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CASE REPORT

Pyomyositis of the piriformis muscle

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KEYWORDS
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Sciatica

Abstract
Unfortunately, diagnosis of deep pelvic muscle infections is often delayed since they usually present with non-specific physical signs suggesting other more common diseases. The authors communicate a case of a previously healthy 12-year-old male who practised dancing regularly and suffered acute pain in the lumbar and right gluteal regions irradiated to the posterior side of the thigh for 1 week. He initially received symptomatic treatment with no success. He continued with diarrhea, fever and malaise. When he was admitted to hospital he suffered severe septic shock and multi-organ failure. Pelvis magnetic resonance imaging showed pyomyositis of the piriformis muscle. Multi-sensitive *Staphylococcus aureus* was isolated in blood cultures. Antibacterial treatment and multi-systemic support were administered, resulting in a good outcome.
Pyomyositis of the piriformis muscle is a rare condition that demands a high index of suspicion to make an adequate diagnosis and prompt treatment, including antibacterial treatment and drainage, particularly in case of abscess formation. This treatment should be established promptly since its outcome may be potentially lethal.

PALABRAS CLAVE
Piomiositis;
Piriforme;
Staphylococcus aureus;
Ciática

Piomiositis del músculo piriforme

Resumen
Las infecciones profundas de músculos pélvicos son difíciles de diagnosticar por ocasionar signos físicos inespecíficos que sugieren otras patologías más comunes. Comunicamos el caso de un paciente de 12 años, sexo masculino, sano, con el antecedente de practicar

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danza. Consultó por dolor en región lumbar y glútea derecha, irradiado por cara posterior del muslo, de siete días de evolución. Recibió tratamiento sintomático sin respuesta. Presentó diarrea, fiebre y compromiso del estado general, evolucionando con shock séptico durante su estadía hospitalaria. La resonancia nuclear magnética pélvica fue compatible con piomiositis de músculo piriforme. Se aisló en sangre *Staphylococcus aureus* multisensible. Recibió apoyo multisistémico y tratamiento antibiótico, evolucionando satisfactoriamente.

La piomiositis del músculo piriforme es una entidad poco frecuente, que requiere un elevado índice de sospecha, para un adecuado diagnóstico y tratamiento, siendo la terapia antibiótica y drenaje en caso de abscesos los pilares de éste último. Este tratamiento debe instaurarse en forma precoz, ya que su evolución puede ser potencialmente letal.

Introduction

Pyomyositis was documented by Scriba, initially being described as endemic in tropical climates (*pyomyositis tropicans*).[1] However, more and more cases are being diagnosed in temperate climates, particularly in adult males with associated diseases.

On occasion, deep infections of the pelvic muscles are hard to diagnose as they cause non-specific physical signs that are suggestive of more common conditions, which can delay diagnosis with an ominous outcome for the patient. Imaging studies are key to diagnosing the illness, with nuclear magnetic resonance imaging (nMRI) the technique of choice, as it makes it possible to establish an early diagnosis, aids in the differential diagnosis and in locating abscesses in the event that surgical intervention is required.[2,3]

Pyomyositis of the piriformis muscle is an uncommon condition, an infection very rarely reported in the paediatric age group.

Case report

Twelve-year-old, healthy male patient with a history of dancing daily who consulted due to progressive pain in the lumbar region and right gluteus, radiating along the posterior aspect of the right thigh lasting for seven days, causing severe functional impotence, keeping him from walking. Negative history of trauma. The patient received symptomatic treatment for a diagnosis of sciatica. Two days prior to admission, he presented fever and diarrhoea.

The physical examination at the Emergency Department revealed the following findings: febrile (39°C), examination of the gluteus and right hip did not reveal any alterations, with resistance to passive mobility of the hip and thigh. Negative for evidence of neurological deficit. Vital signs with heart rate of 125 bpm and blood pressure of 104/49 mmHg, 93% saturation. The most salient laboratory findings were: Htc 37%, leucocytes 13.2 x 10^3 mm^3, Platelets 376 x 10^3 mm^3, C reactive protein 145 mg/L (VN: < 5 mg/L). An ultrasound made of the hip failed to show articular compromise. X-ray of the lumbo-sacral spine and pelvis without evidence of bone destruction. The pelvic MRI revealed thickening of the right piriformis muscle, with an abscess of poorly defined thickness, concluding that it was pyomyositis (fig. 1). The infection coursed with severe septic shock, requiring the use of mechanical ventilation, resuscitation fluid therapy (70 mL/kg/12 h), transfusion of haemocomponents, inotropic and vasoactive drugs, and renal replacement therapy. Empirical antibiotic therapy was started with vancomycin (40 mg/kg), cefotaxime (150 mg/kg), and clindamycin (30 mg/kg). Blood cultures were positive for multi-sensitive *Staphylococcus aureus*. At 24 hours, the process coursed with multi-organ dysfunction with respiratory, haemodynamic, hepatic, renal, and haematologic involvement. Creatine-phosphokinase rose to 1,649 U/L. The follow-up axial computerized tomography performed 24 hours later showed no increase in the size of the abscess; percutaneous drainage was not deemed necessary, with gradual normalization of his organ dysfunctions. On day three, the patient presented erythematous exanthema on the upper third of the thorax, compatible with staphylococcal toxic shock syndrome. Extubation was achieved on the fourth day of hospitalization. He evolved satisfactorily; he completed two weeks of endovenous antibiotic therapy and a total of four weeks. The six-month follow-up revealed that he was fully recovered and presented no sequelae.

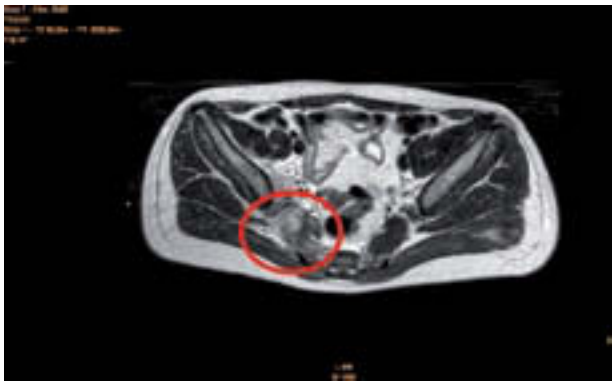

Figure 1 Image from the nuclear magnetic resonance of the pelvic area of a 12-year old patient with pyomyositis of the piriformis muscle due to *Staphylococcus aureus*. The right piriformis muscle (circle) is seen to be enlarged and oedematous.

Discussion

Primary pyomyositis has been defined as a sub-acute infection of skeletal muscle that is usually caused by transitory bacteriaemias, with the agents most commonly isolated being *S. aureus* (70% to 95%) and *Streptococcus* spp. It generally involves the quadriceps (26%), iliopsoas (14%), and gluteus (11%) muscles.[4,5]

Pathogenesis of primary pyomyositis has not been clearly elucidated, although it is well known that the muscle is intrinsically resistant to infection unless it presents prior alterations. Studies conducted in animal models by Christin and Sarosi[6] proved that the injection of sub-lethal doses of *S. aureus* does not give rise to pyomyositis unless the muscles have suffered prior trauma in the form of punctures, electric shock, or ischaemia. This has been confirmed in other studies in which less than 1% of patients who died as a result of staphylococcal sepsis have been seen to have muscle abscesses.

A major role has been attributed to microtrauma in the muscle and hyperaemia subsequent to inflammation, where bacteriaemia is sown. An example of what has previously been indicated is observed in patients who regularly practise sports or recreational activities; thus, pyomyositis of the piriformis muscle has been reported in an adolescent swimmer[7] and in a14-year-old rugby player.[8] This same aetiopathological mechanism can be considered in our patient given his recreational dancing activity.

Other predisposing factors have been pointed out, including vitamin C deficiency, beriberi, and infections caused by viruses, parasites, or spiroketes. Myositis in HIV patients and anti-retroviral therapy has also been associated with an increased risk of infection.[5]

Chiedozi divided the evolution of pyomyositis into three stages: The "initial or invasive stage": Diffuse muscle pain of insidious onset, with or without fever and anorexia, with no local signs of inflammation. "Second or purulent stage": This stage occurs between 10 and 21 days after the onset of symptoms and is characterized by the formation of muscle abscesses associated with fever and poor health status in general. Local inflammatory signs appear, although they tend to be minimal. Most patients seek help at this stage of disease. The "third stage": Generalized infection. Patients suffer significant pain, local signs of infection, and systemic manifestations of sepsis, that require emergency intervention.[9]

Pyomyositis of the piriformis muscle typically follows a sub-acute course, with the usual clinical manifestations of fever, coxalgia, and limping. Moreover, in the few cases published in the literature, the vast majority have presented significant sciatic pain, as did the patient whose case we have reported here. This occurs because the inflammation of the piriformis muscle displaces the sciatic nerve anteriorly, being compressed between the piriformis and the superior geminus muscle. In addition, cytokines released by the infected tissue can irritate the nerve directly.

Early diagnosis is needed in order to prevent the progression of this clinical syndrome; unfortunately, in most cases, diagnosis is delayed, since its clinical manifestations are non-specific, leading to misdiagnoses and prolonged hospitalizations. The diagnoses to be considered include septic arthritis of the hip, osteomyelitis, abscess of the psoas, appendicitis, epidural abscess, stenosis of the lumbar spine, herniated disc, Legg-Calve-Perthes disease, among others.

As in other infectious processes, leucocytosis and increased erythrocyte sedimentation rate and C reactive protein are seen. Serum muscle enzyme levels are usually normal. Blood cultures tend to be negative in the early stages; however, in later stages, they are positive in up to 16-38%.[4] The presence of eosinophilia is often seen in tropical areas, in all likelihood secondary to parasitic infection; hence, this situation is not to be expected in a different epidemiological context.

Given that the deep muscles of the pelvis are not accessible to direct physical examination, the definitive diagnosis is based on imaging studies consisting of: X-ray, ultrasound of the hip, axial computerized tomography, and nuclear magnetic resonance imaging, with nMRI the diagnostic examination technique of choice. During the early stage, diffuse thickening of the piriformis muscle is usually seen associated with increased intensity in T2-weighted images.[4] In addition to the precise anatomical extension, the nMRI enables us to verify the eventual presence of abscesses, osteomyelitis, or articular involvement.

Another aspect to be highlighted in this case report, in addition to the unusual location of the pyomyositis, is the discordance between the severity of the systemic situation and the lesion found on the nMRI. This can be explained if we understand sepsis as a dynamic process that involves complex interaction between the pathogenic micro-organism and the host, with special emphasis on the host's predisposing genetic factors. Furthermore, in this case, we cannot rule out an eventual role of the delay in diagnosis in the multi-organ dysfunctions observed.

Treatment will depend on stage of illness. In the early stages, intravenous antibiotic therapy usually suffices. Antibiotics providing good coverage against *S. aureus* should be used empirically. During the second and third stages, treatment consists in percutaneous or surgical drainage of the abscesses in combination with broad spectrum antibiotics; moreover, on occasion it may be necessary to decompress the sciatic nerve by releasing the tendon of the piriformis muscle. Treatment duration has not been clearly established and varies depending on the severity of the disease, amount or extension of the abscesses, and on the patient's immunological status. Treatment is generally necessary for a total of 3 to 6 weeks,[10] with a minimum of two weeks of intravenous administration.

This condition usually resolves completely and without sequelae if the treatment applied is appropriate. Otherwise, relapses occur, along with the involvement of multiple organs, with mortality rates of close to 4%.[5]

Level of evidence

Case report. Level of evidence V.

References

1. Scriba J. Beitrag zur Aetiologie der Myositis acuta. Dtsch Z Chir. 1885;22:497-502.

2. Baleato S, Vilanova J, García R, Álvarez A, Alonso A, Ares M. Papel de la resonancia magnética en el diagnóstico precoz de la piomiositis en niños. Radiología. 2008;50:495-501.
3. González Morán G, García Durán C, Albiñana J. Imaging on pelvic piomiositis in children related to pathogenesis. J Child Orthop. 2009;3:479-84.
4. Bickels J, Ben-Sira I, Kessler A, Wientroub S. Primary Pyomyositis. J Bone Joint Surg Am. 2002;84-A:2277- 86.
5. Crum NF. Bacterial pyomyositis in the United States. Am J Med. 2004;117:420-8.
6. Christin L, Sarosi G. Pyomyositis in North America: case reports and review. Clin Infect Dis. 1992;15:668- 77.
7. Chusid MJ, Hill WC, Bevan JA, Sty JR. Proteus pyomyositis of the piriformis muscle in a swimmer. Clin Infect Dis. 1998;26: 194- 5.
8. Dick J. Unlikely cause for a painful hip in a 14-year-old boy ANZ J. Surg. 2004;74:1125- 9.
9. Chiedozi LC. Pyomyositis. Review of 205 cases in 112 patients. Am J Surg. 1979;137:255- 9.
10. Llorente Otones L, Vázquez Román S, Iñigo Martín G, Rojo Conejo P, González Tomé M. Piomiositis en los niños: no sólo una enfermedad tropical. An Pediatr (Barc). 2007;67: 578-81.