

A 72-year-old man with a rapidly progressive sepsis caused by a rare but life-threatening infection

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CASE REPORT

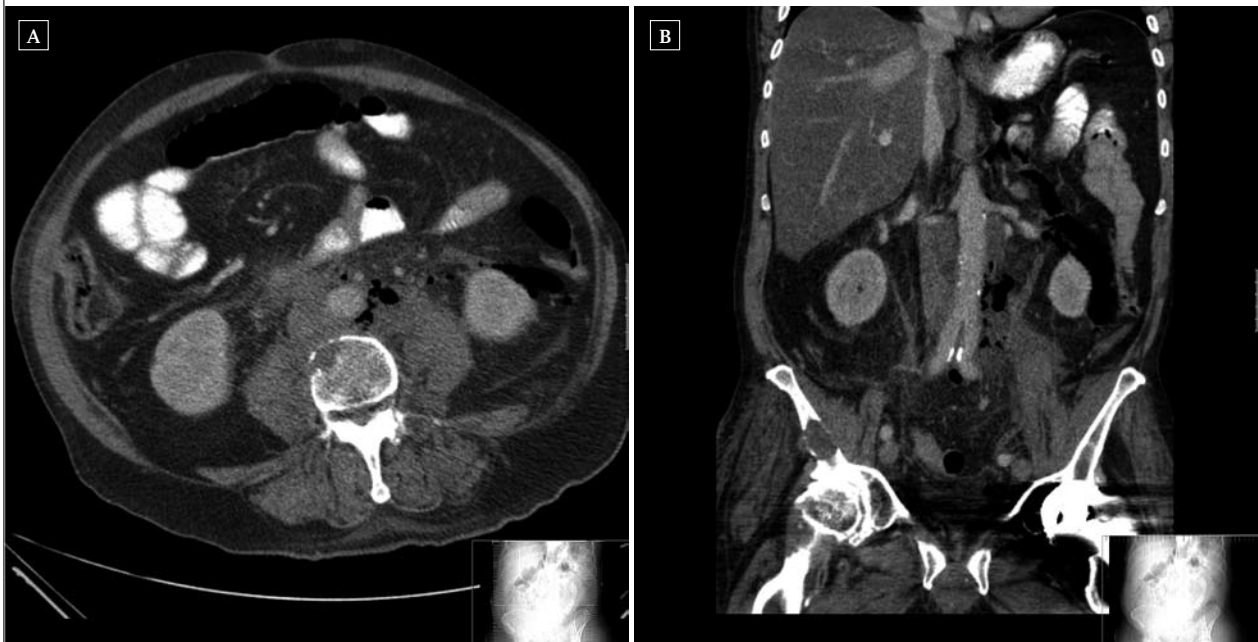
A 72-year-old man with a history of colon cancer presented to the emergency department with fever and abdominal pain. He had received his third course of oxaliplatin, capecitabine and bevacizumab one week before presentation. Physical examination revealed a slightly tender lower abdomen and a suprapubic catheter. Laboratory studies showed a white cell count of $19/\text{mm}^3$ and a C-reactive protein level of 2.94 mg/dl. He was treated with ceftazidime under the clinical suspicion of a urinary

tract infection. Shortly after admission he deteriorated clinically and went into a septic shock. A computed tomography of the abdomen was requested which showed extensive retroperitoneal gas formation (*Figure 1A and B*).

WHAT IS YOUR DIAGNOSIS?

See page 307 for the answer to this photo quiz.

Figure 1. Computed tomography of the abdomen



DIAGNOSIS

The diagnosis of spontaneous abdominal gas gangrene was made in this patient. Multiple fluid boluses, tazocin and clindamycin were given. Blood cultures grew *Clostridium perfringens*, after which hyperbaric oxygen therapy was started. After six courses of hyperbaric oxygen therapy and antibiotics the patient recovered and survived.

Clostridial gas gangrene is a rare but rapidly progressive, life-threatening infection. *Clostridium* species are spore-forming, gram-positive bacteria found in soil and the gastrointestinal and genitourinary tract of humans and animals. They require an anaerobic environment to grow and therefore occur most frequently after trauma or surgery. In a minority of cases, however, a spontaneous infection occurs which is known to be associated with the highest mortality risk.¹ Various risk factors for spontaneous gas gangrene have been identified, including diabetes, liver cirrhosis, delivery and malignancy.^{1,3} Of these, genitourinary and gastrointestinal malignancies are most commonly associated with spontaneous gas gangrene.^{3,4} These cases are thought to be due to haematogenous spread from devitalised tissue.⁴ In the case presented here, the angiogenesis inhibitor bevacizumab may have formed a risk factor as well. By inhibiting the growth of blood vessels, bevacizumab creates the required anaerobic environment for the *Clostridium* species to grow. In addition, bevacizumab is known to be associated with an increased thromboembolic risk and may thereby further contribute to an anaerobic environment.⁵

Spontaneous gas gangrene associated with malignancies is most commonly caused by *Clostridium septicum*, although the most commonly encountered *Clostridium* species overall is *Clostridium perfringens*.^{1,6,7} *Clostridium septicum* is relatively aerotolerant which may have therapeutic consequences.⁷

Normally, the mainstay of treatment is surgical decompression combined with antibiotics. In the case of an extensive abdominal infection, surgical decompression is difficult and hyperbaric oxygen therapy is worth

considering. Hyperbaric oxygen decreases clostridial toxin production and creates a less anaerobic environment for the bacteria to grow. It has been shown to be of benefit when used in conjunction with antibiotics and surgery, although these findings are not based on randomised controlled trials.⁸⁻¹⁰ Based on the relative aerotolerance of *Clostridium septicum*, hyperbaric oxygen therapy would in theory be less effective for gas gangrene caused by *Clostridium septicum* than for *Clostridium perfringens*.

In conclusion, spontaneous abdominal gas gangrene associated with a gastrointestinal malignancy is a rare but serious disorder which requires timely recognition in order to initiate an early and specific therapy to prevent death.

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