Clinical research of chronic osteomyelitis in proximal region of the left clavicle in 8-year-old female student: case report

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Abstract

The osteomyelitis is a bone infection characterized by the progressive destruction of the cortical bone and cavity spinal cord caused by pathogenic microorganisms. The infectious agent varies taking into consideration factors such as age, means of infection, condition of the patient, and form of contact. Currently, about 85% of cases of osteomyelitis affect patients younger than 17 years and its incidence is almost three times higher among minors under, the age of 3 years, and the male population the most affected. This bone infection can be classified as acute, subacute or chronic. The present work has as objective to present a case of chronic osteomyelitis in school of 8 years, with a focus on clinical research and on the diagnostic importance. The clinical research associated with the completion and analysis of the complementary tests allowed the diagnostic of chronic osteomyelitis, being conducted treatment with antibiotic venous, and outpatient follow-up with specialists, favouring a good prognosis of the patient.

Keywords: Osteomyelitis, Clavicle, Infection.
INTRODUCTION

Bone infection is called osteomyelitis, meaning involvement of the medullary canal, cancellous and cortical bone. As described by Hebert and Sizinio, 1988, osteomyelitis is classified as acute hematogenous, chronic osteomyelitis, posttraumatic osteomyelitis and postoperative osteomyelitis. In acute hematogenous osteomyelitis, the contamination happens through the blood, due to the previous existence of distant infectious foci: dental, respiratory, skin, injuries and abrasions are the most common forms in children and adolescents. Chronic Osteomyelitis occurs when the therapeutic approach to acute osteomyelitis is delayed, or in the absence of treatment, leading to the chronification of the infectious process in acute osteomyelitis. Chronic osteomyelitis is described as a severe and persistent inflammation of bone tissue. It is the result of increased intramedullary pressure that generates a periosteal dislocation, causing vascular thrombosis, bone necrosis and sequestration, which occur when a granulated tissue circumcises the necrotic bone, showing an inflammatory exudate that is the main feature of the disease. The incidence ranges from 1: 1000 to 1: 20,000, and most cases occur in children under five years of age. It affects boys more than girls, in the ratio of 3:1. The infectious agent varies according to factors such as age, means of infection, condition of the patient and form of contact. In the pediatric population, the most common causative agent is Staphylococcus aureus, in 92% of cases. Enterobacteriaceae, Streptococcus Group A and B, H. Influenza and Pseudomonas constitute etiological agents. Thus, both clinical history and complementary examinations are indispensable for the patient’s investigative and diagnostic process. The aim of this paper is to present the clinical investigation of chronic osteomyelitis and the diagnostic importance of clinical data and complementary exams.

CASE REPORT

An 8-year-old female student came to the pediatric emergency room at the Marcilio Dias Naval Hospital (HNMD) brought by her parent on January 16, 2018, complaining of pain in the proximal region of the left clavicle, beginning two weeks ago, in addition to unquantified weight loss during this period. She had no history of local trauma or previous skin infections. Her father had had a bone tumor in his left knee at 20 years of age, with no history of recurrence after surgical exeresis. Upon examination, she was in good general condition, only with swelling and pain on palpation in the proximal region of the left clavicle. No other changes seen on clinical examination. The patient was admitted to the ward for investigation and diagnostic elucidation. Upon admission, she had evidence of inflammatory activity (ESR and CRP) and normal blood count, negative serology for TORCH, EBV, hepatitis and anti-HIV; normal LDH, non-reactive PPD and negative blood culture. Her chest X-ray showed a sclerotic image (bone with increased density) in the proximal region of the left clavicle, without other changes.

Neck ultrasonography (USG) performed during hospitalization showed a heterogeneous image of partially defined limits, located near the medial face of the left clavicle, with apparent cortical bone discontinuity, with increased regional vascularization in the color Doppler study, a bone lesion with soft tissue involvement. Total abdomen US showed no changes. During evolution we ordered new laboratory tests, such as serum complement (C3, C4 and CH50); Beta HCG; Beta 2 microglobulin; alpha fetus protein; 25-hydroxyvitD; and autoantibodies (FAN, Anti-Ro, anti-LKM-1 liver and kidney, anti-smooth muscle antibody) and protein electrophoresis; all without changes vis-à-vis their reference values. On 01/23/2018, we performed contrasted CT scans of the chest, abdomen and pelvis. Abdominal and pelvic CT scans showed no changes, but upon chest CT, we found morphostructural changes in the proximal third of the left clavicle, with a permeated lesion in this metaphysis, with significant periosteal reaction, and cortical rupture, as well as the presence of insufflation (associated with the biopsy performed on the spot on 01/21/2018) [Figures 1 and 2]. Magnetic Resonance imaging (MRI) performed on the same date, corroborated the CT results.

Other imaging exams were performed during the investigation, with greater attention given to Bone Scintigraphy, which showed intense diffuse radiopharmaceutical overcapacity with central low uptake in the left clavicle projection; no changes in growth cartilage projections (Figure 3).

The biopsy showed a morphological picture favoring chronic osteomyelitis, with exuberant periosteal reaction and absence of malignancy. Bone culture was not performed. We started treatment with daptomycin for 8 weeks under the guidance of the Hospital Infection Control Center with...
Figure 2. CT Chest: cortical bone preserved in the middle third of the clavicle and hyperinflation

significant clinical improvement after treatment onset. She continued on outpatient follow-up with rheumatologist, infectious pediatrician and orthopedist.

COMMENTS

Inflammatory bone lesions can be detected on plain radiographs, presenting as radiolucent, osteolytic or sclerotic lesions, depending on the stage of the disease. However, in the early stages, radiographs may remain normal. Plain radiography is widely used for its availability, low cost and differential diagnosis with other pathologies. However, it has low specificity for osteomyelitis in patients with previous bone changes. According to Hebert and Xavier (1998) ultrasound is valid because it shows the existence or not of extra-bony liquid and purulent collections, serving as a differential diagnosis mainly in septic arthritis. Whole body imaging techniques, including magnetic resonance imaging and Tc-99m-labeled methylene bone scintigraphy, have become widely available and represent valuable new diagnostic tools.

Computed tomography is of relevant importance in cases of suspected infectious focus on the pelvis or spine, for which it is the test of choice, and it helps identify the location for cases requiring biopsy.

Scintigraphy methods assist in the diagnosis of osteomyelitis by allowing the detection of functional changes present in this infectious process. Bone scintigraphy with technetium-99m-labeled diphosphonates (Tc-99m) shows increased bone remodeling in the infected area and it is highly sensitive, even at an early stage, making it the method of choice in diagnosing acute osteomyelitis in patients without previous bone disease and with radiologically normal bone image. However, the increase in diphosphonate remodeling and high high uptake occurs in several pathologies, which is an unspecific finding. In these cases, bone scintigraphy is often complemented by gallium-67 scintigraphy, an inflammatory marker whose uptake could confirm osteomyelitis. However, the gallium-67 concentration is partially dependent on osteometabolic activity and occurs in bone remodeling sites, even in the absence of infection, reducing its specificity.

In addition to imaging, laboratory tests are of paramount importance for the diagnosis; they identify the offending germ, determine disease activity of and assist in the clinical treatment. The authors corroborate the performance of laboratory tests. According to the searched literature, blood culture is positive in 50% of cases. Acute-phase inflammatory response tests measuring C-reactive protein and erythrocyte sedimentation rate (ESR) may be useful in complementing the diagnosis, in differential diagnosis and in monitoring disease progression. ESR, although not specific, in cases of infection increases after 48-72 hours and returns to normal after two to four weeks of infection resolution. The C-reactive protein (CRP), present in responses to trauma or infection, usually rises after 6 hours of the process and remains high until its resolution. CBC usually shows leukocytosis with characteristics of acute infection; left shift in the early stages after the first week; Low hematocrit and hemoglobin after the second week or in very intense and highly virulent infections. Direct bone puncture/aspiration or surgical biopsy should be performed in those patients whose blood culture is negative. In chronic osteomyelitis, bone biopsy and deep aspiration are the preferred diagnostic procedures.

Regarding the treatment of chronic osteomyelitis, the authors are emphatic regarding the use of parenteral antibiotic therapy, but there are controversies regarding the duration of medication use. Osteomyelitis must be distinguished from numerous disorders, depending on the bone involved and the clinical situation. The main...
differential diagnosis is neoplasms, which may also present pain accompanied by inflammatory signs, in addition to some trauma episodes\(^8,9\). Among the differential diagnoses, we can describe primary bone tumors representing about 10% of malignant neoplasms that affect children and adolescents. However, among adolescents and young adults, they come in third place, after leukemia and lymphomas. Among these tumors, two varieties stand out for representing more than 95% of cases: osteosarcoma and Ewing's sarcoma. Osteosarcoma is the most common, accounting for about 60% of the cases; while Ewing's sarcoma is the most common under ten years of age\(^9,10,11\). In the present report, laboratory tests, blood culture and imaging exams were nonspecific, requiring bone biopsy for diagnostic elucidation and, consequently, initiation of appropriate treatment.

**FINAL REMARKS**

Clinical research is a branch of medical science that determines the safety and effectiveness of diagnostic and therapeutic plans. The diagnosis of chronic osteomyelitis in activity or overlapping with other pathologies is difficult, as is the concept of cure itself. Laboratory and imaging tests are consensus among the authors as to: the diagnostic approach, treatment follow-up and disease remission. The total time of antibiotic therapy is a matter of discussion among the authors, but according to the researched literature, they describe treatment periods between three to eight weeks. The present study demonstrated that the clinical history associated with the performance and analysis of adequate complementary tests enabled the diagnosis of chronic osteomyelitis, promoting the specific treatment for the disease, which favored the good prognosis for the patient.

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