

Short Research Communication

Leishmania Infection of a Knee Megaprosthesis

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Abstract

This article presents a 19-year old patient with a distal femoral osteosarcoma treated with limb salvage and distal femoral megaprosthesis reconstruction complicated postoperatively by bone leishmaniasis. Bone biopsy was done; bone tissue was sent for cultures and histology. Cultures were negative. Histological sections showed Leishman - Donovan bodies within histiocytes confirming the diagnosis of leishmania infection of the distal femoral megaprosthesis. The patient was administered amphotericin B for a total of 10 days and gradually became afebrile. Two months after treatment the patient was readmitted with high fever, pancytopenia, liver and spleen enlargement, and chest pain. Radiographs of the chest showed lobar pneumonia and pleural effusion; thoracentesis showed Mycobacterium avium intracellulare lung infection. Despite multi-regimen antibiotic therapy and chemotherapy, disease progressed and the patient died 19 months after osteosarcoma resection and distal femoral megaprosthesis reconstruction from cancer-related complications.

Key words: Leishmaniasis; Knee megaprosthesis.

Introduction

The most common complications of limb salvage surgery and megaprosthesis reconstruction are mechanical failure, infection and local recurrence [1,2]. Deep infection represents a real threat, often leading to amputation. While the most common pathogens are Staphylococcus and Streptococcus species [3,4], in immunocompromised patients' atypical microorganisms and opportunistic infections may arise. To the best of our knowledge, leishmania infection of a megaprosthesis has not been previously reported. This article presents a 19-year old patient with a distal femoral osteosarcoma treated with limb salvage and distal femoral megaprosthesis reconstruction complicated postoperatively by bone leishmaniasis. The purpose is to increase the awareness of the treating physicians for the possibility of atypical infections in tumor patients.

Case report

A 19-year-old man was referred for a stage IV left distal femoral osteosarcoma. The patient responded favorably to neo-adjuvant chemotherapy with tumor shrinkage and disappearance of pulmonary nodules, and underwent distal femoral resection and megaprosthesis reconstruction. Histological examination of the tumor specimen showed >90% tumor necrosis; the surgical margins were microscopically negative. Adjuvant chemotherapy was administered. Four months postoperatively, the patient presented with fever up to 39°C and a painful left knee joint. Clinical examination showed swelling and reduction of range of motion of the left knee megaprosthesis; the spleen was enlarged. The overlying skin was normal without evidence of skin sores. Routine laboratory examination showed pancytopenia. Wide spectrum

antibiotics were administered; however, the patient did not respond to treatment.

Radiographs of the left knee were normal. With the assumption of local recurrence of the sarcoma or infection of the megaprosthesis, a technetium-99m methyl diphosphonate bone scan and a sulesomab-monoclonal antibody leukoscan were performed; both studies showed increased uptake at the lateral tibial condyle (Figures 1 and 2). Needle biopsy of the tibial condyle (Figure 3) and bone marrow aspiration of the iliac crest (Figure 4) was done. Bone tissue was sent for cultures and histology. Cultures were negative. Histological sections were stained with hematoxylin and eosin, and examined with light microscopy. Leishman - Donovan bodies were found within histiocytes confirming the diagnosis of leishmania infection of the distal femoral megaprosthesis.

The patient was administered amphotericin B for a total of 10 days and gradually became afebrile. One month after diagnosis and treatment of the leishmania infection, the patient was asymptomatic; repeat iliac crest bone marrow aspiration was negative. However, two months later the patient was readmitted with high fever, pancytopenia, liver and spleen enlargement, and chest pain; the left knee megaprosthesis joint was painless. Radiographs of the chest showed lobar pneumonia and pleural effusion; thoracentesis yielded 200 ml of purulent exudates, which were positive for *Mycobacterium avium intracellulare*. Anti-tuberculosis antibiotics, liposomal amphotericin B and a third generation cephalosporin were administered, with gradual resolution of patient's symptoms. However, initial response to neoadjuvant chemotherapy was temporary; 19 months after osteosarcoma resection and distal femoral megaprosthesis reconstruction, the patient

experienced osteosarcoma lung metastases and died from cancer-related complications.

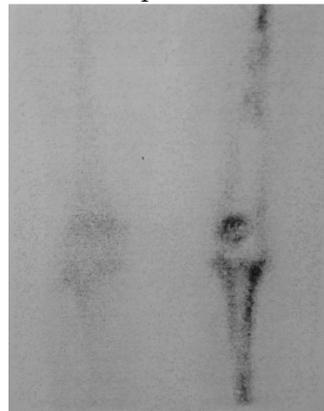


Figure 1. 99m-technetium bone scan shows increased uptake at the lateral tibial condyle.

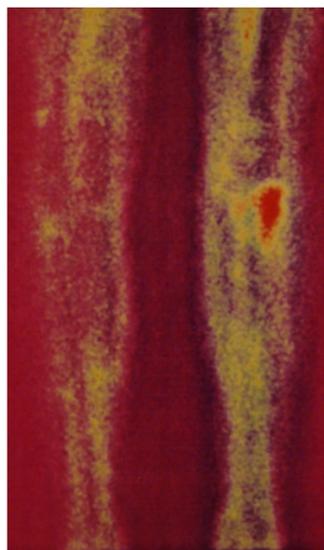


Figure 2. Sulesomab-monoclonal antibody leukoscan shows increased uptake at the lateral tibial condyle.

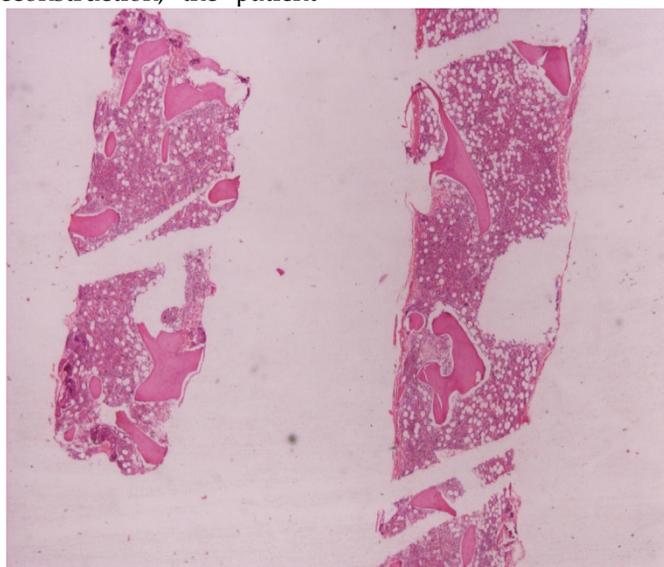


Figure 3. Fine needle biopsy of bone tissue from the tibial condyle shows Leishman - Donovan bodies within histiocytes.

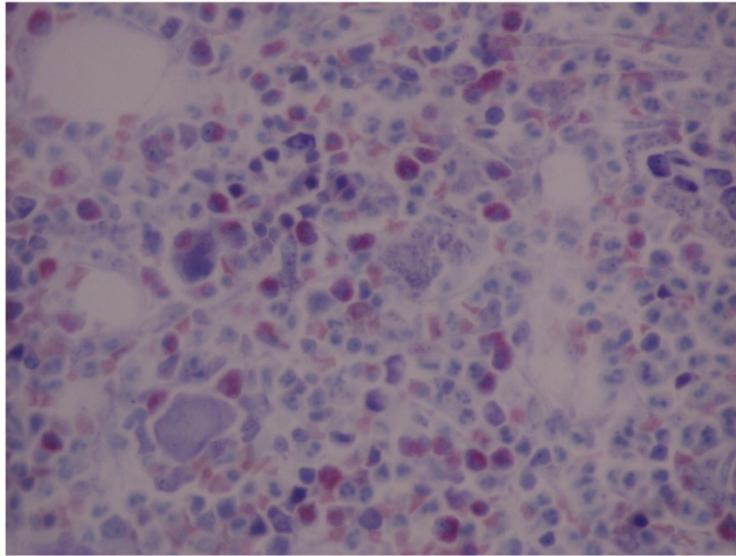


Figure 4. Bone marrow aspiration Leishman – Donovan bodies within histiocytes.

Discussion

Loosening and infection are common complications of megaprosthesis reconstruction in musculoskeletal sarcoma patients [1,2,5]. Megaprosthesis infection usually requires implant revision and ultimately may lead to amputation. The rate of megaprosthesis infection ranges from 2.2% (6) to 20% [7]. The most common bacterial isolates are Staphylococci or Streptococci species [3,4]. Chemotherapy and cancer itself promotes immunosuppression and myelosuppression, and may predispose to atypical opportunistic infections, as leishmaniasis in the present patient. Technetium bone scan in conjunction with leukoscan are highly sensitive for the diagnosis of bone infection [8]; biopsy and cultures documented the leishmania donovani isolates.

To the best of our knowledge, leishmania infection of a prosthetic reconstruction has not been previously described. There is only another case of an 11-year-old patient with a vertebral osteosarcoma and metastatic lung disease who experienced visceral leishmaniasis postoperatively after completion of a chemotherapy regimen [9]. Leishmaniasis is a disease caused by protozoan parasites that belong to the genus *Leishmania* and is transmitted by the bite of certain species of sand fly (subfamily Phlebotominae), as was probably the case in the present patient. *Leishmania donovani* are intracellular parasites that are phagocytized by macrophages causing massive hyperplasia of the reticuloendothelial cells that are heavily parasitized. The spleen is grossly enlarged and the bone marrow heavily infiltrated. Clinical presentation is characterized by body weight loss,

splenomegaly, pancytopenia and high mortality mostly secondary to concurrent infections such as pneumonia, pulmonary tuberculosis and cacrum oris. The incubation period of leishmanial infection varies from weeks to some months or even years. Cutaneous leishmaniasis occurs within weeks to some months. The incubation period of mucocutaneous leishmaniasis ranges from 1 to 3 months, while the incubation period of visceral leishmaniasis ranges usually 3-6 months, but can be many months or years, and may depend on the patient's age and immune status as well as the species of *Leishmania* [1-10]. *Leishmania* infection can remain subclinical or become symptomatic with an acute, subacute or chronic pattern depending on patient's immune status. Currently, visceral leishmaniasis has become an important opportunistic infection among HIV positive patients. Diagnosis is based on isolation of the protozoan parasites on stained slides or in cultures of a tissue aspirate or biopsy specimen from spleen, liver, bone marrow or lymph node. Lipid formulations of amphotericin B is the current treatment of choice with FDA approval for leishmaniasis [10].

In conclusion, immunosuppression caused by chemotherapy and cancer itself may predispose to rare opportunistic infections such as leishmaniasis. Physicians should be aware of this rare complication in sarcoma patients with atypical clinical symptoms and findings.

Competing Interests

The authors have declared that no competing interest exists.

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