Educational Topic 28: Postpartum Infection

Rationale: Early recognition and treatment of postpartum infection decreases maternal morbidity and mortality.

Intended Learning Outcomes:

A student should be able to:

- List the risk factors for postpartum infection
- List common postpartum infections
- Develop an evaluation and management plan for the patient with postpartum infection

TEACHING CASE

CASE: A 24 year-old G1P1 African-American woman, 3 days post op from a primary Cesarean delivery, is evaluated for a fever of 102.2°F. She denies nausea or vomiting, but has noticed increased lower abdominal pain since last evening. Her pregnancy has been uncomplicated. She presented to the hospital at 38 6/7 days with rupture of membranes, with cervical dilation of 2 cm/50% effacement. She was given oxytocin to induce labor. She progressed slowly to the active phase, and 9 hours later, she was 5 cm/completely effaced and vertex at zero station, but her labor remained protracted. She had an intrauterine pressure catheter placed and the oxytocin dose was titrated to achieve adequate labor. Despite adequate contractions (240 Montevideo units per 10 minutes), she had no progress for the next 4 hours. The fetus developed tachycardia with a baseline heart rate of 170 beats per minute. At this time, a low transverse Cesarean delivery was performed. The surgery was uncomplicated. She delivered a viable male, 3750 grams, with Apgar scores of 9/9 at one and five minutes respectively. She was given perioperative antibiotic prophylaxis (Ancef 1 gm) at the time of the Cesarean delivery.

COMPETENCY-BASED DISCUSSION & KEY TEACHING POINTS:

Competencies addressed:

- Patient Care
- Medical Knowledge
- Systems-Based Practice
1. What findings in the history place this patient at risk for postpartum fever? Are there any other factors that place patients at risk for postpartum infection that we don’t learn from this history?

   - Postpartum febrile morbidity is defined as a temperature of 100.4°F (38°C) or higher that occurs for more than 2 consecutive days (exclusive of the first postpartum day) during the first 10 days postpartum. Puerperal infection is more common following Cesarean delivery than vaginal delivery and is most commonly due to ascending genital tract infection, resulting in endomyometritis. Maternal, intrapartum, and perioperative characteristics can increase the risk for puerperal infections. The following factors can increase the risk for infection:
     - Maternal Factors:
       - Poor nutrition
       - Anemia
     - Intrapartum Factors:
       - Prolonged membrane rupture
       - Frequent vaginal exams during labor
       - Intrauterine monitors
       - Chorioamnionitis
     - Perioperative Factors:
       - Cesarean delivery
   - The route of delivery, that is vaginal vs. Cesarean delivery, is the single most important risk factor. The incidence of endometritis following vaginal delivery rarely exceeds 2 – 3%; however, after Cesarean delivery frequency ranges from 10% in low-risk patients who have received prophylactic antibiotics to as high as 95% in a high-risk population without prophylactic antibiotics. In the latter group, i.e. Cesarean delivery, if the membranes have been ruptured for a prolonged period of time (> than 6 hours) and the patient has had prolonged labor, then the likelihood of endometritis is markedly increased. There are few data to support a direct increase in endometritis following the use of electronic fetal monitoring or on the number of vaginal examinations. It is true and related that with slow progress of labor there are more vaginal exams performed.

2. What would you include in your differential for the cause of the postpartum fever?

   - Genital Tract: Endometritis, pelvic abscess
   - Urinary Tract: Pyelonephritis
   - Breast: Breast engorgement, mastitis, breast abscess
   - Wound: Surgical site infection
   - Pulmonary: Pneumonia, atelectasis
   - Vascular: Pelvic thrombophlebitis
   - Postpartum endometritis is also termed endometritis, metritis, endomyometritis and endomyoparametritis. Of these, endometritis is the most commonly used term to describe postpartum uterine infection.

3. How would you approach evaluating this patient?

   - Evaluation of a patient should always commence with a careful history and physical exam. Since the differential includes a number of extra-pelvic sources, students should not forget to elicit history about and perform examination of these organ systems. The most common reported clinical signs and symptoms of postpartum endometritis include fever, leukocytosis, lower abdominal pain, uterine tenderness and foul-smelling vaginal discharge. Clearly, the most important sign and symptom is that of
fever. This diagnosis is based on clinical findings alone and there has been no laboratory and/or culture techniques used to increase the likelihood of this diagnosis.

- **Examination:**
  - Breast
  - Pelvic
  - Wound

- **Laboratories:**
  - CBC
  - Bacterial cultures

- **Imaging:**
  - Usually reserved when there is no response to empiric therapy

4. **How would you approach managing this patient?**

- It is well established that the pathogenesis of postpartum endometritis involves both anaerobic and aerobic organisms. This infection is an ascending infection and is caused by the organisms found in the normal vaginal flora. These included the aerobic organisms of Group A and B Streptococcus, Enterococcus, as well as Staphylococcus, Gram-negative aerobic organisms include *E. coli*, *Klebsiella pneumoniae*, and *Proteus mirabilis*, as well as a whole host of anaerobic organisms. Therefore, the primary management of puerperal infection is to institute empiric antibiotic therapy. Therefore broad-spectrum coverage is indicated:

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clindamycin 900 mg + gentamicin 1.5 mg/kg, q8h intravenously</td>
<td>“Gold standard,” 90-97% efficacy, once daily gentamicin acceptable + Ampicillin added to regimen with sepsis syndrome or suspected enterococcal infection</td>
</tr>
<tr>
<td>Clindamycin + aztreonam</td>
<td>Gentamicin substitute with renal insufficiency</td>
</tr>
<tr>
<td>Extended-spectrum penicillin</td>
<td>Piperacillin, ampicillin/sublactam</td>
</tr>
<tr>
<td>Extended-spectrum cephalosporin</td>
<td>Cefotetan, cefoxitin, cefotaxime</td>
</tr>
<tr>
<td>Imipenem+cilastatin</td>
<td>Reserved for special indications</td>
</tr>
</tbody>
</table>

• Failure to respond to the antibiotic therapy within 48-72 hours may be due to pelvic abscess, septic pelvic thrombophlebitis and/or the emergence of a resistant organism. The treatment should be continued until the patient is afebrile, as well as asymptomatic, for 24-36 hours. Patient may be discharged from the hospital at this time with no antibiotic therapy, as follow up oral antibiotics are generally unnecessary.

REFERENCES


ACOG Practice Bulletin Number 76, Postpartum Hemorrhage, 2006; Reaffirmed 2013.

ACOG Practice Bulletin 120, Use of Prophylactic Antibiotics in Labor and Delivery, June 2011.