropriate to hold on antibiotic therapy until other signs of triple I arise or to initiate an evaluation for other causes. If significant risk factors for triple I are present or no other source is identified, antibiotics should be considered. Controlling maternal fever with antipyretics and hydration may be necessary. Because antipyretics may prevent or mask further fever, a decision regarding likelihood of diagnosis of triple I should be reached before they are given.

2. **Suspected or Confirmed Triple I:** Treatment with antibiotics is recommended. See below for a table of recommended antibiotic regimens for suspected or confirmed Triple I. (Table from ref 2)

<table>
<thead>
<tr>
<th>Recommended Antibiotics</th>
<th>Dosage</th>
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<tbody>
<tr>
<td>• Ampicillin and Gentamicin</td>
<td>2 g IV every 6 hours</td>
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<tr>
<td>• Cefazolin and Gentamicin</td>
<td>2 mg/kg IV load followed by 1.5 mg/kg every 8 hours or 5 mg/kg IV every 24 hours</td>
</tr>
<tr>
<td>• Clindamycin or Vancomycin and Gentamicin</td>
<td>2 mg/kg IV load followed by 1.5 mg/kg every 8 hours or 5 mg/kg IV every 24 hours</td>
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</tbody>
</table>

**Postcesarean delivery:** One additional dose of the chosen regimen is indicated. Add clindamycin 900 mg IV or metronidazole 500 mg IV for at least one additional dose.

**Postvaginal delivery:** No additional doses required; but if given, clindamycin is not indicated.

<table>
<thead>
<tr>
<th>Alternative Regimens</th>
<th>Dosage</th>
</tr>
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<tbody>
<tr>
<td>• Ampicillin–sulbactam</td>
<td>3 g IV every 6 hrs</td>
</tr>
<tr>
<td>• Piperacillin–tazobactam</td>
<td>3.375 g IV every 6 hrs or 4.5 g IV every 8 hrs</td>
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<tr>
<td>• Cefotetan</td>
<td>2 g IV every 12 hrs</td>
</tr>
<tr>
<td>• Cefoxitin</td>
<td>2 g IV every 8 hrs</td>
</tr>
<tr>
<td>• Ertapenem</td>
<td>1 g IV every 24 hrs</td>
</tr>
</tbody>
</table>

**Postcesarean delivery:** One additional dose of the chosen regimen is indicated. Additional clindamycin is not required.

**Postvaginal delivery:** No additional doses required, but if given, clindamycin is not indicated.

*Vancomycin should be used if the woman is colonized with group B streptococci resistant to either clindamycin or erythromycin (unless clindamycin- inducible resistance testing is available and is negative) or if the woman is colonized with group B streptococci and antibiotic sensitivities are not available.*
**Other Considerations:**

1. Communication with neonatal providers and accurate documentation regarding maternal diagnoses and treatment are key to timely and adequate evaluation and treatment of the newborn.

**References**


Reviewed: 12/22/2017