

Lower Limb Myonecrosis due to *Clostridium Septicum* in a Patient with Acute Myeloid Leukemia

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Purpose and clinical case. This is a clinical case of a 64 year-old patient diagnosed with acute myeloid leukemia (AML) with medullary aplasia who developed infectious soft tissue necrosis (ISTN) of the right thigh in a time-frame of 12 hours. An emergency fasciotomy and radical debridement of the affected limb were carried out and antibiotic treatment with penicillin was initiated. Four hours after surgery the patient died.

Conclusions. The unique nature of this case lies in the fact that on autopsy lower limb myonecrosis was found, caused by contiguity to necrotizing enterocolitis caused by *Clostridium septicum* in an immunodepressed patient, a fact that undoubtedly contributed to the rapid clinical progress of the condition and its end-result, in spite of the treatment applied.

Key words: *myonecrosis, acute myeloid leukemia, Clostridium septicum.*

Mionecrosis de la extremidad inferior por *Clostridium septicum* en paciente con leucemia mieloide aguda

Objetivo y caso clínico. Se expone el caso clínico de un paciente de 64 años de edad diagnosticado de leucemia mieloide aguda (LMA) con aplasia medular que desarrolló un proceso compatible con una infección necrosante de partes blandas (INPB) en el muslo derecho en un plazo de 12 horas. Se realizó de urgencia una fasciotomía y desbridamiento radical de la extremidad afectada y se instauró tratamiento antibiótico con penicilina. A las cuatro horas de la intervención se produjo el fallecimiento del paciente.

Conclusiones. La singularidad del caso presentado reside en el hallazgo en la necropsia de una mionecrosis de la extremidad inferior, producida por contigüidad a partir de una enterocolitis necrosante por *Clostridium septicum* en el contexto de un paciente inmunodeprimido, hecho que sin duda contribuyó al rápido desenlace del cuadro clínico, a pesar del tratamiento realizado.

Palabras clave: *mionecrosis, leucemia mieloide aguda, Clostridium septicum.*

Infectious soft tissue necrosis (ISTN) is an extremely aggressive type of infection¹⁻⁴. This kind of process occasionally appears in patients with a jeopardized immune system, as is the case of leukemic patients with medullary aplasia⁴⁻⁷. This disease can develop from bacteriemia or through

an entry portal^{2,5}, and can be caused by diverse anaerobic germs^{2,8}. Although early diagnosis and radical treatment methods are determining factors in its cure, the process is severely complicated in the case of immunodepressed patients^{2,6,7}.

Depending on the type of etiological agent originating ISTN, we can distinguish clostridial myonecrosis from necrotizing fasciitis³. Clostridial necrotizing infections can appear in the form of localized cellulitis (the weakest form of presentation of this infection in which it is necessary to carry out limited debridement of the lesion); disseminated cellulitis (a more serious form of the disease in which there is rapid evolution on septic shock and disseminated intravascular coagulation) and myonecrosis (which appears

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after a 24-48 hour incubation period and which is the most severe form of presentation of the disease, revealing a necrotizing injury of muscle tissue)³. On the other hand, the necrotizing fasciitis group comprises processes such as the streptococcal anaerobic myonecrosis (clinically similar to clostridial subacute gas gangrene), non-clostridial synergistic anaerobic myonecrosis (also known as synergistic necrotizing cellulitis, which affects skin, subcutaneous tissue, fascia and muscle tissue), infected vascular gangrene (a mixed muscle infection, which develops in muscle groups in areas that are devitalized due to arterial ischemia) and myonecrosis due to hydrophyllic aeromona (a rapidly progressive myonecrosis, which is connected to injuries occurring in water or associated with fish and aquatic animals)³.

From an anatomical point of view, necrotizing fasciitis refers to an ISTN located in the tissues that are between the skin and the superficial fascia, whereas a myonecrosis is, technically speaking, a necrosis of muscle tissue⁹. However, the most frequent presentation is a combination of the two notwithstanding the pathogen that may have caused it⁹.

CASE REPORT

We present a 64-year-old male patient who was diagnosed with acute myeloid leukemia (AML) with medullary aplasia one month before the outburst of the present clinical condition. The patient had entered the Department of Hematology at the Asturias Central University Hospital for chemotherapeutic treatment of his initial disease. Significant data in his clinical case history are chronic bronchitis and sigmoideal diverticulosis.

The clinical condition began with increasingly intense abdominal pain lasting 3 to 4 hours together with diarrhea and a 38 °C temperature. On examination we found a distended abdomen, with diffuse pain on palpation. During the first few hours after the inception of pain, an abdominal ultrasound was performed which rendered an acute non-complicated diverticulitis, due to which the patient was kept under clinical observation in the same hospital unit to which he had originally referred.

Less than 12 hours after the inception of this clinical condition a very intense pain developed on the anterolateral surface of the right thigh, together with significant swelling of the soft tissue, which presented a hard consistence on palpation; there was crepitation of the subcutaneous cell tissue in the area, and complete functional disability of the hip joint and the entire lower right limb. The distal nerve and vessel exploration of the limb did not show significant pathological signs.

We performed an emergency CT scan of the lower right limb which exposed a collection of gas in the vastus later-

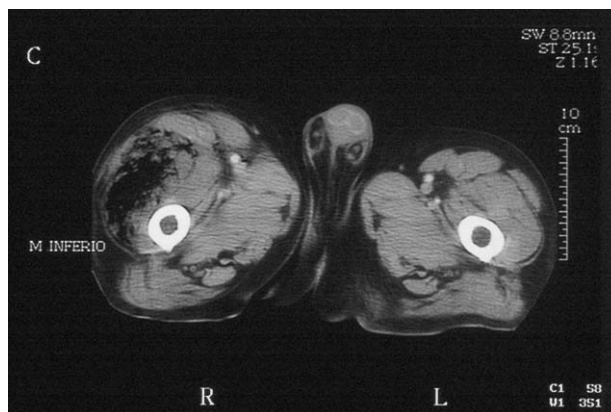


Figure 1. CT scan of lower limbs at groin level. Gas bubbles are observed dissecting the vastus lateralis muscle and producing a proximal curving of the fascia lata.

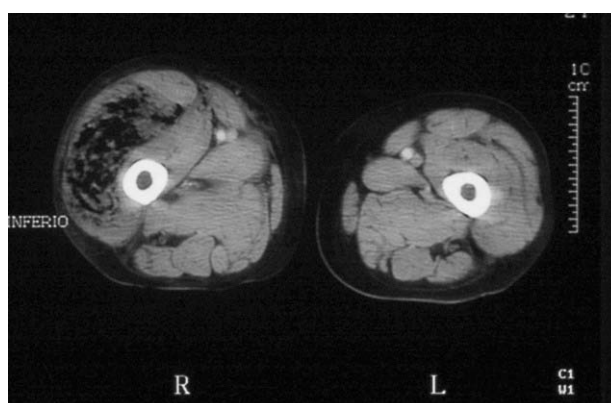


Figure 2. CT scan of lower limbs at the level of the union of the middle and proximal third of the thigh. Gas bubbles are observed dissecting the vastus lateralis muscle and producing a curving of the fascia lata towards the distal end of the thigh.

alis muscle of the right quadriceps which extended to fascial planes with a slight associated inflammation-hence the vastus lateralis myonecrosis diagnosis (figs. 1 and 2).

Emergency surgery was carried out on the patient by performing a large excision on the lateral surface of the thigh and reaching the fascia lata, which was in a state of great tension. An abundant emergence of gas was observed after the opening of the fascia lata, and a devitalized and necrotic muscle tissue which affected most of the vastus lateralis of the femoral quadriceps and the gluteus medius. A swab culture was carried out, and radical debridement of all necrotized tissue was performed, as well as abundant cleansing of the wound with hydrogen peroxide. The excision was left open. Antibiotic treatment with imipenem was initiated. Four hours after the surgical operation the patient expired.

In the necropsy that was subsequently carried out the diagnoses were: AML with medullary aplasia, necrotizing

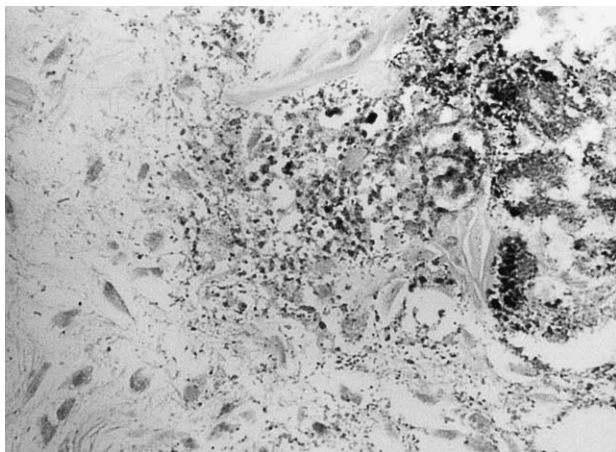


Figure 3. Microscopic image showing masses of germs in hematic bed.

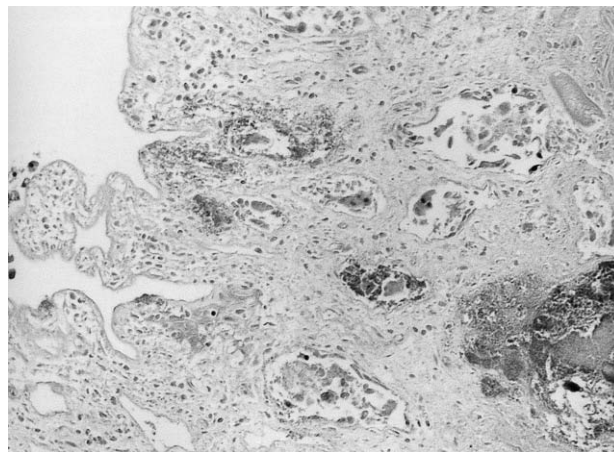


Figure 4. Microscopic image showing interstitial necrosis.

enterocolitis and myonecrosis of the vastus lateralis of the right thigh quadriceps (figs. 3 and 4). The culture of the necrotized muscle tissue was positive for Clostridium septicum.

DISCUSSION

The ISTN is probably the most aggressive kind of infection of the soft tissue in the limbs, having a death rate which, according to the series consulted, can reach 75%^{1,2}. This severe disease is often associated with the presence of conditions that affect the immune system, such as diabetes mellitus⁴, hepatic cirrhosis² and oncological processes, like gastrointestinal tumors, as well as AML with medullary aplasia, which is more frequently present in childhood^{6,8,10}.

The process occasionally develops locally in one of the limbs and is initiated through an entry portal^{2,5}, while at other times –generally at times of marked immunosuppression– it is triggered by bacteriemia which is in turn caused by different types of anaerobic germs^{2,6-8}.

The uniqueness of the case under analysis lies in the fact that, after the onset of bacteriemia due to Clostridium septicum, a necrotizing enterocolitis developed, causing myonecrosis of the limb by contiguity, all of this being infrequent in the consulted literature¹¹.

When bacteriemia is caused by Clostridium—the most common germ is Clostridium perfringens, followed by Clostridium septicum and Clostridium sporogenes⁸.

The differential diagnosis must be carried out with cutaneous cellulitis, profound abscess, compartmental syndrome and profound venous thrombosis¹⁰.

Although the diagnosis is pre-eminently clinical (sudden onset with rapid progression and signs of severity and blood tests revealing signs of hemolysis and rhabdomyolysis),

both the CT scan as well as magnetic resonance imaging (MRI) are extremely helpful to reach a reliable diagnosis^{3,12}. A gram stain test of the wound exudates (for gram positive bacilli) might also be of help³.

It is fundamental to obtain a diagnosis as early as possible so as to be able to apply early and radical treatment based on surgical intervention (fasciotomy and radical debridement of the affected areas); antibiotic treatment, and physical procedure (such as hyperbaric oxygen therapy, if possible)³. However, the severity of the base pathology together with the aggressiveness of the infectious process will make for a very severe prognosis.

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