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Clostridium sordellii as a cause of gas gangrene in a trauma patient

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Abstract:

Gas gangrene is a necrotic infection of the skin and soft tissue that is associated with high mortality and often necessitating amputation to control the infection. Clostridial myonecrosis is most often cause of gas gangrene and usually present in settings of trauma, surgery, malignancy, and other underlying immunocompromised conditions. The most common causative organism of clostridial myonecrosis is *Clostridium perfringens* followed by *Clostridium septicum*. Here, we are reporting an unusual case report of posttraumatic gas gangrene caused by *Clostridium sordellii*.

Key words:

Clostridium sordellii, matrix-assisted laser desorption/ionization-time-of-flight, myonecrosis, trauma

Introduction

Clostridium sordellii is an anaerobic Gram-positive bacillus with subterminal spores and peritrichous flagella. It is commonly not only found in the soil and sewage but also as part of the normal flora of the gastrointestinal tract and vagina of a small percentage of healthy individuals.^[1] Although most strains of *C. sordellii* are nonpathogenic, some virulent, toxin-producing strains cause fatal infections. In contrast, *C. sordellii* infections are more common in animals. In human's infection, *C. sordellii* can complicate childbirth, abortion, and gynecological procedures. The prevalence of clostridium myonecrosis, caused by *C. sordellii* is reported in only 4% of cases.^[2] However, *C. sordellii* is more commonly reported as a cause of myonecrosis in injection drug abusers and only six sporadic cases of gas gangrene are being reported after trauma.^[2] Here, we are reporting an unusual case of gasgangrene in trauma patient cause by *C. sordellii*.

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Case Report

A 32-year-old male patient presented to the emergency department of trauma center with a fracture of the right sacroiliac joint along with open wound of right tibial fracture. Elective surgery was performed for sacroiliac disruption and pubic diastasis. Three days after surgery, the patient developed toxic symptoms such as high-grade fever (102°F), tachycardia, and hypotension. The patient also gave a history of increasing pain out of proportion to physical findings accompanied by progressive swelling, erythema, and crepitus over the right calf leg. The patient was unable to move his right lower extremity and had no sensation below the knee joint level. The physical examination revealed severely swollen and brownish skin of the right lower extremity along with necrotic wound along the fracture site in the calf region. Wound over right calf was also foul smelling. X-ray of the right lower limb revealed gas in the interfacial planes of the leg along with extensive gas formation throughout all the muscle compartments of the right leg. Laboratory evaluation showed increased

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total leukocyte counts (TLCs) (24, 270/cubic mm³), erythrocyte sedimentation rate, 122 mm/h, and C-reactive-protein 17.13 mg/dl. In view of the critical condition of the patient, a presumptive diagnosis of gas gangrene was made, and the patient was taken for emergency surgical debridement. Wound was debrided extensively, and pus pockets were removed and washed. Necrosed medial gastrocnemius muscle was debrided completely. Tissue and pus sample was sent to the microbiology laboratory for gram-stain and culture. On gram-staining, variable Gram-positive rods were seen in the smear. The pus and tissue samples were cultured both in the aerobic and anaerobic conditions. After overnight incubation, anaerobic blood agar plate showed growth of transparent and flat colonies with irregular borders. The aerobic culture showed no growth. The colony was taken directly from the primary plate and tested on the automated Matrix Assisted Laser Desorption/Ionization- time-of-flight mass spectrometry system (BioMérieux SA). The organism was identified as *C. sordelli*, with a 99.9% confidence value. The patient was empirically started injection clindamycin 300 mg intravenously TDS and linezolid 600 mg intravenously BD. According to culture reports and identification, the patient's antibiotics were deescalated, and he was started injection metronidazole 750 mg OD and injection clindamycin 300 mg intravenously TDS. The patient clinical condition improved after 48 h of surgical debridement and antibiotic therapy. Once the patient was clinically stable, he received six sittings of hyperbaric oxygen therapy (HOBt). His wound healed well and repeated pus culture from the wound was sterile after 10 days of antibiotic treatment. Patient was completely recovered and was subsequently discharged after 20 days of his hospital stay.

Discussion

Gas gangrene is a necrotic infection of the skin and soft tissue that is characterized by the presence of gas under the skin, which spreads quickly in soft tissues of the body.^[3] Gas gangrene is subclassified into two categories. Most common is traumatic or postoperative gangrene followed by nontraumatic or spontaneous gangrene. *C. perfringens* is the most common cause of traumatic gas gangrene, isolated in approximately 80% of cases of gas gangrene, followed by *C. septicum*, *Clostridium*

novyi, *Clostridium histolyticum*, *Clostridium bifermentans*, *Clostridium tertium*, and *Clostridium fallax*.^[4-6]

C. sordellii is an anaerobic, Gram-positive, spore-forming rod, first isolated in 1922 by Argentinian microbiologist Alfredo Sordelli.^[7] Human infections caused by *C. sordellii* are rarely reported in the literature. Most of the cases of *C. sordellii* infection are reported in healthy young adult women after natural childbirth and spontaneous abortion. Several studies of fatal *C. sordellii* soft-tissue infection in injection drug users had been reported.^[8] The prevalence of *C. sordellii* causing gas gangrene infections are reported in 4% of patients, globally.^[9] While in trauma patients, only six case reports of gas gangrene caused by *C. sordellii* had been published worldwide till date [Table 1]. *C. sordelli* gas gangrene carries a high mortality in trauma patients as reported in the literature.^[10]

A presumptive clinical diagnosis of gas gangrene caused by *C. sordellii* can be challenging. Clinical manifestations of *C. sordellii* infection are insidious in nature and subsequent progressive rapidly. The patient develops excruciating pain with marked local edema; also develop hypotension and tachycardia as described in the present case also. Laboratory tests have demonstrated elevated hematocrit, increased TLC and platelet counts, and decreased serum calcium and protein levels. Specifically, the leukemoid reaction is unique findings in this infection described in various case reports which is highly predictive of fatal outcome.^[11,12]

The mainstay of treatment is early aggressive surgical intervention, antibiotic therapy, and intensive care support. Wide resection of all necrotic tissues is necessary for better outcome of patient.^[13,14] In our case, multiple sittings of debridement and daily dressings, combined with antibiotics and HOBt were the mainstay of treatment which has decreased the clinical severity of the infection and responsible for good prognosis of the patient.

The present case demonstrates that *C. sordellii* should be considered as one of the important causes of gas gangrene in trauma patients. Early recognition and confirmatory diagnosis of unrecognized pathogen like *C. sordellii*, along with an aggressive surgical approach

Table 1: Summary of *Clostridium sordellii* infections causing gas gangrene in trauma patients

n	Age year/sex	Presenting illness or condition	Outcome	Year	References
1	50/female	Vehicle accident and D2, D3 fracture, leg amputation followed by necrosis	Died	2010	[9]
2	38/male	Polytrauma (motorbike fall) cellulitis, myonecrosis	Died	2008	[9]
3	4/male	Transverse fracture of the arm	Died	2006	[6]
4	37/male	Foot trauma	Survived	2000	[11]
5	23/male	Leg trauma	Died	1975	[8]
6	42/male	Hand trauma	Survived	1968	[10]

and appropriate antimicrobial therapy, can decrease the mortality among trauma patients.

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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