

CASE REPORT

Dale Ray,¹ M.D., Stephen D. Cohle,² M.D., and Patricia Lamb,³ M.D.

Spontaneous Clostridial Myonecrosis

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ABSTRACT: Spontaneous, nontraumatic clostridial myonecrosis is a rare infection with an insidious onset and usually fatal outcome. Spontaneous clostridial myonecrosis has a frequent association with colon carcinoma, leukemia, diabetes mellitus, and drug-induced immunosuppression. We present the case of a 73-year-old diabetic man who died of spontaneous *Clostridium septicum* myonecrosis, who had presented with fulminant gangrene of the right thigh. *Clostridium septicum* was cultured from the quadriceps muscle postmortem.

At autopsy, in addition to the gangrene, there was a Duke's A adenocarcinoma of the cecum, which had not been diagnosed during life. When spontaneous nontraumatic clostridial myonecrosis is diagnosed at autopsy, investigation should include thorough exam and the obtaining of past medical history in order to elucidate predisposing factors.

KEYWORDS: pathology and biology, clostridial myonecrosis, diabetes mellitus, colon carcinoma

Clostridial myonecrosis is an infectious disease typically associated with wound contamination following trauma or surgery. It also has been found with abortions, burns, surgical instrumentation, and skin infections [1].

Rarely, spontaneous clostridial myonecrosis occurs without preceding trauma. This entity has been associated with colon carcinoma, hematologic malignancy, and diabetes mellitus [2]. While *Clostridium perfringens* is the cause of trauma-related gas gangrene in 60 to 80% of cases [2], *C. septicum* is increasingly recognized as a causative agent in spontaneous gas gangrene. Because of the lack of a clinically evident predisposing event, the insidious onset, and the extreme rapidity of its course, this illness has an extremely high mortality and requires aggressive, rapid treatment.

We present the case of an elderly diabetic man who presented with fulminant gangrene of the right thigh and who had a previously undiagnosed colon carcinoma.

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¹Physician, Department of Emergency Medicine, Butterworth Hospital, Grand Rapids, MI.

²Forensic Pathologist, Blodgett Memorial Medical Center, Grand Rapids, MI.

³Physician, Department of Emergency Medicine, Jackson, MI.

Report

A 73-year-old white man with a history of noninsulin dependent diabetes mellitus had the onset of right leg pain one day prior to death. The pain became worse after he walked across a parking lot. He was evaluated by his cardiologist who did not report any abnormalities of the leg and he was discharged home for bed rest. He was up all night with the leg pain and at 6:30 A.M. the following day, he went to see his family physician and was diagnosed with sciatica and was given a cortisone injection in the right sacroiliac joint. His pain worsened throughout the day and midafternoon. He asked his wife to get him a glass of water, and, on her return, he had collapsed. He was taken to a hospital emergency department where cardiopulmonary resuscitation was unsuccessful. At that time, blistering was noted on his right thigh. His wife thought there may have been a blister on his thigh the morning of his death.

At autopsy there was hemorrhagic blistering of the entire right thigh (Fig. 1), right side of the abdomen, chest, and neck. There was extensive skin sloughing and erythema as well as necrosis of the right thigh musculature. No purulent exudate was identified within the quadriceps muscle or its fascia. A 4 by 2.5 cm tan, exophytic tumor extending into the submucosa was identified in the cecum (Fig. 2). Microscopically, this tumor was a well differentiated Duke's A adenocarcinoma. The right quadriceps muscle contained numerous gram positive bacilli with subterminal spores (Fig. 3). There was coagulation necrosis but no inflammatory reaction within the skeletal muscle fibers in the region of the bacilli. Bone-marrow sections showed no microscopic abnormalities.

Postmortem quadriceps muscle cultures grew *Clostridium septicum*. Portions of quadriceps muscle were cultured anaerobically on blood agar and in thioglycollate broth and CMG (chopped meat glucose) broth. Spore forming gram positive rods were isolated from these media. An enzymatic biochemical identification using the IDS (Innovative Diagnostic Systems, Atlanta, GA) Rapid ANA II system showed the organism to be *Clostridium septicum*.



FIG. 1—Gangrenous necrosis of right thigh and leg with hemorrhagic bullae.

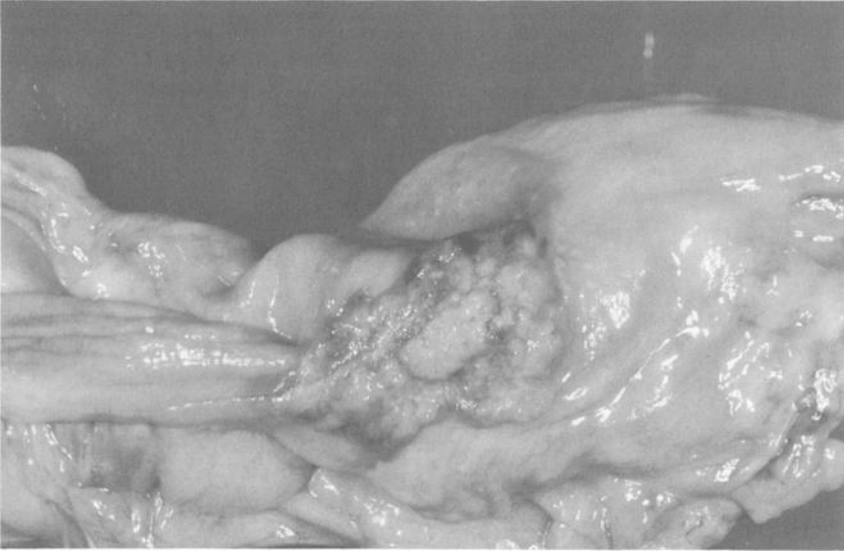


FIG. 2—Adenocarcinoma arising in the cecum.

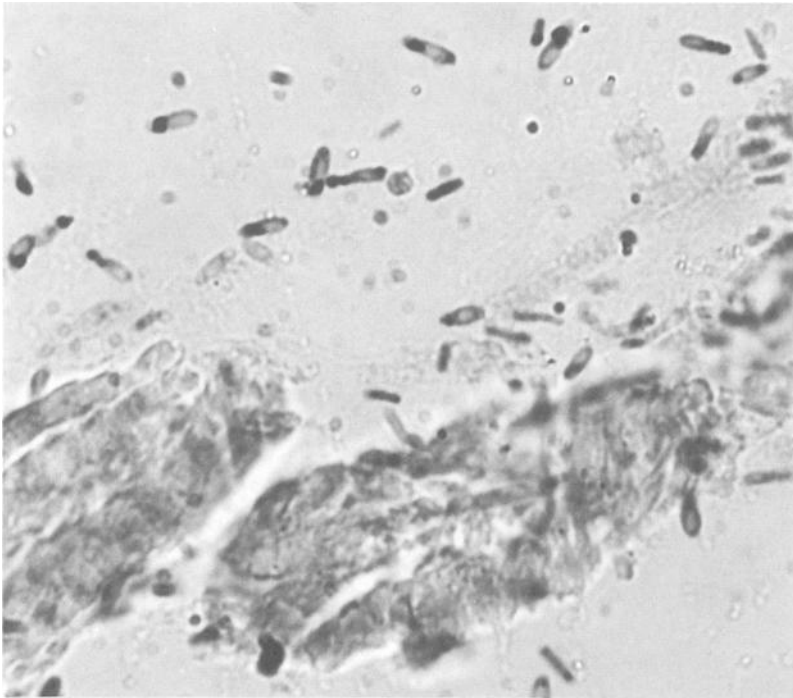


FIG. 3—Photomicrograph of right quadriceps muscle showing gram positive bacilli with subterminal spores. Brown and Brenn gram stain. Original magnification $\times 1000$.

Discussion

Clostridial gas gangrene most frequently occurs in a contaminated wound following traumatic injury or a surgical procedure. *Clostridium perfringens*, a rod shaped, anaerobic, spore forming, gram-positive bacterium, is the etiologic organism in the majority of these cases [2].

Gas gangrene that occurs without apparent preceding etiology has been termed spontaneous myonecrosis. Although *Clostridium septicum* accounts for only 1 to 2% of clostridial infections [3] and *C. perfringens* was the most frequent causative organism in early reports of spontaneous gas gangrene, *C. septicum* has been reported with increasing frequency and in fact may be the most common cause of spontaneous clostridial myonecrosis [2].

There are several risk factors for spontaneous myonecrosis caused by *C. septicum*. First, there is an association with malignancy. Kornbluth et al. reviewed the English-language literature and found 38 cases of *C. septicum* with spontaneous myonecrosis between 1945 and 1987. Colon cancer was found in 22 out of 38 (58%) cases and was occult in 19. The cecum was the most frequent site. Hematologic malignancy, most frequently leukemia or lymphoma, was found in 13 out of 38 (34%); 2 of 13 were occult [3].

The portal of entry of the clostridial infection is thought to be due to colonic mucosal disruption from a tumor or the inflamed and necrotic mucosa associated with hematologic malignancy. The acidic and relatively anaerobic environment of the tumor is well suited for growth of clostridial spores; in fact, spores of clostridia can germinate in non-neoplastic necrotic tissue without affecting adjacent normal tissue [3].

As in this case, diabetes often occurs in patients with *C. septicum* infection and was present in 14 of 38 (37%) [3] patients in the Kornbluth series and was the only identifiable risk factor in 19 to 28% in other series [1,2]. This relationship may be due to localized tissue ischemia and small vessel disease [1,3].

Immunosuppression may also be a contributing factor as spontaneous clostridial myonecrosis has been found in patients with neutropenia [1-3], renal transplantation [4] and chemotherapy [2,3]. However, there have not been any cases reported in AIDS patients and there may be a more significant relationship to colon muscosal damage than to immunosuppression [3].

Patients with *Clostridium septicum* myonecrosis often present with extreme pain, out of proportion to clinical findings. Some patients may present with less specific symptoms, including heaviness or numbness in the affected extremity, confusion or malaise [2]. The extremity may be initially normal appearing but then develop crepitation, edema, hemorrhagic bullae, and bronze discoloration of the skin [2,5]. It should be noted that crepitation may not be apparent until late and is not specific to clostridial infections. The patient becomes moribund quickly with marked hemolysis and lactic acidosis. Patient mortality is approximately 80% and usually occurs within 24 h [3,6].

Treatment consists of rapid and aggressive administration of antibiotics and surgical debridement. The antibiotic of choice is Penicillin G 10 to 25 million units/day, although there are other options such as metronidazole, clindamycin, tetracycline, erythromycin, and chloramphenicol [2]. Surgical treatment may include amputation of the affected limb. Hyperbaric oxygen may be useful as adjunctive therapy, but its utility is not proven [3,6].

Summary

Our patient had two risk factors for the development of spontaneous myonecrosis due to *Clostridium septicum*, namely an occult carcinoma of the cecum and diabetes mellitus. Investigation of a death from this disease should include a medical history, with special attention to such conditions as immunosuppression, carcinoma, and non-neoplastic dis-

eases of the gastrointestinal tract, diabetes mellitus, and diseases of the bone marrow. The autopsy should be complete, including examination of the gastrointestinal mucosa. The bone marrow should be examined microscopically, and necrotic tissue should be cultured, including for anaerobic organisms.

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Address requests for reprints or additional information to
Stephen Cohle, M.D.
Blodgett Memorial Medical Center
1840 Wealthy St. SE
Grand Rapids, MI 49506