

## Postoperative Clostridial Myonecrosis of the Abdominal Wall

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### Abstract

*Clostridium sordellii*, a Gram positive spore-forming anaerobe, is one of the lesser known members of the clostridia species. This microorganism is predominantly an animal pathogen, and it is rarely associated with disease in humans. Since its first report in 1922 only a few cases of abdominal infection have been reported and occasional cases of myonecrosis and gas gangrene have been published. We describe a case of postoperative clostridial myonecrosis after abdominal wall surgery. Despite presenting in critical condition, the patient improved after surgical debridement of the wound, aggressive hemodynamic resuscitation, source control and intravenous antibiotic therapy. The successful outcome in these cases might be related to early identification and institution of appropriate antibiotic treatment. The addition of prophylactic anti-anaerobe drugs should be strongly considered until an optimal prophylactic regimen judging from our experience and the reviewed literature.

**Keywords:** *Clostridium sordellii*; wound infections; necrotizing infection; rare clostridial infections.

### INTRODUCTION

*Clostridium sordellii* is a rare gram-positive anaerobe, spore-forming bacteria that is capable of causing a variety of clinical manifestations, including pneumonia, endocarditis, septic arthritis, peritonitis, myonecrosis, gynaecological infections, and bacteremia<sup>1,2</sup>. It is one of the lesser known members of the clostridia species. We present a case of postoperative clostridial myonecrosis of the surgical wound.

### CASE PRESENTATION

A previously healthy 45-year old male underwent an operation for an obstructive problem due to congenital adhesions (Figure 1 and 2). Vital signs and laboratory values on admission were within normal limits, except for white blood cells of  $14.2 \times 10^3 / \mu\text{L}$  (78.3% neutrophils) and haemoglobin (10.9 g/dL). The operative findings were multiple dense adhesions in the small bowel mesentery and surgical adhesiolysis was performed. On the fourth postoperative day, the patient experienced fever of 38.4°C, nausea, vomiting,

generalized abdominal pain and distension, with only minimal pain and erythema at the infected site, resulting in a surgical wound with a malodorous and purulent exudate. Haematological study found an elevated white blood cell count of  $23.1 \times 10^3 / \mu\text{L}$  (92%, neutrophils), high sensitivity troponin level of 32 ng/L, C-reactive protein (CRP) of 212mg/L, and procalcitonin level of 16 micrograms/L. Respiratory frequency, oxygen level, and Glasgow Coma Scale were normal.

Regarding the patient's bad condition and his non-response to empirical antibiotic treatment with Amoxicillin/clavulanic acid, the patient was operated on again finding necrotizing soft tissue infection of the surgical wound, bowel loops distension and an abnormal buildup of serous fluid. The patient's wound was well debrided using Friedrich's technique and a wound culture was performed. Culture from surgical wound and intra-abdominal liquid subsequently tested positive for *Escherichia coli* and *Clostridium Sordellii*. A blood culture was negative for *Clostridium* and toxin strain was not tested for.

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Adequate clinical response was achieved with a nine-day course of intravenous Piperacillin/Tazobactam plus Clindamycin, which was chosen based on wound

culture sensitivities. Outpatient follow-up six months after hospital discharge showed an overall clinical and analytical improvement.



**Figure 1.** X-ray of the abdomen showing distension of small bowel loops compatible with intestinal obstruction.



**Figure 2.** Abdominal CT demonstrating findings compatible with small bowel obstruction probably secondary to congenital bridge with moderate amount of intraperitoneal free fluid and without evidence of parietal pneumatosis or pneumoperitoneum.

## DISCUSSION

Since its first report in 1922 by Alfredo Sordelli, who isolated the bacteria from a patient with postoperative gas gangrene, only a few cases of human infection have been described. This microorganism is predominantly an animal pathogen, mainly found in sheep and cattle.

It is only found in 0.5% of human gastrointestinal tracts, but more commonly isolated from soil<sup>3,4</sup>.

The pathogenesis of *C. sordellii* infection is still being characterized. Near to 40 different strains of *C. sordellii* have been identified, but not all are toxin producing. Seven of those exotoxins have been identified to be produced by *C. sordellii*, the two most virulent being edema producing or lethal toxin and haemorrhagic toxin. The clinicopathologic manifestations and significant morbidity and mortality described with these infections have been linked to the elaboration of this two unique exoproteins<sup>3,5</sup>.

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Risk factors for developing infection include exposure to contaminated soil, animal feces, or human gut flora but also include surgical procedures, injecting drug use, penetrating/crush/traumatic soft tissue injury, and comorbidities such as cirrhosis, malignancy, and immunosuppression. Probably, our patient was already a carrier of *C. sordellii* in his normal bowel flora and the surgical procedure had the potential to create cross-contamination from the patient's bowel flora to the abdominal wound. Severe toxic shock syndrome among previously healthy persons has been described in a small number of *C. sordellii* cases, most often associated with gynecologic infections, infection of the umbilical stump in newborns, injection drug users and trauma cases<sup>3</sup>.

Symptoms of a *C. sordellii* infection include nausea, vomiting, lethargy, diarrhea, and sometimes abdominal pain without fever. Of particular concern, fatal septicaemia is characterized by edema, pleural or peritoneal effusion, refractory hypotension, severe tachycardia, haemoconcentration, extreme leukemoid reaction and intravascular haemolysis which might possibly develop into multiple organ failure. Although clinically similar to toxic shock syndrome, a notable difference is *C. sordellii* infections rarely involve fever<sup>4,5</sup>. Clostridial bacteraemia is uncommon<sup>4</sup>. Remarkably, in our case the local manifestations prevailed over the general repercussion on the patient.

Treatment for toxic shock must be started immediately after the onset of symptoms, and consists of using broad-spectrum antibiotics with activity against all the anaerobes. Piperacillin/Tazobactam, metronidazole or Ticarcillin/Clavunate plus Clindamycin provide this spectrum. In addition to the antibiotic treatment, early definitive Clostridial necrotizing infections management requires supportive measures such as intravenous fluids to control hypotension and tachycardia, as well as surgical exploration and debridement of necrotic tissues where applicable on the part of the surgeon<sup>2</sup>. If necessary, hysterectomy or any other surgical procedure may be performed.

The majority of cases portrayed in literature in the last two decades have been young and healthy people

usually affected after the childbirth, puerperium or medical abortion due to wound infections such as episiotomy or lacerations. In a non-gynaecological intervention, as it is our clinical case, the report of Clostridium infection in the postoperative period is late and limited but the associated mortality rate is characteristically high (approaching 70% in previously healthy individuals)<sup>6-8</sup>

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