



Clostridium perfringens causing spontaneous pelvic inflammatory disease, peritonitis, and toxic shock syndrome

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Introduction

- *Clostridium perfringens* (*C. perfringens*) is a gram-positive anaerobic pathogen.¹
- Pelvic inflammatory disease mostly occurs in young, sexually active women.²
- Delays in pelvic inflammatory treatment can cause infertility, ectopic pregnancy, and sepsis.^{3,4}
- Pelvic inflammatory disease due to *C. perfringens* is rare.⁵
- In reproductive aged women, toxic shock due to *C. perfringens* is rare and is highly fatal with a mortality rate of up to 95%.⁶

Case Presentation

- A previously healthy 22-year-old female presented to the emergency room with right lower quadrant abdominal pain. Only other symptom reported was a low-grade fever.
- No past medical or surgical history. She was gravida 0, and last had sexual intercourse 4 years prior to admission. Her last menstrual period was two weeks ago.
- On physical exam, her abdomen was soft and diffusely tender with guarding. There was no rebound tenderness.
- Computerized tomography scan reported appendicitis with possible perforation.
- The patient was promptly taken to surgery for a laparoscopic appendectomy. However, her appendix was found to have secondary inflammatory changes. Peritonitis and diffuse turbid fluid were also noted. Her fallopian tubes were dilated and fluid-filled which suggested pelvic inflammatory disease. A culture of the abdominal fluid was taken.
- The patient was started on intravenous azithromycin, metronidazole, and piperacillin/tazobactam.

Evening labs (post op day 0):

- White blood cell count: 46.3 cells/mm³
- Red blood cell count: 7.10 cell/mm³
- Hemoglobin: 22.1 g/dl
- Hematocrit: 71.0%
- Lactic acid: 9.2 mmol/L

Labs the next morning (post op day 1):

- White blood cell count: 49.7 cells/mm³
- Red blood cell count: 7.25 cells/mm³
- Manual hematocrit: 68%
- Neutrophils: 82%
- Bands: 10%

Morning vitals (post op day 1):

- Temperature: 37.8 °C
- Pulse - 147 bpm
- Blood pressure - 104/64 mmHg

- The next morning (day 1 post op), the patient was complaining of 6/10 abdominal pain, nausea, vomiting, and an episode of syncope.
- Infectious disease was consulted, and it was suspected that she might have pelvic inflammatory disease with peritonitis and toxic shock syndrome due to *Clostridium sordellii* (*C. sordellii*) or *C. perfringens*. Antibiotics were switched to meropenem and clindamycin.
- The patient went into shock that evening (post op day 1) and was found to have a blood pH of 7.06 and serum lactate of 5.7 mmol/L. She was intubated, given pressors, and was aggressively volume resuscitated.
- Cultures two days later confirmed *C. perfringens*.
- Due to the volume resuscitation, the patient developed third spacing. She developed bilateral pleural effusions and acute kidney failure which resulted in her needing dialysis.
- Despite these complications, she gained back her strength slowly. Twenty-nine days after her initial presentation, she was discharged. Two months after presentation, she was back to her initial baseline.

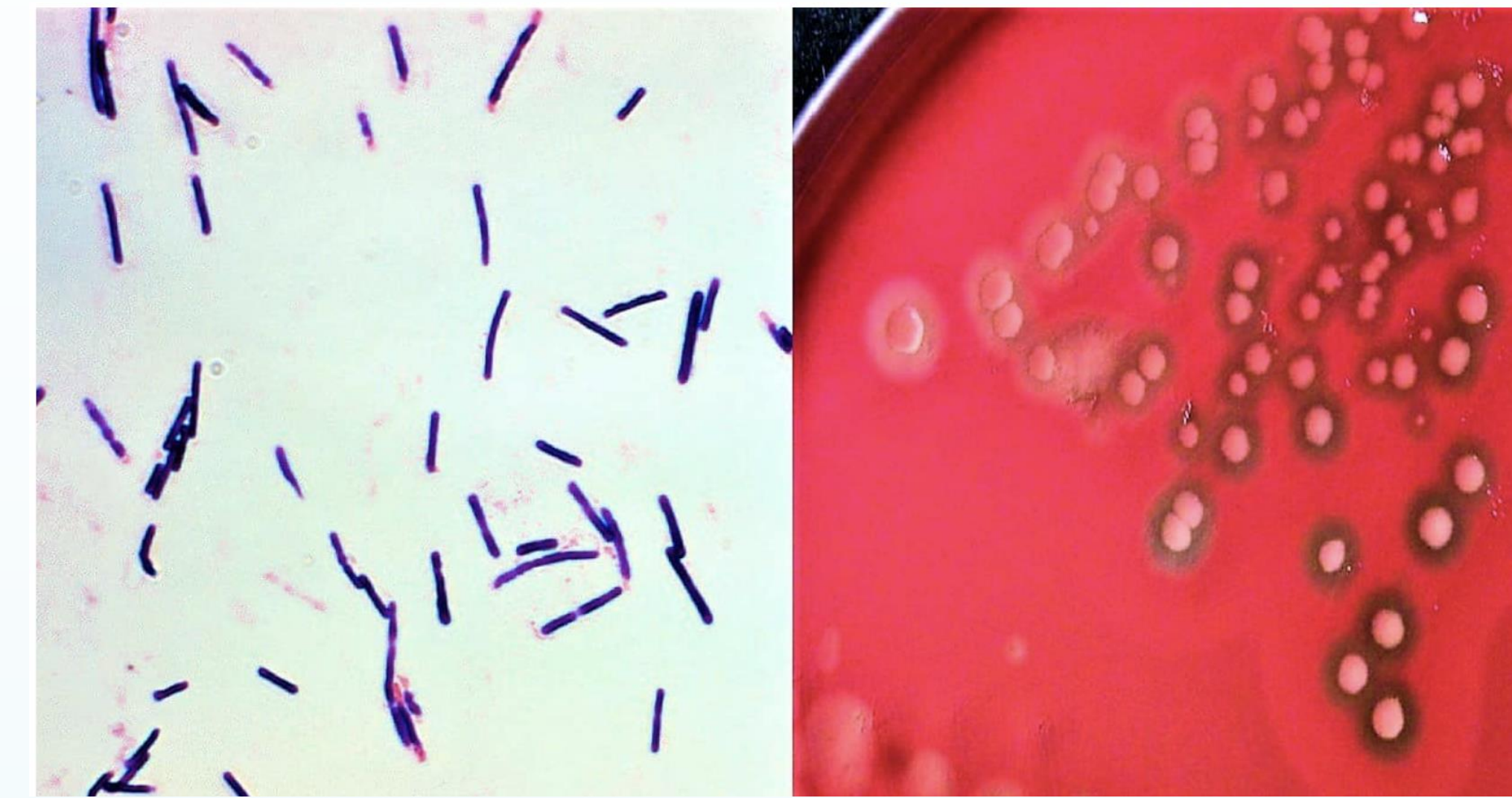


Figure 1: Gram stain and blood agar culture of *Clostridium perfringens*



Figure 2: Computerized tomography scan of the patient's abdomen showing a large volume of intraperitoneal fluid.

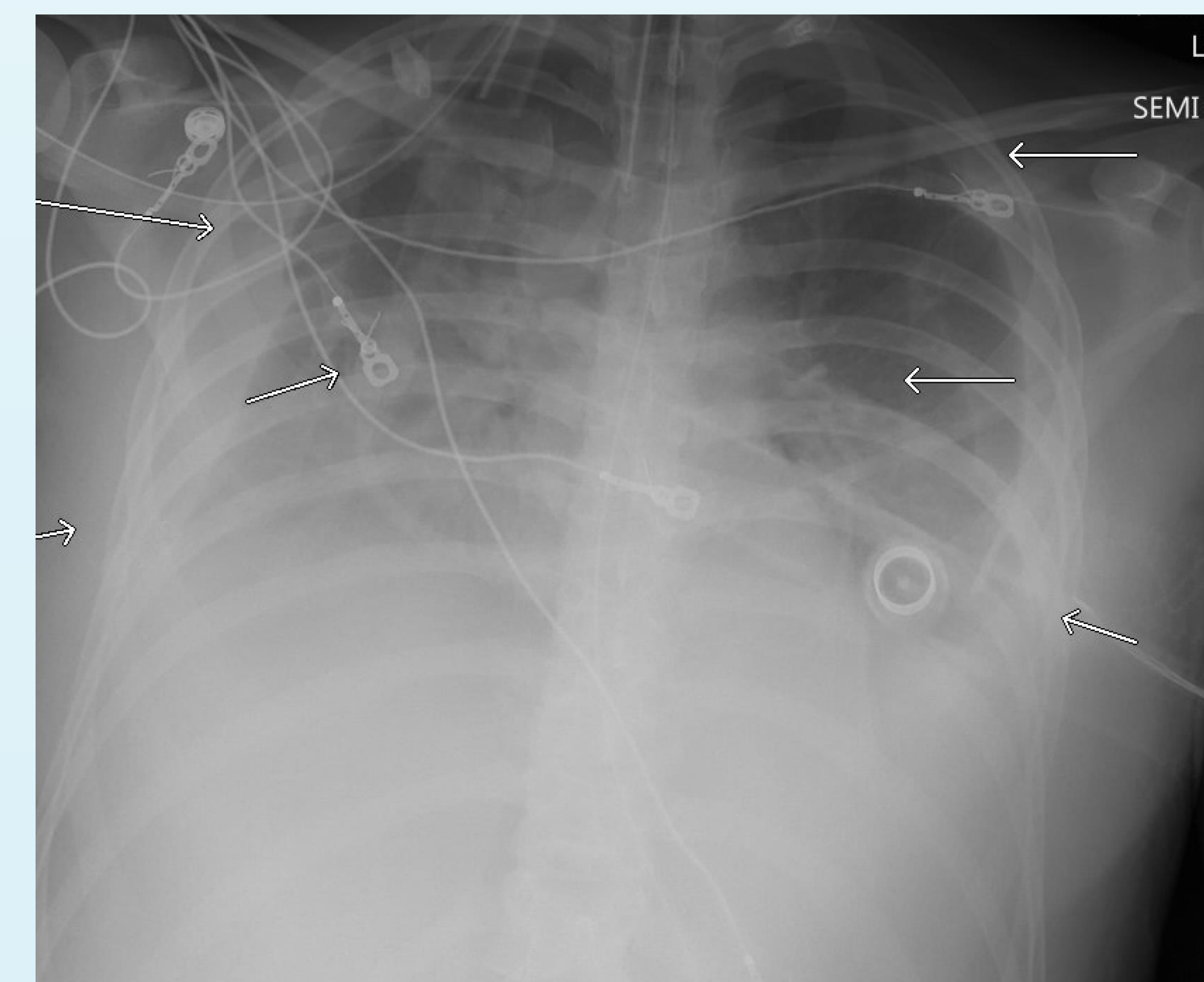


Figure 3: Radiograph of the patient's chest showing a large, bilateral pleural effusion

Discussion

- Pelvic inflammatory disease, peritonitis, and toxic shock from *C. perfringens* is rare. Toxic shock from *C. perfringens* is more commonly seen with pregnancy related outcomes and rarely presents in nonpregnant women.⁶
- This patient was a very uncommon presentation as she had no predisposing factors. She was not pregnant, last had sexual intercourse 4 years ago, no tubo-ovarian abscesses were found during surgery, and no vaginal foreign bodies were found.
- The exact cause of her pelvic inflammatory disease leading to peritonitis and toxic shock is unknown.
- Common symptoms of clostridial shock syndrome include abdominal pain, tachycardia, hypotension, third-space fluid accumulation, hemoconcentration, and a marked leukemoid response without fever.⁶ In this case, the patient presented with all these symptoms.
- Before the culture results were final, the two probable causes of her infection were *C. perfringens* and *C. sordellii*. Both can cause catastrophic gynecological illnesses in women of childbearing age. In addition, *C. perfringens* can often be misdiagnosed for *C. sordellii*, so it is important to keep both in the differential diagnosis.⁷
- Although both *C. sordellii* and *C. perfringens* can cause infections with high mortality, the presence of them in the vagina and rectum is rare, so prophylactic treatment or screening is not recommended.^{6,8}

Conclusions

- Toxic shock due to *C. perfringens* is a rapidly progressive condition that requires prompt treatment with antibiotics and supportive measures.⁶
- Clinicians should be aware of the signs and symptoms of infections due to *C. perfringens* as they are highly fatal. In addition, patients might not present with the typical risk factors or epidemiological background, as seen in this specific case.
- It is important to include *C. perfringens* when considering the etiologies of pelvic inflammatory disease, peritonitis, and toxic shock syndrome.^{5,8}

References

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Figure 1 photo credit: <https://paramedicsworld.com/clostridium-perfringens/morphology-culture-characteristics-of-clostridium-perfringens-welchii/medical-paramedical-studynotes>

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