

# Septic abortion: Clinical presentation and management

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TUMS

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# INTRODUCTION

- ▶ any abortion, spontaneous or induced
- ▶ complicated by severe uterine infection, including endometritis and Parametritis.
- ▶ pregnancies of less than 20 weeks gestation while those  $\geq 20$  weeks gestation with intrauterine infection are described as having intraamniotic infection.

# EPIDEMIOLOGY AND MICROBIOLOGY

- ▶ **Incidence** : not fully known
- ▶ **Microbiology** : can invade the placenta, endometrium, myometrium, and beyond.
- ▶ Routine vaginal flora, gastrointestinal flora, and anaerobic pathogens are typical
- ▶ Enterobacteriaceae (35 percent), streptococci (31 percent), staphylococci (9 percent), and enterococci (9 percent)
- ▶ Group A *Streptococcus* as well as *Clostridium* and other anaerobic infections can develop and progress rapidly in postpartum individuals and those who have undergone medication abortion

# CLINICAL FEATURES

- ▶ **Pregnancy loss:** a demised intrauterine pregnancy, a partially passed demised pregnancy (ie,incomplete abortion), or completed pregnancy loss with an infected uterus, often related to retained products of conception.
- ▶ **Pregnancy termination:** complication of both medication and surgical pregnancy termination

# Signs and symptoms

- ▶ **Common signs and symptoms** –pelvic and/or abdominal pain, uterine tenderness, purulent vaginal discharge, vaginal bleeding, and/or fever
- ▶ **Severe infection and sepsis** –triggers life-threatening organ dysfunction caused by the host's response to infection.
- ▶ Markers of severe infection may include fever ( $>38.0^{\circ}\text{C}$ ) or hypothermia, tachypnea, tachycardia, and leukocytosis or leukopenia
- ▶ Pain and/or tenderness out of proportion to physical examination findings may indicate necrotizing infection



# Criteria for the systemic inflammatory response syndrome

## Criteria for the systemic inflammatory response syndrome

The systemic inflammatory response syndrome (SIRS) is clinically recognized by the presence of **two or more** of the following:

Temperature  $>38^{\circ}\text{C}$  or  $<36^{\circ}\text{C}$

Heart rate  $>90$  beats/min

Respiratory rate  $>20$  breaths/min or  $\text{PaCO}_2 <32$  mmHg

WBC  $>12,000$  cells/mm<sup>3</sup>,  $<4000$  cells/mm<sup>3</sup>, or  $>10$  percent immature (band) forms

# EVALUATION

► Need for rapid

► Algorithm1

► Algorithm 1B

Patient with suspected septic abortion:

- Pregnancy less than 20 weeks of gestation or history of pregnancy (including pregnancy loss or pregnancy termination)
- Clinical presentation of pelvic pain, uterine tenderness, vaginal bleeding and/or discharge, and/or fever



Perform rapid evaluation:

- Targeted history, including last menstrual period and likelihood of pregnancy
- Obtain laboratory tests:
  - Blood cultures: Aerobic and anaerobic
  - STI screen for gonorrhea, chlamydia, and trichomoniasis
  - Serum tests: Complete blood count with differential, complete metabolic panel, lactate level, PT, PTT, fibrinogen, blood type and screen
  - Urinalysis and urine culture



Does the patient have either of the following:

- Hemodynamic instability
- Two or more criteria for systemic inflammatory response syndrome (refer to table inset)

Yes



No (patient is stable)

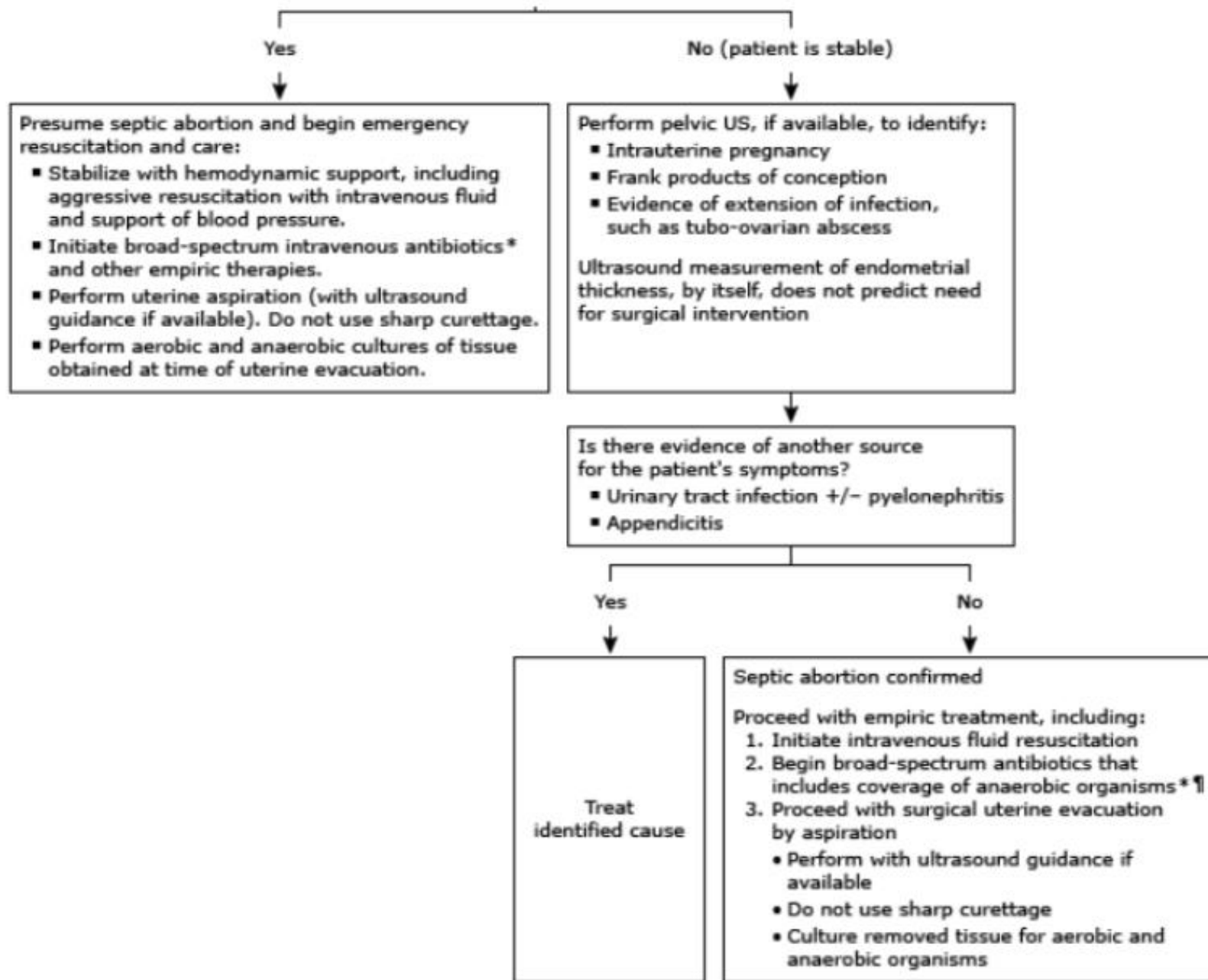


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- White blood cell count  $>12,000$  cells/ $\text{mm}^3$ ,  $<4000$  cells/ $\text{mm}^3$ , or  $>10\%$  immature (band) forms





# Obtain targeted history

- ▶ may not be aware that they are or have recently been pregnant (eg, early pregnancy loss may be experienced as a late period).
- ▶ some may have tried to interrupt the pregnancy without involving a medical professional or using unsafe methods and may not feel safe reporting the procedure or the pregnancy
- ▶ In addition to asking about medical conditions, medications, and allergies, other questions include:
  - ▶ •Date of last menstrual period and whether the patient has regular periods (ie, approximately monthly). Individuals with irregular menses, such as those with polycystic ovary syndrome, may be less likely to know they are pregnant.
  - ▶ •If the patient is known to be pregnant.
  - ▶ •If the patient had a uterine procedure within a few weeks of presentation

# Perform laboratory evaluation

- ▶ **Blood cultures** – Blood cultures, both aerobic and anaerobic
- ▶ **STI testing:** gonorrhea, *Chlamydia trachomatis*, and trichomoniasis/on urine, vaginal, or cervical specimens
- ▶ **Serum tests for sepsis syndromes:** complete blood count with differential, lactate level, coagulation studies (prothrombin time/partial thromboplastin time and fibrinogen), and a complete metabolic panel (to evaluate renal function)
- ▶ **Blood type and antibody screen**
- ▶ **Urinalysis and urine culture**



# Assess for complications of septic abortion

- ▶ **Complications :**
  - ▶ **acute respiratory distress syndrome (ARDS)**
  - ▶ **, hemolysis and/or disseminated intravascular coagulation (DIC),**
  - ▶ **lactic acidosis,**
  - ▶ **acute renal injury,**
  - ▶ **toxic shock**
  - ▶ **, necrotizing soft tissue infections, gas gangrene,**
  - ▶ **sepsis syndromes**
- ▶ Patients who are diagnosed with any of these may rapidly progress to hemodynamic instability and should be managed emergently and moved toward rapid surgical treatment as quickly as medically safe.

# Proceed with imaging if clinically stable

## Role of ultrasound to aid clinical decision-making:

### Ultrasound findings are not diagnostic for septic abortion

Ultrasound findings are not diagnostic for septic abortion; the decision to treat with antibiotics and evacuate the uterus is based on the patient's history and clinical evaluation findings. Ultrasound imaging can support the diagnosis by showing retained products of conception or evidence of upper tract infection (eg, dilated fallopian tubes and/or tubo-ovarian abscess) but normal ultrasound imaging does not exclude a septic abortion. Ultrasound measurement of endometrial thickness by itself does not predict the need for surgical intervention

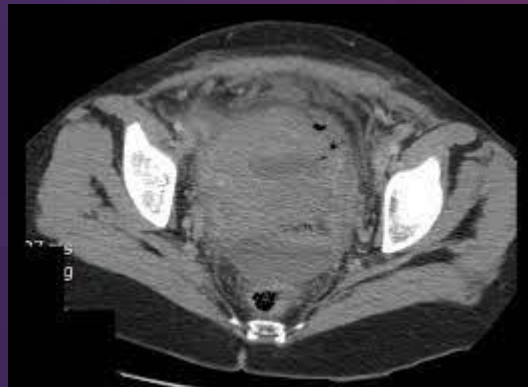
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# Common imaging findings

- ▶ Presence or absence of embryonic or fetal tissues.
- ▶ Gestational age and presence/absence of cardiac activity (if an embryo or fetus is seen). **The presence of a living embryo/fetus on ultrasound imaging does not exclude the possibility of septic abortion nor does it change the interventions needed to treat a patient with sepsis.**
- ▶ Amount of intrauterine tissue, fluid, or air. If present, intrauterine tissue is evaluated for size in three planes and blood flow with color and spectral Doppler.
- ▶ Loss of well-defined endometrial myometrial interface and development of a thin hypoechoic rim in subserosa distribution.
- ▶ Enhanced myometrial vascularity. Postpartum patients may have increased myometrial vascularity even in the absence of intrauterine tissue, which can help support the diagnosis of recent pregnancy, and suggest septic abortion, if the history is unclear.
- ▶ Hydro/pyosalpinxes or adnexal evolving inflammatory process suggestive of tuba-ovarian complex or abscess.

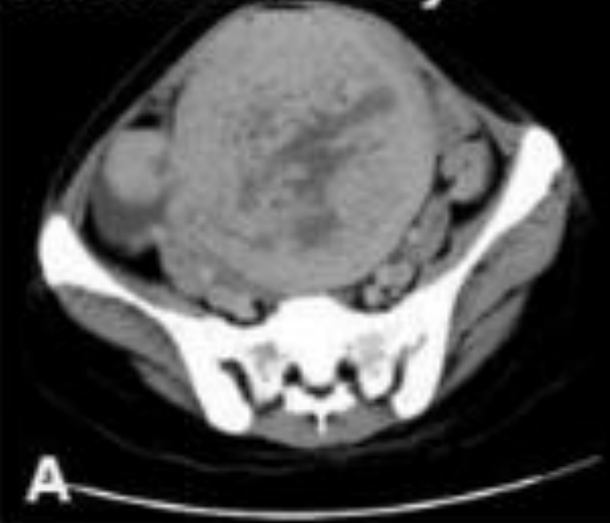
## Computed tomography (CT)



- ▶ first-line imaging study performed for patients presenting to an emergency department with abdominal pain and concerns for infection.
- CT may demonstrate small amounts of gas in the endometrial cavity up to three weeks postpartum.
- if the inflammatory process has progressed to parametrial soft tissues, extended to the extrauterine pelvis, or caused septic thrombophlebitis.
- In hemodynamically stable patients, CT can help to exclude inflammatory processes other than gynecologic in origin, such as appendicitis or diverticulitis.



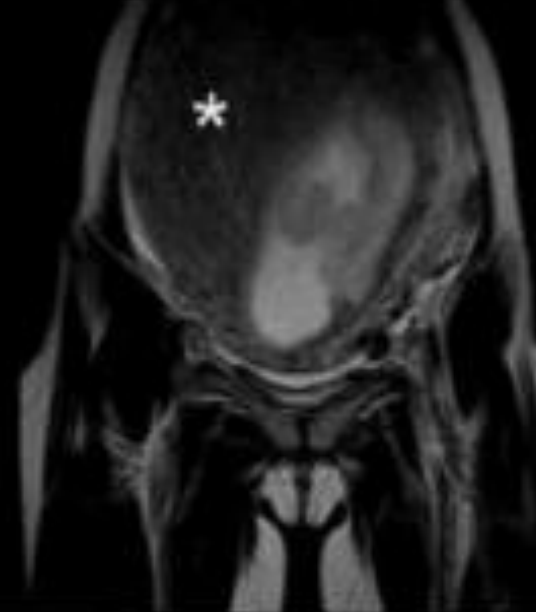
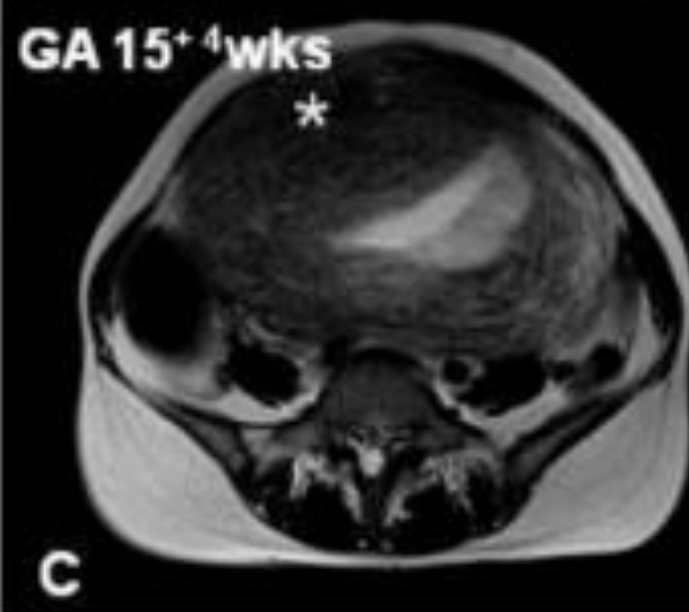
**Abortion # 6 days**



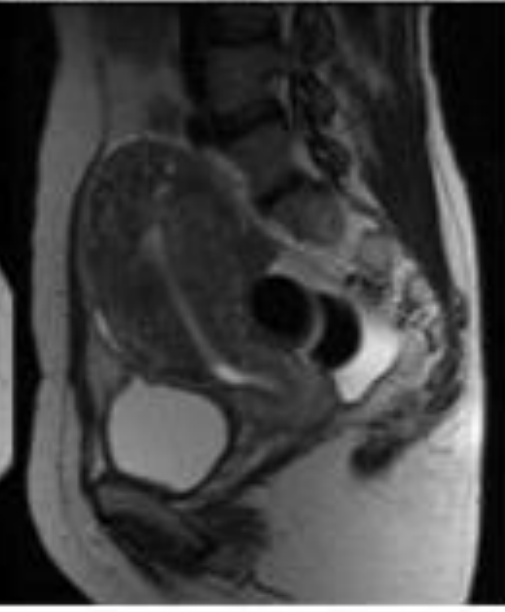
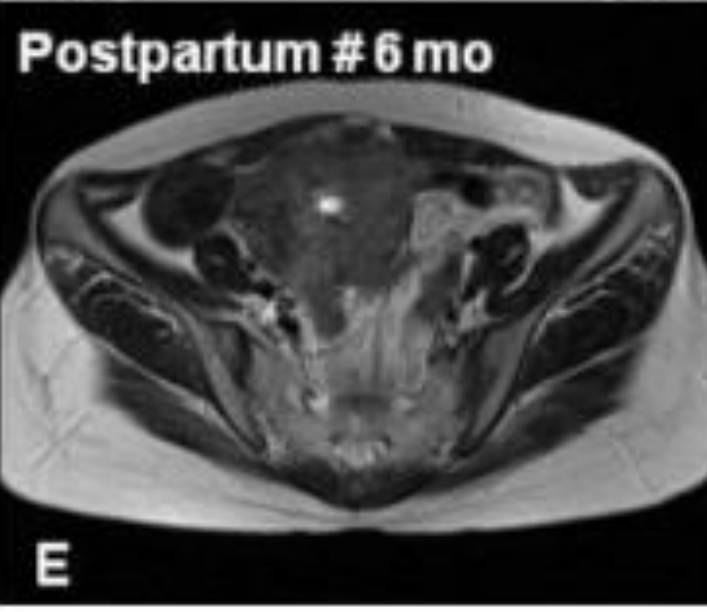
**Postpartum # 2 mo**



**GA 15<sup>+</sup> 4wks**



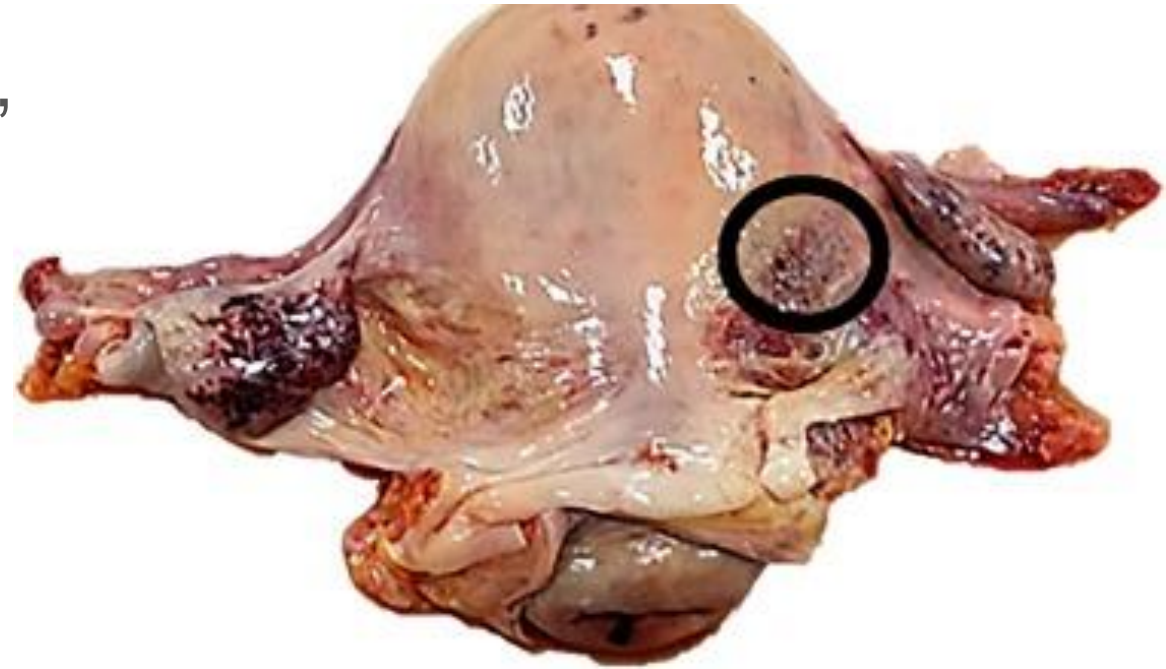
**Postpartum # 6 mo**





# Concern for necrotizing infection

- ▶ While CT may demonstrate gas in the deep tissue indicating necrotizing or clostridial infections, lack of gas does not exclude this entity. Other imaging findings suggestive of *Clostridium perfringens* or *Paeniclostridium sordellii* infection include peritoneal and/or pleural effusions and signs of tissue edema or necrosis





SEPTIC ABORTION IS A  
**CLINICAL DIAGNOSIS** MADE  
IN PATIENTS WHO PRESENT  
**WITH SIGNS AND**  
**SYMPTOMS** OF PELVIC  
INFECTION (UTERINE PAIN  
AND TENDERNESS, FEVER,  
VAGINAL BLEEDING)  
**FOLLOWING PREGNANCY**  
**LOSS OR TERMINATION UP**  
**TO 20 WEEKS GESTATION.**

# DIFFERENTIAL DIAGNOSIS

- ▶ Postpartum endometritis
- ▶ Urinary tract infection with or without pyelonephritis
- ▶ Appendicitis
- ▶ Pelvic inflammatory disease (PID)
- ▶ Ectopic pregnancy



# MANAGEMENT

## Hemodynamically unstable patient

- emergency **resuscitation** (including airway, breathing, and circulatory support, with vasopressors and inotropes as needed)
- **initiation of IV antibiotics**
- **urgent surgical evacuation** of the uterus.
- **If available, early consultation with an infectious disease specialist is suggested**
- Patients with suspected infection with toxin-producing bacteria or uterine injury **may require emergency progression to exploratory laparotomy and hysterectomy.**
- Postoperative management **in an intensive care unit may be required.**

**CRITICAL**

# Stable patient

- THE CORNERSTONES OF TREATMENT ARE **THE RAPID RESTORATION OF PERFUSION, INITIATION OF IV ANTIBIOTICS, AND SURGICAL EVACUATION OF THE UTERUS**
- THE PATIENT MAY REQUIRE MANAGEMENT IN THE EMERGENCY DEPARTMENT OR OPERATING ROOM SETTING TO MAXIMIZE RESUSCITATION

# Begin intravenous fluids

- Intravascular hypovolemia may be present, particularly in individuals with prolonged bleeding and/or evidence of sepsis syndrome, **and rapid fluid resuscitation is warranted.**
- rapid infusion of **crystalloid fluid boluses of 30 mL/kg during** the first one to three hours of resuscitation (assuming there is no evidence of pulmonary edema)

# Start broad-spectrum intravenous antibiotics

- broad-spectrum IV antibiotics
- Most infections arise from urogenital and gastrointestinal flora and include Gram-negative, Gram-positive, and anaerobic pathogens.
- Antibiotics should be **initiated immediately** but do not replace surgical management for source control

**Piperacillin-tazobactam (4.5 g IV every eight hours) with or without vancomycin (inclusion of vancomycin is based on culture results and local antibiotic resistance patterns)**

## Alternatives:

**Imipenem** (500 mg IV every six hours). This regimen may be useful for severely ill patients.

or

- **Gentamicin** (5 mg/kg/day IV) plus **ampicillin** (2 g IV every four hours) plus **clindamycin** (900 mg IV every eight hours)

or

- **Gentamicin** (5 mg/kg/day IV) plus **ampicillin** (2 g IV every four hours) plus **metronidazole** (500 mg IV every eight hours)

or

- **Levofloxacin** (500 mg IV daily) and **metronidazole** (500 mg IV every eight hours)

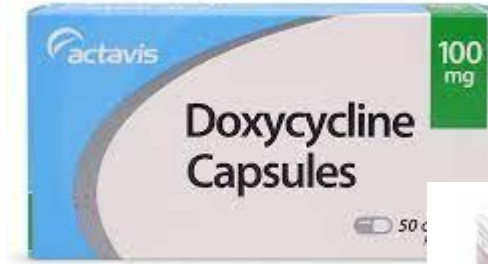
or

- **Ticarcillin-clavulanate** (3.1 g IV every four hours)





(CDC) Sexually Transmitted Diseases Treatment Guidelines' suggested drug treatment of pelvic inflammatory disease (PID), regimens consisting of cefoxitin or cefotetan ,plus doxycycline and metronidazole, could also be reasonable, although these agents have not been specifically studied for septic abortion or severe intra-abdominal infections



# Oral regimens

In general, we **do not use oral antibiotics** for **initial treatment** of septic abortion because of insufficient data on their efficacy and safety in patients with severe infection of the uterus



# Evacuate the uterus

## rapid source control is a critical step in management of infection

clinically symptomatic infection, who do not meet criteria for sepsis syndrome, require **urgent** surgical evacuation of the uterus

- **Timing** – Uterine evacuation by aspiration is typically performed soon after initiation of IV antibiotics. While evidence-based consensus is lacking, we advise evacuation within four to six hours after presentation as this time frame allows initiation of antibiotics and fluids while the patient is stabilized

- **Technique** – The technique for uterine aspiration is the same whether the patient experienced pregnancy loss or a complication of induced abortion. Gestational age of the pregnancy, if still present, generally guides the approach. As with all uterine aspiration procedures, we avoid sharp curettage

**Ultrasound guidance** — The authors use ultrasound guidance during the procedure to ensure all infected tissue is removed and to potentially reduce the risk of uterine perforation, which is more likely in an infected uterus. However, the procedure should not be delayed if an ultrasound is not immediately available.

## •Culture of retained tissue

Pregnancy tissue (products of conception) should be sent for aerobic and anaerobic culture

Culture of the uterus cavity is not indicated.

# RISK

- In the presence of infection, the **main risks of uterine evacuation are bleeding**, which can be massive, **and uterine perforation**
- **Massive hemorrhage** – Massive hemorrhage can occur with uterine atony or vascular injury.
- The approach to managing bleeding is similar to managing hemorrhage after pregnancy termination or postpartum hemorrhage (for third trimester pregnancy) (
- **Uterine perforation** – Perforation can lead to injury of abdominal or pelvic organs or vasculature

# Duration of antibiotic treatment

- varies based on the patient's hemodynamic stability, clinical response, and culture results, particularly blood culture information.
- Minimum criteria for stopping intravenous antibiotics include complete control of the infection's source, significant patient clinical improvement, and significant improvement of end-organ changes.
- Patients may then be switched to oral medication to complete 10 to 14 days of additional treatment [

# Postoperative care

- require frequent monitoring and ongoing management
- **Frequent monitoring** — After uterine aspiration, the patient continues IV antibiotics and fluid.
- We monitor patients continuously and reassess **them hourly for** improvement or lack thereof.
- Evidence of clinical improvement can be seen as early **as six hours after uterine evacuation combined with IV fluid resuscitation and antibiotics**

# Patients who improve

- Patients who improve are transitioned to routine postoperative care protocols, and IV antibiotics are tailored to the culture results
  - If the **culture does not identify specific organisms**, then broad-spectrum regimens that include coverage of anaerobic organisms are maintained
  - . Intravenous antibiotics are continued **until the patient's uterus has been evacuated and there is clinical evidence of resolving infection** (eg, afebrile for 48 hours, reduced pelvic tenderness).
  - The patient is then transitioned to oral antibiotics **to complete a 10- to 14-day course**
  - One oral antibiotic regimen that is extrapolated from treatment of patients with PID includes :
    - ●Doxycycline 100 mg orally twice a day for 14 days
  - and
    - ●Metronidazole 500 mg orally twice a day for 14 days



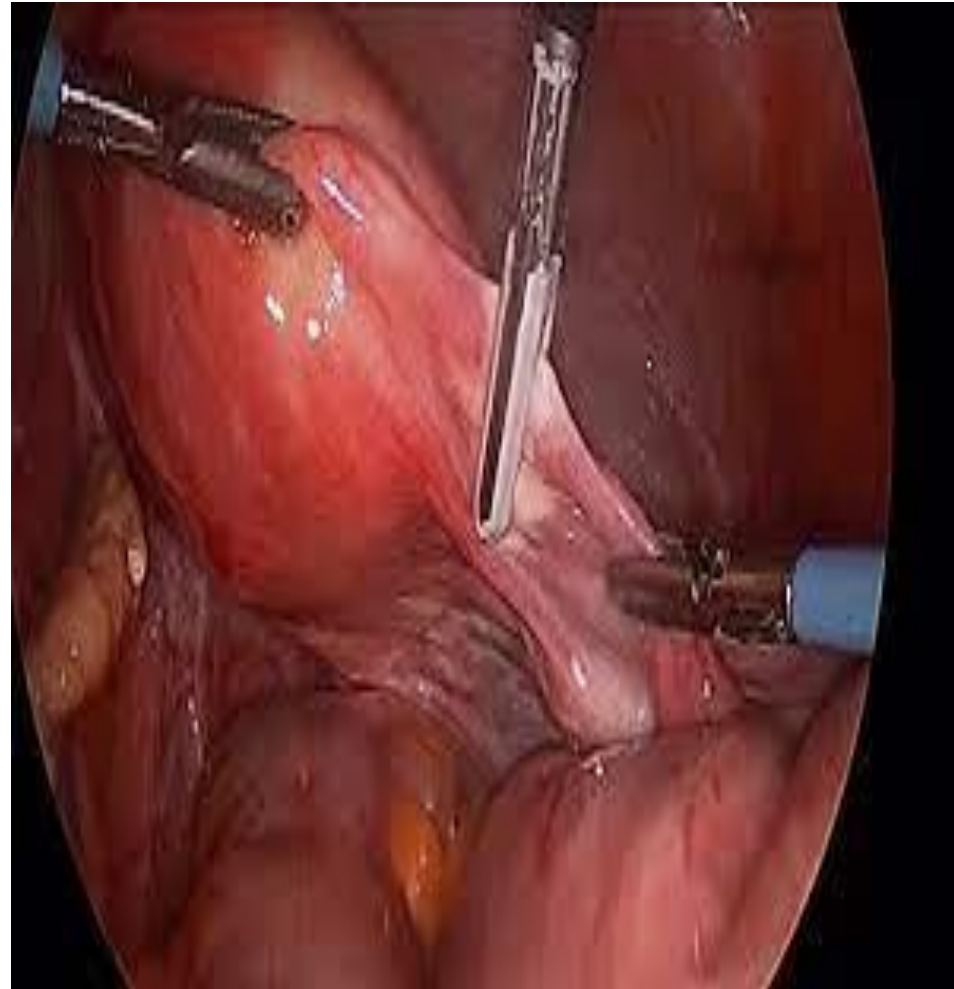
# Patients who do not improve or who worsen

— Following uterine aspiration, patients who do not adequately improve and/or who develop sepsis syndrome, acute respiratory distress syndrome (ARDS), disseminated intravascular coagulation (DIC), evidence of organ failure, peritonitis, or pelvic abscess proceed with emergency laparotomy and hysterectomy

- IV antibiotics and fluid resuscitation are continued.
- If readily available, abdominal imaging with radiograph or computed tomography (CT) can be helpful to assess for free air in the abdomen and/or gas in the myometrium, which suggest clostridial infection.
- This is a devastating disease progression and by definition, is occurring in young, reproductive-age females. A desire to preserve future fertility should not prevent performing a life-saving hysterectomy.

## EXPLORATORY LAPAROTOMY AND HYSTERECTOMY —

Emergency laparotomy and hysterectomy may be necessary to treat infection that does not respond (or spreads) or complications of uterine evacuation.



Specific scenarios include:

- **Infection with toxin-producing bacteria** – These most commonly include *Staphylococcus aureus*, group A *Streptococcus*, *Clostridioides* (formerly *Clostridium*) species, and strains of *Escherichia coli*.
    - Such infection may be suspected or confirmed by Gram stain and culture, suggested by imaging studies showing gas in tissues, the physical examination findings of crepitance or significant tenderness to palpation, or by features of toxic shock.
  - **Evidence of myonecrosis** – **Hysterectomy is required** for an avascular wood-like uterus because antibiotics cannot penetrate necrotic tissue.
  - **Significant intraperitoneal infection** – This can include tubo-ovarian or other abscess(es).
  - **Massive hemorrhage** – Hysterectomy can be a life-saving procedure for massive bleeding from vascular injury (uterus or pelvic vessels), uterine atony, or coagulopathy
- Management approaches are similar to postpartum hemorrhage and massive blood loss

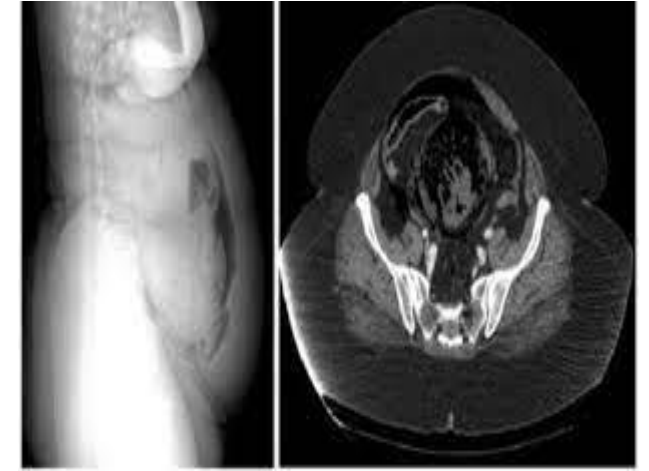


FIGURE 1: Axial CT image showing enlarged uterus with endometrial canal thickening and endometrial canal air (arrow) with surrounding inflammatory stranding, suggestive of endometritis.

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