

CASE REPORTS

Severe back pain in an adolescent - what to suspect?

Dor lombo-sagrada grave num adolescente – o que suspeitar?

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ABSTRACT

We present a case involving an adolescent who visited our emergency department with a two-day history of debilitating lower back pain affecting daily activities. The pain's intensity and presence of fever raised concerns, prompting a bone scintigraphy that led to an osteomyelitis diagnosis. Timely identification of osteomyelitis is crucial due to its potential life-threatening nature. *Staphylococcus aureus* infection, prevalent in skin and deep tissue infections, is the most common etiology across all age groups. Swift diagnosis and treatment play a pivotal role in achieving positive outcomes.

Keywords: adolescent; back pain; osteomyelitis

RESUMO

Apresentamos um caso de um adolescente que recorreu ao serviço de urgência, com um quadro clínico de dor na região lombo-sagrada com dois dias de evolução, que interferia com as atividades de vida diária. A intensidade da dor e o quadro febril de novo motivou a realização de uma cintigrafia óssea, que permitiu o diagnóstico de osteomielite. É crucial o diagnóstico atempado dada a gravidade do quadro. A etiologia mais frequente e transversal a todas as faixas etárias é a infeção por *Staphylococcus aureus*. O diagnóstico e tratamento atempados permitem um bom prognóstico.

Palavras-chave: adolescentes; dor; osteomielite

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INTRODUCTION

Back pain constitutes a frequent complaint encountered in both emergency department and outpatient settings.^(1,2)

When addressing such cases, clinicians must meticulously characterize the pain in terms of its location, descriptive attributes, radiation pattern, duration of evolution, association with trauma, impact on physical activity, specific positions exacerbating or alleviating it, and precipitating or relieving factors. Identifying alarm signs, such as the presence of fever, hindrance to physical activity, or disruption of social and academic functions, is imperative, prompting thorough investigations into potentially serious underlying causes.⁽³⁾

This case underscores the importance of being aware of the alarm signs and the necessity for a comprehensive clinical and physical assessment. There are several possible serious underlying causes, such as osteomyelitis.⁽⁴⁾ While *Staphylococcus aureus* remains the predominant causative agent across all age groups, a meticulous history-taking enables the exclusion of other potential causative agents, common during adolescence, including those associated with sexually transmitted diseases. Rarely, the causative agent may be isolated in blood cultures, warranting empiric antibiotic treatment. Timely administration of antibiotics is crucial to a favorable outcome.⁽⁴⁾

CASE PRESENTATION

A caucasian male adolescent, previously diagnosed with facial acne and recent impetigo in some acne lesions, sought medical attention at our hospital due to a two-day history of severe lower back pain, unresponsive to analgesics.

The pain, disrupting his sleep and impacting school attendance, was present while sitting, lying down, and particularly when standing, complicating the act of walking. He wasn't taking any medications, had no known allergies, and no prior history of trauma, recent infections, fever, or involvement of other joints, skin, or ocular structures.

On examination he was normotensive but presented with marked

discomfort and diaphoresis. Palpation of the right paravertebral lumbosacral region exacerbated pain. Despite preserving global and segmental strength and sensitivity, right side Lasègue sign and FABER test were positive. Laboratory results demonstrated a slightly elevated leukocyte count (13,200 cells/uL), erythrocyte sedimentation rate (ESR) of 20 mm/1st hour, and C-reactive protein (CRP) levels of 2.9 mg/dL. Radiographs of the spine and iliac region exhibited no abnormalities. A subsequent spine and iliac region CT scan revealed a small L4-L5 hernia, but its contribution to the overall presentation was deemed insufficient.

Given the severity of symptoms and the presence of alarm signs, the patient was admitted for monitoring in our pediatric department. On the first day of hospital stay, fever intensified, pain escalated, and blood work indicated a rising CRP (7 mg/dL), with procalcitonin levels now suggestive of localized infection (0,1 ng/mL). Two blood cultures were obtained. Suspecting bone or joint infection and considering the contraindication of magnetic resonance imaging due to dental orthosis, a bone scintigraphy was performed, revealing a probable infection localized at the right iliac region (**figure 1**). As he denied having sexual activity without protection and considering *Staphylococcus aureus* as the most prevalent agent causing osteomyelitis, he was empirically treated with endovenous flucloxacillin (200 mg/Kg/daily). On the second day, blood *phenoTest Accelerate* confirmed *Staphylococcus aureus methicillin-sensitive* (MSSA) as the causative agent, later corroborated by the blood culture results. Apirexia ensued within 36 hours of antibiotic initiation, with analgesic discontinuation by the seventh hospital day. Inflammatory parameters, including CRP, peaked on the fifth day, reaching a maximum 20 mg/dL, thereafter gradually declining. ESR showed a progressive increase until the sixth day, peaking at 30 mm/1st hour, while the leukocyte count remained stable. Substantial CRP reduction to 30% of its higher value occurred on the eighth day. After clinical and laboratorial improvement, the patient was discharged on the ninth day, continuing oral flucloxacillin for a total of four weeks. The decision of four weeks treatment duration was discussed alongside with orthopedics team, given the favorable response to endovenous flucloxacillin, the identification of the causative agent in blood cultures and the lack of clinical complications.

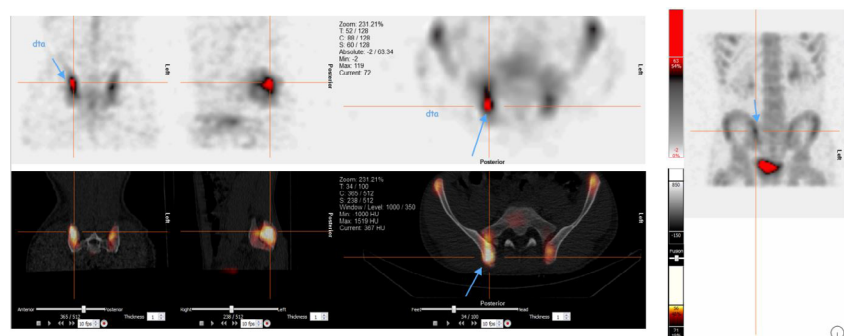


Figure 1 - Intense uptake of the radiotracer within the right iliac bone tissue, indicative of inflammatory processes associated with infection.

After a series of orthopedic consultations spanning twelve months, the patient reported no more pain, and was able to resume normal activities.

DISCUSSION

Back pain in children and adolescents is a prevalent concern, often attributed to non-specific muscle strain.⁽⁵⁾ However, the presence of red flags during a comprehensive history and physical examination mandates a thorough investigation for potential serious underlying conditions such as bone fracture, malignancy, or infection. In the presented case, the adolescent's severe lower back pain, coupled with disrupted sleep and impact on school attendance, prompted a detailed examination.^(2,3,5) Among the potential causes of back pain with associated red flags, osteomyelitis emerged as a significant consideration in this case. The recent impetigo lesion a week prior to the onset of symptoms added a plausible link to the development of osteomyelitis. The isolation of *Staphylococcus aureus* through bacterial PCR in a blood sample, subsequently confirmed by rarely positive blood cultures, underscored the challenges in diagnosing this condition. The patient's swift presentation at the emergency department aligns with the pattern commonly observed in high-income settings.⁽⁴⁾ The utilization of diagnostic tools such as radiographs, CT scan, and bone scintigraphy played a crucial role in localizing the infection to the right iliac region, as magnetic resonance imaging was contraindicated due to dental orthosis. Empirical treatment with endovenous flucloxacillin, based on the prevalent causative agent *S. aureus*, proved effective, as indicated by the rapid resolution of symptoms and the confirmation of *Staphylococcus aureus* methicillin-sensitive (MSSA) through blood *phenoTest Accelerate* and subsequent blood cultures.⁽⁴⁾

The presented case highlights an acute event, reducing the likelihood of a diagnosis like discitis, which typically exhibits a more gradual onset, especially in the context of recent infection without accompanying systemic signs or symptoms. The absence of a history involving recent trauma or repetitive traumatic events diminishes the probability of lumbar or sacral hernia, vertebral fracture, or spondylolysis, given the acute nature of the presentation. Additionally, the lack of pain irradiation or its variation in different positions makes these diagnoses less plausible. Notably, nocturnal pain that awakens the patient serves as an alert for potential infections or tumors. However, the absence of weight loss and night sweats, coupled with the acute setting, diminishes the likelihood of malignancy.^(3,5,6)

Comparatively to osteomyelitis, septic arthritis typically presents acutely and has a bimodal distribution in early childhood and adolescence, being more prevalent in children under five years old. Additionally, inflammatory signs are usually concentrated around the joint, with a positive FABER test, and pain during passive joint mobilization, thus contrasting with the broader manifestations of

osteomyelitis. In both conditions, systemic signs and symptoms tend to coexist with localized pain and the gold standard for differential diagnosis between both is magnetic resonance imaging.^(3,4) However, in cases where this is not feasible, as in the presented scenario, bone scintigraphy stands as a viable alternative for diagnostic clarification.^(4,7)

Our patient presented some features associated common to arthritis of the sacroiliac joint, present in various positions, but no irritation to the posterior side of the leg. Also, the bone scintigraphy revealed alterations specifically around the iliac bone, making the diagnosis of osteomyelitis of the iliac bone more likely.⁽⁷⁾

Performing a bone radiograph is important for an initial evaluation, to exclude diagnosis other than osteomyelitis and to have a baseline to compare to possible alterations during the disease course. We didn't perform other bone radiograph during the hospital stay given the favorable evolution without complications.⁽⁶⁾

Given the favorable outcome and no apparent complications, no subsequent CT scan was performed.

Antibiotic treatment is tailored to the most likely cause, considering the patient's age, clinical presentation, and the resistance profile prevalent in the patient's local community. Irrespective of age, *S. aureus* remains the most common pathogen linked to osteomyelitis, particularly in cases with a personal history of skin infections, aligning with the scenario presented.⁽⁷⁾ Regarding the inflammatory parameters and their response to treatment, ESR can continue to rise during the initial treatment days, requiring up to three to four weeks to normalize while CRP levels may elevate in the early days of illness but tend to normalize within a week of treatment, as exemplified in the current case.⁽⁴⁾

Transitioning from intravenous to oral antibiotics necessitates the patient's sustained afebrile state for at least 48 hours, following 24 hours of clinical improvement, along with a consistent reduction in CRP values, reaching 30 to 50% of the maximum recorded value. The recommended minimum duration of antibiotic treatment typically ranges from three to four weeks. However, longer therapy may be warranted, considering factors such as age, the causative agent, and the specific nature of bone involvement.^(4,8)

In the presented case, the adolescent underwent a comprehensive four-week course of treatment with flucloxacillin and subsequent radiographs of the spine and iliac region, at the end of treatment, showed no abnormalities. Subsequently, he diligently maintained regular follow-up appointments at the orthopedic clinic throughout the year following the onset of the infection.^(4,8) Remarkably, these consultations revealed a complete recovery without any residual limitations.

This case underscores the necessity of considering uncommon etiologies, such as osteomyelitis, in adolescents presenting with back pain and red flags. Timely recognition, comprehensive diagnostic assessments, and targeted management contribute to favorable outcomes, emphasizing the importance of a nuanced approach in pediatric orthopedic care.⁽⁴⁾

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