



A Rare Case: Traumatic Clostridial Myonecrosis

Nadir Bir Vaka: Travmatik Klostridyal Miyonekroz

Büşra Özyalvaç¹(ID), Gülsüm Alkan¹(ID), Meltem Kıymaz¹(ID), Ali Güleç²(ID), Hatice Türk Dağı³(ID), Melike Emiroğlu¹(ID)

¹ Department of Pediatrics, Division of Pediatric Infectious Diseases, Selçuk University Faculty of Medicine, Konya, Türkiye

² Department of Orthopedics and Traumatology, Selçuk University Faculty of Medicine, Konya, Türkiye

³ Department of Medical Microbiology, Selçuk University Faculty of Medicine, Konya, Türkiye

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Abstract

Myonecrosis (clostridial gas gangrene), a highly fatal infectious disease caused by *Clostridium* species, is characterized by gas formation in deep soft tissues and requires rapid diagnosis and treatment. Local and systemic exotoxins of bacteria that grow rapidly in anaerobic environments are responsible for pathogenesis. A 14-year-old male patient had fallen onto the ground three days ago, and the laceration on his right knee had been sutured. The day after the incident, the patient developed a fever and presented with complaints of severe pain and swelling in his right leg. There was widespread edema, skin redness, increased warmth, and black crusted, bullous, necrotic lesions on the right knee and crepitus on palpation around it. An emergency debridement was performed due to the presence of gas in computed tomography scan of the knee. During the operation, a foul odor, purulent discharge, and gaseous tissue appearance were noted. The patient was started on meropenem and clindamycin. Tissue cultures grew *Clostridium* spp., but susceptibility testing and typing could not be performed. The wound was closed with a graft. After completing 30 days of clindamycin treatment, no sequelae were observed during follow-up. Although rare in children, myonecrosis should be considered in the differential diagnosis of rapidly progressing soft tissue infections, whether traumatic or spontaneous.

Keywords: Children, gas gangrene, traumatic myonecrosis, necrotizing soft tissue infections

Öz

Miyonekroz (klostridyal gazlı kangren), *Clostridium* türlerinin neden olduğu, derin yumuşak dokuda gaz oluşumu ile karakterize, hızlı tanı ve tedavi gerektiren, mortalitesi yüksek bir enfeksiyon hastalığıdır. Patogenezden anaerop ortamda hızla çoğalan bakterilerin lokal ve sistemik ekzotoksinleri sorumludur. On dört yaşında erkek hasta, üç gün önce toprak zemine düşmüş, sağ dizinde gelişen kesi sütüre edilmiş. Olaydan bir gün sonra ateşi yükselen hasta, sağ bacağında şiddetli ağrı ve şişlik şikayetiyle başvurdu; sağ dizinde yaygın ödem, ciltte kızarıklık, ısı artışı, siyah krutlu büllöz nekrotik lezyonlar ve etrafında palpasyonla krepitasyon saptandı. Bilgisayarlı diz tomografisinde gaz saptanması üzerine acil debridman yapıldı. Operasyon sırasında dokuda kötü koku, püvy ve gazlı görünüm izlendi. Hastaya meropenem ve klindamisin tedavisi başlandı. Doku kültüründe *Clostridium* spp. üremesine rağmen antibiyogram ve tiplendirme yapılamadı. Yara yeri greft ile kapatıldı. Klindamisin tedavisi 30 güne tamamlanan hastanın takiplerinde sekel gelişmedi. Çocuklarda nadir görülmekle birlikte, travmatik veya spontan gelişen ve hızla ilerleyen yumuşak doku enfeksiyonlarının ayırıcı tanısında miyonekroz akılda bulundurulmalıdır.

Anahtar Kelimeler: Çocuk, gazlı kangren, travmatik miyonekroz, nekrotizan yumuşak doku enfeksiyonu

Introduction

Although *Clostridium* species are commonly found in nature, soil and sea, they can also be found in the intestinal flora of humans and animals, female genitalia and skin (1).

Although myonecrosis may occur after trauma or spontaneously, *Clostridium perfringens* is most commonly responsible for the traumatic form and *Clostridium cepticum* is responsible for the spontaneous form (2).

Correspondence Address/Yazışma Adresi

Büşra Özyalvaç

Department of Pediatrics,
Division of Pediatric Infectious Diseases,
Selçuk University Faculty of Medicine,
Konya, Türkiye

E-mail: drbusraozyalvac@gmail.com

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Clostridium species are facultative anaerobic bacteria. Infection may develop slowly within weeks or rapidly within hours depending on the oxygen pressure in the tissue and the number of microorganisms (3).

Many exotoxins secreted by *Clostridium* species play an important role in the development of clinical findings. These toxins may cause tissue destruction, necrosis and sometimes systemic findings (4). The typical incubation period for myonecrosis is shorter than 24 hours, but incubation periods ranging from one hour to six weeks have been reported (5). Sudden onset of pain is usually the first sign of myonecrosis. Local swelling and serosanguinous exudate appear immediately after the onset of pain. The skin characteristically turns bronze, then turns blue-black with skin blisters and hemorrhagic bullae. Tissue crepitation may occur following gas production but is sometimes undetectable on palpation due to muscle edema. The wound is odorless or may have a foul odor. Pain and tenderness with palpation disproportionate to the wound appearance are the most common findings (6).

In the diagnosis, it is important to detect gas formation by imaging methods together with clinical findings. In the early period of infection, computed tomography and magnetic resonance imaging are useful to determine whether the infection is localized or spread along the fascial planes. However, it is necessary to produce *Clostridium* in culture for definitive diagnosis (7).

Treatment consists of early surgical debridement, antibiotics and supportive therapies. Traumatic cases should be evaluated for tetanus prophylaxis (8).

In this article, we present a 14-year-old boy who presented with severe pain, swelling, foul odor, black crusting and high fever one day after his leg was sutured and splinted after trauma.

Case

A 14-year-old male patient was admitted to our hospital with complaints of fever, pain and swelling in his leg for two days. It was learned that the patient, who had no previous history of known disease, had fallen on the ground three days ago and was sutured and splinted at the kneecap due to a cut on his leg. On physical examination, body temperature was= 38.5°C, blood pressure= 130/70 mm/Hg, pulse rate= 120/min, respiratory rate= 25/min, oxygen saturation= 98%. Diffuse edema, skin redness, increased temperature and black crusted, bullous, necrotic lesions were found on the right leg (Figure 1). Crepitation was detected under the skin towards the proximal thigh and distal tibia. In admission, laboratory values were as follows: White blood cell count= 12.100 K/uL, neutrophils= 89%, lymphocytes= 5.7%, hemoglobin= 15.6 g/dL, platelet count 237 K/uL. Blood biochemistry was normal. Sedimentation rate was 41 mm/h, C-reactive protein= 343 mg/L,



Figure 1. Necrotic tissue at the wound site.

procalcitonin= 32.9 ug/L. The patient had diffuse pain and crepitation in the right leg and a gas appearance was detected in the knee tomography (Figure 2). During emergency surgical debridement performed by the orthopedics and traumatology department, foul odor, diffuse pus and gaseous appearance in the muscle were detected. Microbiologic investigations (Gram staining, aerobic and anaerobic cultures) were performed. Vacuum-assisted closure was applied to the patient's leg. The open wound was closed with a graft.

The patient was started on fluid support with meropenem empirically for polymicrobial agents and clindamycin for inhibition of toxin synthesis until the culture results were completed. On the third day of hospitalization, hyponatremia (sodium= 123 mEq/L) developed despite appropriate hydration. Inappropriate antidiuretic hormone release syndrome due to severe pain was considered. It improved with fluid restriction. Fever decreased on the eighth day of treatment. On the 11th

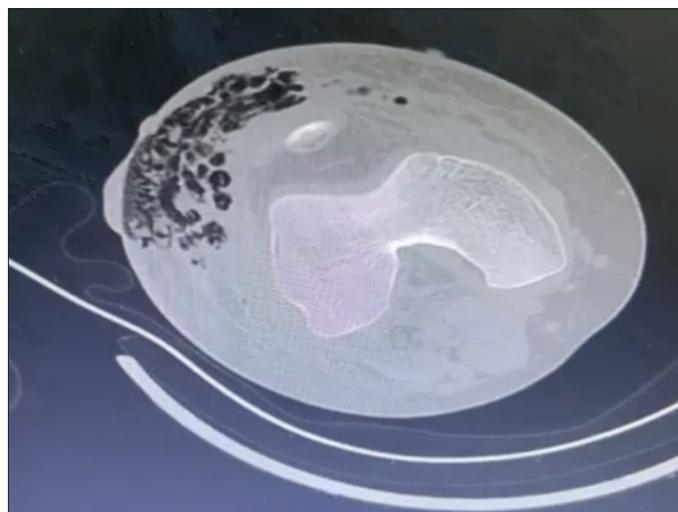


Figure 2. Subcutaneous gas appearance on tomography.

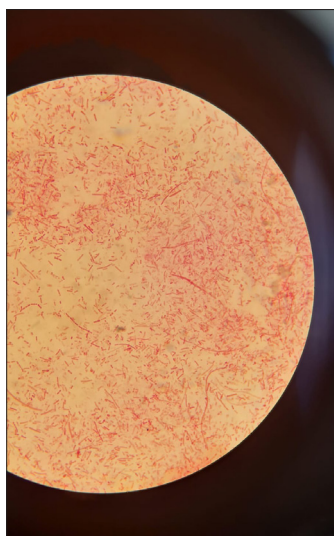


Figure 3. *Clostridium* spp. in tissue culture.



Figure 4. One month after completion of treatment

day of treatment, a diffuse maculopapular rash with a tendency to merge developed on the trunk and extremities, meropenem treatment was discontinued. No growth was detected in blood cultures. *Clostridium* spp. growth was detected on the 13th day of hospitalization in the first tissue culture of the patient who underwent repeated surgical debridement, antibiogram could not be performed (Figure 3).

Oral clindamycin treatment was completed for a total of 30 days. The patient had no sequelae (Figure 4).

Discussion

Necrotizing soft tissue infections are defined as necrotizing cellulitis, necrotizing fasciitis and myonecrosis according to the depth of infection. They are characterized by fulminant

tissue loss, systemic toxicity findings and high mortality (9). Injuries with soil contact are an important risk factor for clostridial infections. Local wound conditions are important in the development of gas gangrene. Degraded or necrotic tissue allows spore germination by providing the necessary enzymes and low oxidation/reduction potential. Studies have shown that foreign bodies, early wound closure and muscle tissue that has lost its vitality facilitate infection (5). The fact that our patient had a soil contact injury, and the wound was closed with a splint created a favorable environment for clostridial infection.

Early diagnosis, complete surgical removal of necrotic tissue and antibiotic treatment that inhibits toxin synthesis are important in preventing mortality and morbidity. Despite this, the mortality rate varies between 30 and 100% and survivors often have to cope with amputations (10). Pediatric cases of traumatic clostridial myonecrosis are rare. In a case report, a five-year-old healthy child developed severe pain at the wound site with fever 12 hours after suturing the incision that developed in the facial region after a sledding accident. *Clostridium* and *Bacillus* spp. grew in the wound culture, and it was reported that the patient recovered with early surgical debridement and antibiotic treatment (11). In another case report, severe pain and edema developed one week later in the arm of a 17-year-old patient who was splinted after a fall and was diagnosed with clostridial myonecrosis. Hyperbaric oxygen therapy was administered to the patient after no clinical response was obtained despite surgery and antibiotic treatment, but it was reported that complete recovery could not be achieved because it could not be continued due to undesirable side effects (12). Our patient was discharged with healing after early debridement and antibiotic treatment and continues her life without sequelae.

Conclusion

Although necrotizing soft tissue infections are not common in the pediatric age group, they are an important disease group due to their morbidity and mortality. Prompt diagnosis and treatment are of vital importance. Clostridial myonecrosis should be considered in the differential diagnosis, especially in open injuries with soil contact and soft tissue infections with severe pain.

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