

NAME EAC Case #156

Case provided by:

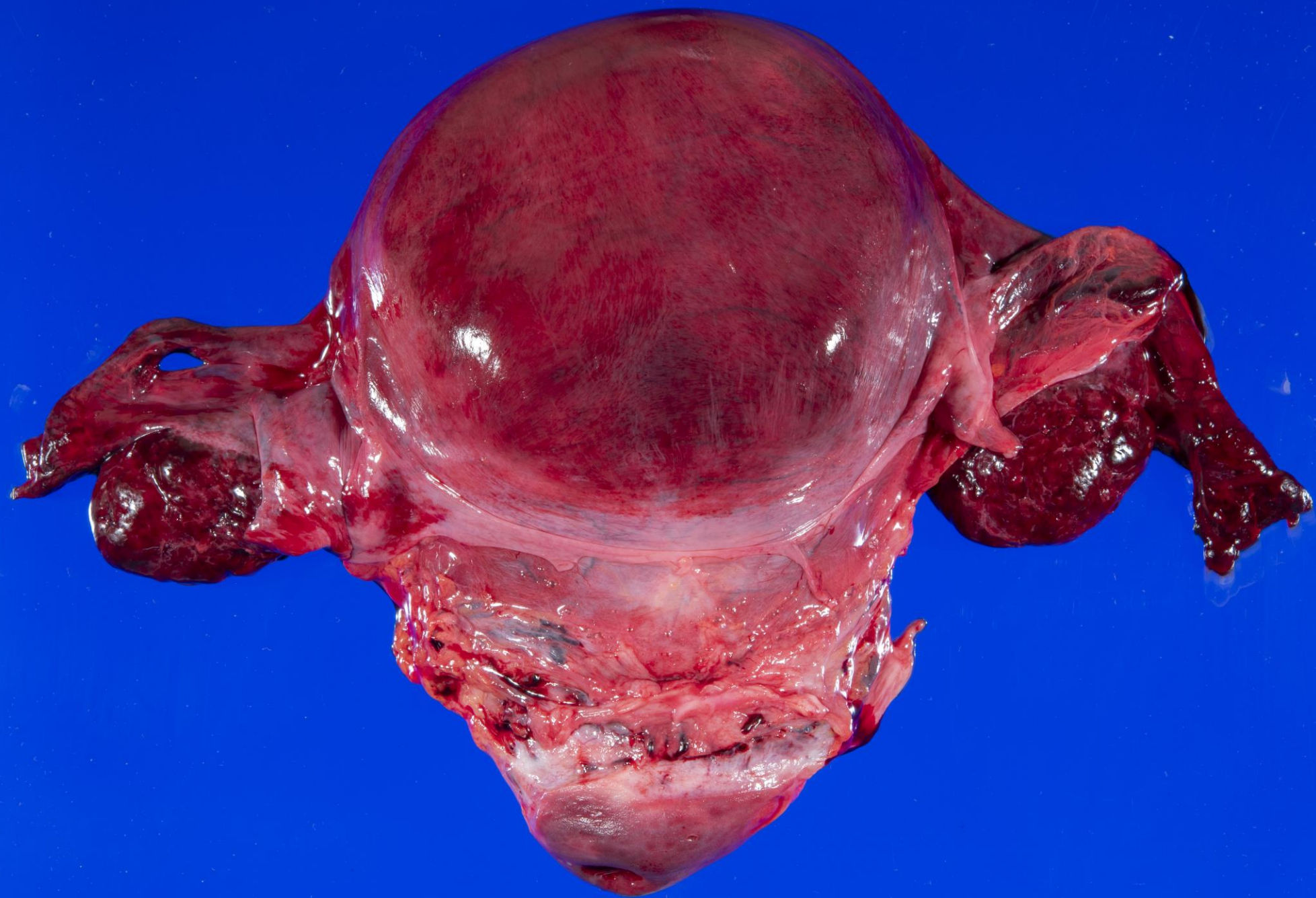
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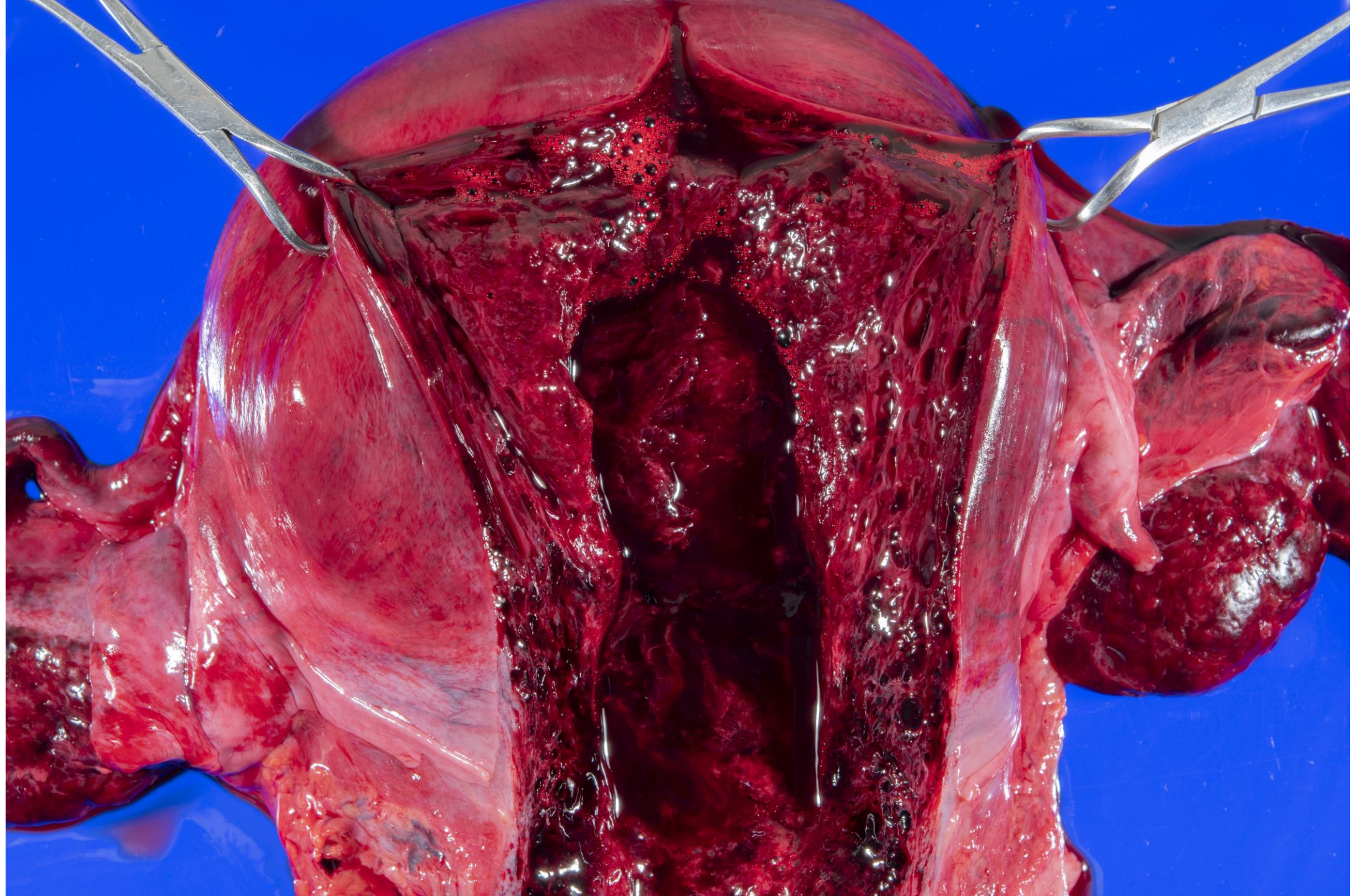
A 38-year-old woman presented to the emergency department with abdominal pain and vaginal bleeding. Transvaginal ultrasound demonstrated a 14-week intrauterine fetus with no fetal cardiac activity. Subsequent dilation and curettage yielded foul-smelling necrotic tissue. During the procedure, she became hypotensive and required multiple pressors. Post-procedural ultrasound demonstrated free fluid around the uterus, concerning for a uterine perforation so an exploratory laparotomy was performed. While transitioning anesthetic equipment for the laparotomy, the patient coded. After achieving ROSC, the exploratory laparotomy found the uterus to be dark purple and extremely soft. The decision was made to forego hysterectomy as no uterine perforation was identified. Following the procedure, the patient rapidly progressed to septic shock with multiorgan failure and died later that same day.

At autopsy, the uterus, fallopian tubes, and ovaries were enlarged, soft, boggy, and necrotic with extensive gas production within the myometrium, as shown in the photos. Histology showed bacteria throughout the uterine, fetal, and placental tissue.

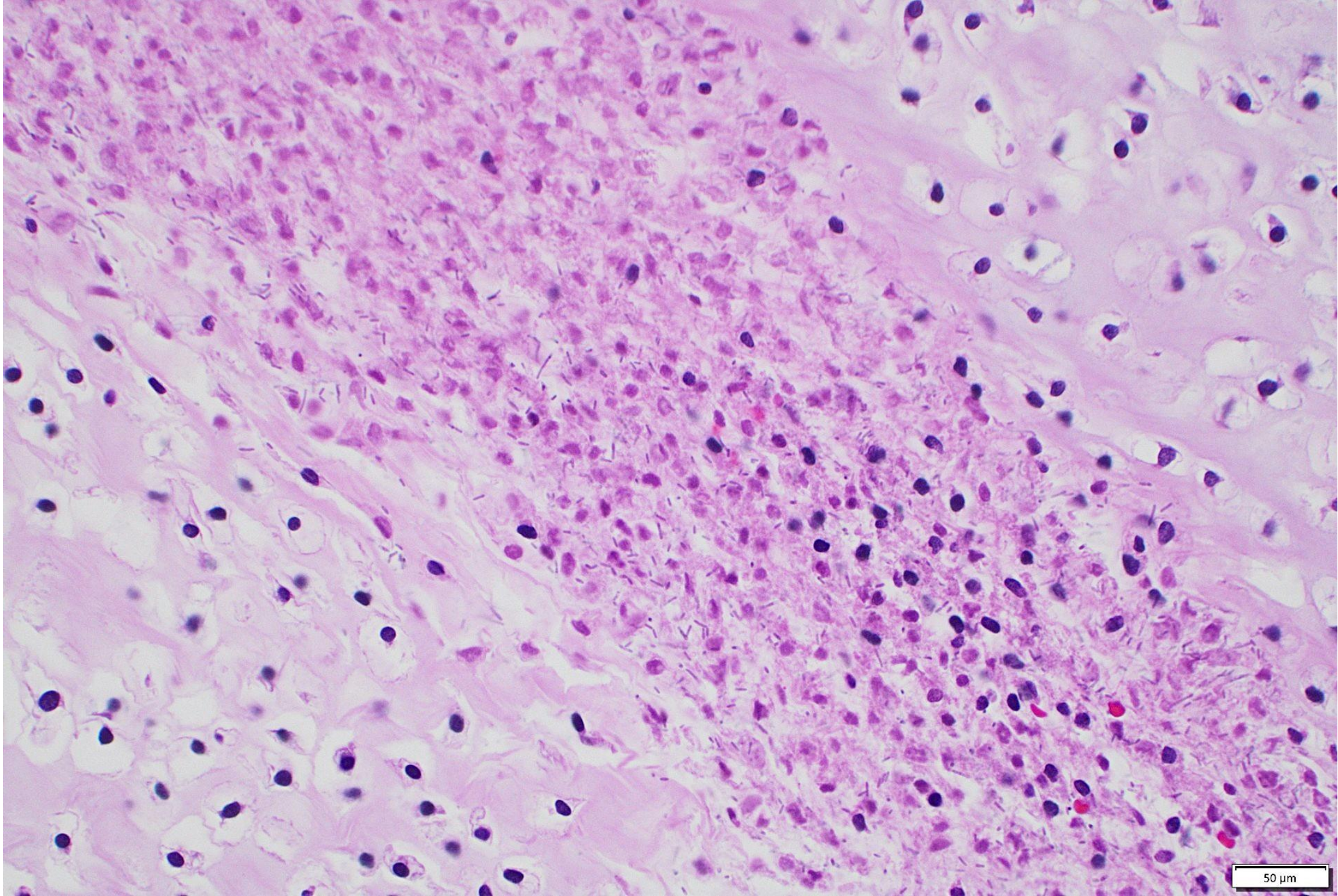
Which organism is the most likely cause?

- A. *Bacteroides fragilis*
- B. *Clostridium septicum*
- C. *Escherichia coli*
- D. *Neisseria gonorrhoeae*
- E. *Streptococcus pyogenes*





Fetal
Tissue
H&E
40X



Correct answer...

B. Clostridium septicum (Correct, 62.85% answers)

This is a case of septic abortion complicated by uterine myonecrosis secondary to a clostridium infection. In this specific case, the organism identified was *Clostridium septicum*, however the most common cause of clostridial myonecrosis is *Clostridium perfringens*. *Clostridium spp* are gram-positive, anaerobic, spore-forming rods that produce alpha toxins, which rapidly leads to progressive gas gangrene. Hallmark features of clostridial infection include foul-smelling necrotic tissue, crepitus, and gas production within soft tissue (1).

Approximately 5-20% of women harbor *Clostridium spp* as part of their normal vaginal flora (2, 3). However, in the setting of prolonged rupture of membrane or retained products of conception, *Clostridium* may proliferate and produce fulminant toxic shock syndrome and death. When intrauterine infection is associated with clostridial infection, aggressive surgical debridement of necrotic tissue and medical management with penicillin-based antibiotics and clindamycin are required. Mortality rates among postpartum patients with clostridial infections range from 50% to 100% (4, 5).

Peripartum uterine infections are typically polymicrobial, and isolation of a single organism is exceedingly rare (3). Most of the organisms that are known to cause peripartum infection originate from the normal vaginal flora and progress into ascending pelvic infections following local injury to the lower genital tract following childbirth and/or instrumentation. However, uterine myonecrosis remains a unique feature that is classically seen with *Clostridium spp* infections (7).

A. *Bacteroides fragilis* (*Incorrect, 7.12% responses*) - While *B. fragilis* is one of the most common causes of post-procedural uterine infections, it is not likely to cause gas gangrene within the myometrium. *B. fragilis* is an anaerobic rod-shaped bacteria that can be found as part of the normal flora in the gastrointestinal tract and vagina. As a result, local injury to the lower genital tract following instrumentation has the potential to cause an ascending *B. fragilis* infection. However, *B. fragilis* utilizes a polysaccharide capsule as a virulence factor to evade phagocytosis. In doing so, it is more commonly associated with suppurative infections and abscess formation rather than myonecrosis and gas gangrene (6).

C. *Escherichia coli* (*Incorrect, 9.16% responses*) - *E. coli* is a gram-negative rod that is part of the normal gastrointestinal flora and is one of the most common causes of postpartum endometritis and ascending uterine infections. However, unlike *Clostridium* which uses an exotoxin to produce myonecrosis and gangrene, *E. coli* utilizes an endotoxin (lipopolysaccharide) to trigger a massive inflammatory response (6).

D. *Neisseria gonorrhoeae* (*Incorrect, 7.12% responses*) - *N. gonorrhoeae* is a gram-negative diplococcus and sexually transmitted infection. While it is a common cause of ascending pelvic infections (such as cervicitis, endometritis, and salpingitis), it is not a typical cause of postpartum uterine infections. Hallmark features of *N. gonorrhoeae* at autopsy include mucopurulent discharge and occasionally tubo-ovarian abscesses (7).

E. *Streptococcus pyogenes* (*Incorrect, 13.74% responses*) - *S. pyogenes* (*Group A Streptococcus*) is a gram-positive coccus that typically arranges in chains. While *S. pyogenes* is more commonly associated with pharyngitis (strep throat) or necrotizing fasciitis, it can also cause peripartum uterine infections, particularly following the use of instrumentation. However, *S. pyogenes* utilizes a variety of virulence factors to evade the immune system and most notably triggers a widespread inflammatory response and septic shock. It is not commonly associated with uterine gas gangrene (7).

References

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