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Hematogenous *Staphylococcus aureus* vertebral osteomyelitis and invasive Amebiasis occurred in a human immunodeficiency virus-infected patient

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Abstract

Hematogenous vertebral osteomyelitis is a severe disease entity and may be diagnosed late in the disease course. The risk factors of the disease include persistent bacteremia, community-acquired bacteremia and injection drug user. Although timely treatment is life-saving, high mortality and disability rates were noted. Disability complication including paraplegia will occur if diagnosis and treatment were delayed. Amebic colitis and liver abscess can be seen sporadically in the group of men have sex with men in developed countries. Prompt diagnosis is needed to prevent intestine perforation in the advanced disease course. Although hematogenous vertebral osteomyelitis and invasive amebiasis are not correlated directly, it may happen concurrently in a human immunodeficiency virus (HIV)-infected patient. We present a patient here and emphasize the importance of thorough survey and prompt treatment in a HIV-infected patient.

Key Words: hematogenous vertebral osteomyelitis; invasive Amebiasis; Staphylococcus aureus; HIV

Introduction

Hematogenous vertebral osteomyelitis is a severe disease entity and becoming a growing concern due to its high mortality rate. *Staphylococcus aureus* is the major causative pathogen[1,2]. Persistent bacteremia, community-acquired bacteremia and injection drug user (IDU) are the risk factors of the disease[3]. Invasive amebiasis usually occurred at low-income and poor hygiene countries. In developed countries, men have sex with men account for the most infections[4]. Reviewing the medical literatures, hematogenous vertebral osteomyelitis and invasive Amebiasis co-infection was hardly to be found. Here, we report a case of hematogenous *Staphylococcus aureus* vertebral osteomyelitis and invasive Amebiasis in a HIV-infected patient.

Case report

A 52 year-old man with lymphoma, HIV infection and IDU history was admitted due to fever.

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After admission, methicillin susceptible *Staphylococcus aureus* (MSSA) bacteremia was diagnosed. No soft tissue infection, no intravascular catheter was noted. Physical examination revealed no heart murmur and no spine area knocking pain. Echocardiogram was arranged and no vegetation was found. Abdominal computed tomography (CT) revealed degenerative joint and spondylosis. After finishing 2 weeks antibiotics treatment, he was discharged under stable condition and arranged outpatient department follow-up for continual antiretroviral therapy. Twenty days after discharge, he was sent back to emergency department due to left leg weakness and back pain. No fever was found. Lumbar spine X-ray revealed loss of endplate definition of L2-L3 (Fig.1) and CT revealed suspicious L1-L2 spine osteomyelitis with phlegmon. Empirical vancomycin was used after admission. L-spine Magnetic resonance imaging (MRI) with contrast media was arranged. Blood culture yielded MSSA again and MRI confirmed the osteomyelitis of spine (Fig. 2). The muscle strength of left lower leg was trace. The patient cannot move the left lower leg actively. The neurology and neurosurgery doctors were consulted for evaluation. Steroid was added for reducing local swelling, and neurosurgery operation was scheduled for spinal cord decompression. Meanwhile, massive watery diarrhea was noted after admission. Medication for diarrhea didn't work. Stool routine test and stool culture didn't reveal any associated pathogen. Colonoscopy was arranged and empirical antibiotics were continually used. The colonoscopy revealed diffuse ulcer of the colon, and biopsy of the ulcer lesion was done (Fig. 3). Several days later, the pathology report revealed trophozoites of ameba (Fig. 4). The amebic colitis was diagnosed. The serum antibody of ameba was positive too. The antibiotic was adjusted to metronidazole

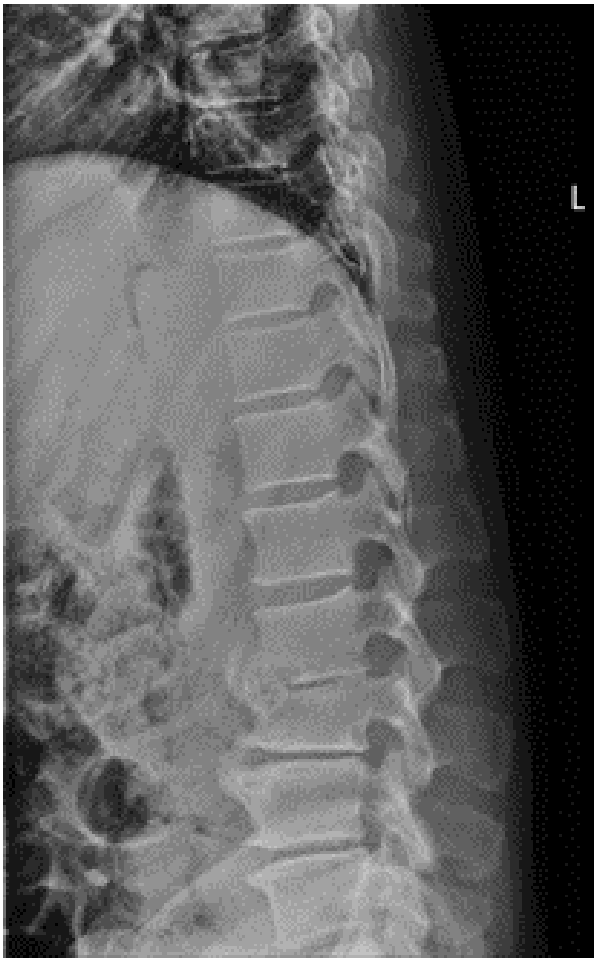

Figure 1. X-ray revealed blurred and distorted endplate line at the level of L2-L3 lumbar spine.

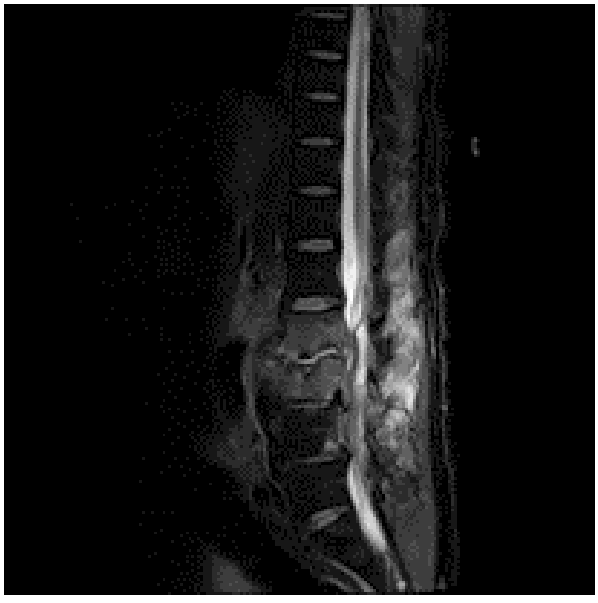

Figure 2. Magnetic resonance imaging of lumbar spine revealed hyper-intensity signal on T2-weighted image of L2-L3 lumbar spine and nearby soft tissue.

for *Entameba histolytica* treatment. Abdominal sonography also revealed two small liver abscesses. Laminectomy operation was scheduled when severe diarrhea ceased. The diarrhea improved after metronidazole use, and metronidazole was discontinued after ten days. Paromomycin was prescribed for continual luminal eradiation of *Entameba histolytica*, 30mg/kg paromomycin divided to three times a day for 7 days totally. During the treatment course, oxacillin was used for 4 weeks combined with fosfomycin, then oral switch to sulfamethoxazole/trimethoprim and rifampin for continual therapy. The blood culture turned sterile. The white blood cell count and C-reactive protein level returned to normal limit before discharge. Antiretroviral medicine was continually used during hospitalization. The viral load of HIV was undetectable and CD4 count was 403/μL during hospitalization. After 37 days of admission, he was discharged. When discharge, the left lower leg weakness persisted and he was bound to wheelchair. At outpatient department (OPD), oral antibiotics were given for 3 months, and discontinued when the erythrocyte sedimentation rate (ESR) level returned to normal limit. Now, he is still followed up at OPD and continues antiretroviral therapy. No recurrence was found.

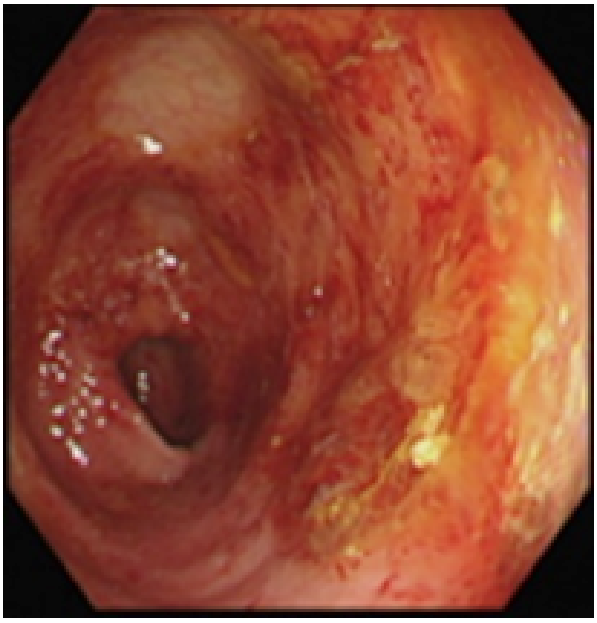

Figure 3. Colonoscopy revealed diffuse hyperemia with ulceration from cecum to rectum

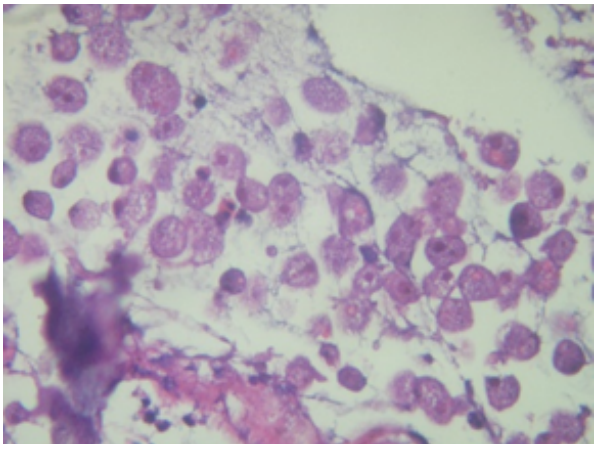

Figure 4. Amebic trophozoites characterized by round oval cells, pink vacuolated cytoplasm and small round nuclei (HE stain, 400X).

Discussion

Vertebral osteomyelitis (VO) is a severe disease entity. It may derived by contiguous infection, caused by trauma, operation, or hematogenous spreading. *Staphylococcus aureus* is the leading causative pathogen of vertebral osteomyelitis[1,2,5,6]. Among the patients with *Staphylococcus aureus* bacteremia, 4-8% of the patients developed hematogenous vertebral osteomyelitis (HVOM)[3,7]. The risk factors of HVOM are persistent bacteremia, IDU, community-acquired *Staphylococcus aureus* bacteremia[3], and tobacco use[7]. The present patient was investigated during first admission. No vegetation was found by echocardiogram. Abdominal CT didn't reveal any intra-abdominal abscess or spine lesion. No prosthesis or intravascular devices in the body. But 20 days after finishing first bacteremia treatment, MSSA bacteremia recurred and HVOM was diagnosed. Because the patient was an IDU, persistent bacteremia and IDU both contributed the HVOM outcome. The treatment duration for HVOM is not well established. The IDSA guideline recommends for 6 weeks[8]. In the real world, the treatment duration may be longer. In a retrospective study conducted at a tertiary hospital of central Taiwan, the

mean duration of total antibiotics treatment reached 104.7 days[6]. The overall prognosis of HVOM is not good. Talha et al report 3-month mortality of *Staphylococcus aureus* vertebral osteomyelitis was 18.6%, the mortality rate was higher in patients with medical treatment alone than medical plus surgical treatment, 26.8% V.S. 14.8% (p=0.132)[7]. One-year cumulative mortality rate of vertebral osteomyelitis was 11.3%, and one-year cumulative relapse rate was 11.8%[2]. 5-year follow up for patients of vertebral osteomyelitis, muscle weakness or paralysis was 14.4%[2]. Kinamon et al reported the one-year mortality rate of *Staphylococcus aureus* HVOM is 22%. Of the surviving patients, 29.6% had recurrence of either HVOM or *Staphylococcus aureus* bacteremia[3]. The risk factors for adverse outcome were muscle weakness or paralysis, longer time to diagnosis and hospital acquisition[2].

So, alertness and early diagnosis for the patient is the gold standard for better outcome.

Amebiasis is the second lethal disease of parasites, just next to malaria[9]. Amebic colitis and amebic liver abscess were the main disease entities of amebiasis, but concurrent colitis and liver abscess occurred variably. Concurrent colitis and liver abscess was only one out of fifty-one in one series[10], but 37.3% in another series[11]. Amebiasis sometimes can be seen in HIV-infected patient, transmitted via oral-anal sexual behavior. Hung et al report the prevalence of invasive amebiasis was 5.2% of 951 HIV-infected persons in a retrospective case review[12]. The prevalence of invasive amebiasis among the newly diagnosed people living with HIV (PLWH) increased from 1.3% in 2012 to 3.3% in 2018 in a study from Taiwan[13]. When be infected, only a minority of all *E. histolytica* infections progress to development of clinical symptoms in the host[14]. Of symptomatic persons, if not discovered and treated early, the severe complication of intestine perforation may follow. The diagnosis may be made by cyst or trophozoite found in stool sample, in biopsied intestine tissue, or polymerase chain reaction (PCR) method. In one retrospective series for amebiasis, only 30% of the patient were stool positive by microscopic detection for amebiasis[10]. So, aggressive colonoscopy biopsy and serum amebic antibody are needed for differential diagnosis. Polymerase chain reaction (PCR) can be used to differentiate *Entameba histolytica* from *Entameba dispar* and *Entameba moshkovskii*. The treatment response is good when prompt treatment was given. Metronidazole for 10 days was advised for amebic liver abscess. Luminal agent paromomycin or iodoquinol was needed for pathogen eradication in intestine.

The co-infection of hematogenous vertebral osteomyelitis and invasive amebiasis was seldom reported even though in HIV-infected patients. In the present patient, invasive amebiasis was diagnosed late and the diarrhea persisted for several days.

The decompression operation was interfered and delayed by the uncontrolled diarrhea. So, timely diagnosis and treatment will be helpful in such a complicated patient. Amebiasis must always be in the differential diagnosis list of HIV-infected patient with diarrhea.

Conclusion

Hematogenous vertebral osteomyelitis is a rare but severe disease entity. We must keep vigilant for patients with previous *Staphylococcus aureus* bacteremia, especially in IDU patients. Blood culture test must be followed until it becomes sterile, and spine examination must be included in every *Staphylococcus aureus* bacteremia patient for early detection of this complication. Thorough survey is needed for HIV-infected patient to not miss any possible pathogen.

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血行性金黃色葡萄球菌脊椎骨骨髓炎合併侵襲性阿米巴原蟲感染發生在一位人類免疫缺乏病毒感染的病人身上

陳宗家[1] 黃麗菁[2]

部立台中醫院 [1]感染科 [2]病理科

摘要

血行性脊椎骨骨髓炎是一種少見的疾病，只有發生在少數的菌血症病人身上，最常見的菌種是金黃色葡萄球菌。致病的危險因子是持續性的菌血症，社區型感染還有注射藥物毒癮者。侵襲性阿米巴原蟲感染常見於開發中國家衛生條件較差的情況下，在已開發國家則常見於人類免疫缺乏病毒感染者身上。回顧歷史文件，血行性脊椎骨骨髓炎和侵襲性阿米巴原蟲同時感染幾乎未曾被報告過，在此我們報告一個罕見且治療成功的病例。