



437 Team: Obstetrics and Gynecology

Puerperal Sepsis

Objectives:

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

References:

- Kaplan USMLE step 2 CK - Obstetrics and Gynecology
- Online Meded videos
- Team 435

Team members:

Shikhah AIRwais & Leena AIRahma

Team leader: Rahaf AlShammari

Revised by: Sondos Alhawamdeh

Introduction

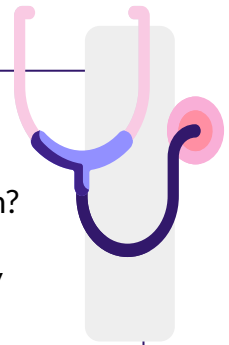
- The rate of postpartum complications have been increasing in the last decades, thought to be **secondary to the increase of cesarean deliveries**.
- Early recognition and treatment of postpartum infections decrease maternal morbidity and mortality.
- About 70% of puerperal infections are caused by anaerobic organisms.
 - Most of these are anaerobic cocci (Peptostreptococcus, Peptococcus, and Streptococcus).
 - The aerobic organisms, **E.coli is the most common pathogen**.

Postpartum Fever

Postpartum fever is defined as fever ≥ 38 C (≥ 100.4 F) on ≥ 2 occasions ≥ 6 hours apart, **excluding first 24 hours postpartum**.

Approach to postpartum fever

- **Start with a good history:**
 - Ask the patient if she has Pain? Redness? Drainage?
 - Find out if the patient had a vaginal delivery or cesarean section?
 - Any Complications during pregnancy or labor course?
 - If she has any medical issues? Or any other risk factors that may increase her risk of poor wound healing such as Smoking.
 -
- **Physical examination:**
 - try to identify the source of the infection by focusing on the important organ system that could be infected during the postpartum time.



Common Postpartum Infection

→ **PP DAY 0 : ATELECTASIS:**

Risk Factors:

General anesthesia with incisional pain (**most common**) and cigarette smoking.

Clinical Findings:

Mild fever with mild rales on auscultation. Patient is unable to take deep breaths.

Management:

- Pulmonary exercises (e.g., deep breaths, incentive spirometry) and ambulation.
- Chest x - rays are unnecessary.

→ PP DAY 1-2 : URINARY TRACT INFECTION:

Etiology: Common pathogens: Bacteria of the normal bowel flora including (E.coli, Klebsiella, Proteus, Enterobacter).

Risk Factors: Multiple intrapartum catheterizations and vaginal examinations due to prolonged labor.

Clinical Findings: High fever, costovertebral flank tenderness, positive urinalysis (e.g., WBC, bacteria) and urine culture.

Management:

- In term of therapy don't forget to ask her if she is **Breastfeeding?** To know which antibiotic to use.
- Single - agent intravenous antibiotics. (e.g., Nitrofurantoin and cephalosporins)

→ PP DAY 2-3 : ENDOMETRITIS: The most common cause of postpartum fever.

Etiology: mostly polymicrobial infections, aerobic and anaerobic organisms from the genital tract.

Risk Factors:

1) **Emergency cesarean section** after prolonged membrane rupture and prolonged labor.

There are 2 common indications for emergency C-section:

1. The cervix is not adequately dilated.
2. The head of fetus is not coming down.

Other indications include: Failure to progress (During labor) and fetal distress.

2) Prolong internal fetal monitoring.

3) Anemia.

4) Decreased Socioeconomic status.

Clinical Findings. Moderate - to - high fever with exquisite uterine tenderness. Peritoneal signs should be absent and peristalsis should be present.

Management. Multiple - agent intravenous antibiotics (e.g., gentamicin and clindamycin) to cover polymicrobial genital tract flora.

→ PP DAY 4-5 : WOUND INFECTION:

Etiology: Streptococcus, Staphylococcus, Gram negative organisms.

Risk Factors:

1) Emergency cesarean section after prolonged membrane rupture and prolonged labor. 2) Rarely after vaginal delivery even with laceration and episiotomy.

- If it happens, she will present with: pain and purulent discharge from the perineal laceration repair side.

Case by the Dr: A woman developed perineal pain 6 hrs after delivery what could be the cause? It could be due to Hematoma or tight sutures. **DON'T** say wound infection!! No one develop infection within 6 hrs, it should be at least 2-3 days after delivery. **Imp in MCQs**

Clinical Findings: Persistent spiking fever despite antibiotics, along with wound erythema, fluctuance, or drainage.

Management:

- Intravenous antibiotics for cellulitis.
- Wound drainage with twice - daily, wet - to - dry wound packing used for an abscess, anticipating closure by secondary intention.

→ **PP DAY 5-6: SEPTIC THROMBOPHLEBITIS:**

Risk Factors.

Emergency cesarean section after prolonged membrane rupture and prolonged labor.

Clinical Findings.

Persistent wide fever swings despite broad - spectrum antibiotics with normal pelvic and physical examination.

Management.

Intravenous heparin for 7-10 days, keeping PTT values at 1.5 to 2.0 times baseline.

→ **PP DAY 7-21 : INFECTIOUS MASTITIS:**

Pain/Swelling in the breast. It is important to ask the patient about Recent delivery and Breastfeeding.

Etiology: S. aureus is the most common organism involved.

Risk Factors. Lactational nipple trauma leading to nipple cracking and allowing Staphylococcus aureus bacteria to enter breast ducts and lobes.

Clinical Findings. Fever of variable degree with localized, unilateral breast tenderness, erythema, and edema.

Management

- Oral penicillinase-resistant penicillin (e.g., dicloxacillin or cloxacillin).
- Breast feeding can be continued.
- Ultrasound imaging is needed to rule out an abscess if lactational mastitis does not respond to antibiotics.

Physical Exam	Diagnosis	Management
Lung “crackles” PP Day 0	Atelectasis	Ambulation, pulmonary exercises
Flank pain, dysuria PP Day 1–2	Pyelonephritis	Single IV antibiotic
Tender uterus PP Day 2–3	Endometritis	IV gentamicin and clindamycin
Wound purulence PP Day 5–6	Wound infection	Wet-to-dry packs
Pelvic mass PP Day 5–6	Pelvic abscess	Percutaneous drainage
“Picket fence” fever PP Day 5–6	Septic thrombophlebitis	Full heparinization

Table I-18-2. Postpartum Fever

Teaching case (video 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.



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.
- Difference between Emergency c-section and elective c-section is that in elective the surgery is planned from the beginning.
 - Common indications of elective c-section:
 1. Repeated c-section (2 or more)
 2. Breech presentation
 3. Placenta previa

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

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.

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



Genital Tract:

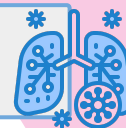
Endometritis,
pelvic abscess

Breast:

Breast engorgement,
mastitis, breast abscess

Pulmonary:

Pneumonia,
atelectasis



Urinary Tract:

Pyelonephritis



Wound:

Surgical site infection

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:

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

- 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.