

A case of pyomyositis due to *Mycobacterium tuberculosis*

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Pyomyositis is a primary bacterial infection of the skeletal muscles. Although infection can affect any skeletal muscle, the large muscle groups such as the quadriceps or gluteal muscles are most often the focus of this disease, and most commonly the inflammation is focal, involving a single muscle. The mechanism of pyomyositis is poorly understood. The local mechanical trauma at the time of an incidental bacteremia is frequently postulated as a mechanism that could explain the high incidence of the disease in tropical areas and its male preponderance. *Staphylococcus aureus* is the most common organism responsible for pyomyositis. *Mycobacterium tuberculosis* primarily affects the lungs, and the prevalence of active pulmonary tuberculosis co-existing with musculoskeletal tuberculosis has been about 30 percent. We report here on a case of an otherwise healthy 17-month-old girl, who had tuberculous pyomyositis at the upper arm after the hepatitis A vaccination with no evidence of any coexistent active tuberculosis. (Korean J Pediatr 2006;49:1116-1119)

Key Words : Pyomyositis, *Mycobacterium tuberculosis*

Introduction

Pyomyositis is a primary bacterial infection of the skeletal muscle. It is endemic in the tropics and has been referred to as tropical pyomyositis. Although it is relatively uncommon in the temperate climate, the disease has been more and more often diagnosed in immunocompromised patients, including patients with the human immunodeficiency virus (HIV)^{1, 2)}. The mechanism of pyomyositis is poorly understood. Local mechanical trauma at the time of an incidental bacteremia is frequently postulated as a mechanism that could explain the high incidence of the disease in tropical areas and its male preponderance. Pyomyositis is most often caused by *Staphylococcus aureus*. We report here on a case with an atypical and rare presentation of tuberculous pyomyositis, without bone involvement, in a pediatric patient.

Case report

A 17-month-old girl presented with a painful erythematous swelling on the distal part of the left upper arm. She had no previous significant medical problems in her history. She had been vaccinated in accordance with the Korean routine schedule, including being given *Mycobacterium bovis* bacillus Calmette-Guérin (BCG), Tokyo 172 strain, in the left upper arm when she was 1-month-old, and she had received a hepatitis A virus vaccination (Havrix[®], GSK) in the left deltoid muscle 2 weeks before the onset of symptoms. There was no family history of tuberculosis.

For 15 days prior to visiting our hospital, the patient had been treated with second generation cephalosporine at a private clinic, but the swelling had not resolved. On the examination, she was afebrile, well nourished and did not show any respiratory symptoms. The only clinical finding was an erythematous, poorly defined, tender swelling that measured 3 by 4 cm over the left deltoid region. No regional lymphadenopathy was found. The laboratory findings showed leukocytosis (WBC 22,880/ μ L) and a mild elevation of C-reactive protein (0.56 mg/dL). The radiograph of the chest showed normal findings. The ultrasonography showed

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an echogenic fluid collection (1.5×3×3 cm) in the deep subcutaneous and muscular layer on the posterolateral aspect of the left upper arm. Antibiotic therapy with ceftriaxone (50 mg/kg, iv. twice daily) was administered for the presumed diagnosis of bacterial cellulitis and pyomyositis, but no improvement was noted.

On the 8th day after the antibiotic therapy, the abscess was drained and the pus was examined for conventional microbial culture. The soft tissue biopsy from the left arm revealed acute inflammatory cells and necrotic debris. Ultrasonography on the 12th day after the antibiotic therapy showed an improvement of the lesion, and the patient was given oral antibiotics (cefdinir for 7 days). The lesion failed to completely resolve for 2 months of follow-up, and then drainage and biopsy were performed again. The biopsy showed chronic granulomatous inflammation with necrosis. Ziehl-Neelsen stain was negative for acid-fast microorganisms, but the AFB-MTB PCR for *Mycobacterium tuberculosis* complex was positive. Skin testing with purified protein derivative tuberculin was positive at 20 mm. On the immunoassay study, the immunoglobulin levels and the lymphocyte subsets were normal. A diagnosis of tuberculous pyomyositis was made, and the patient was given isoniazid (10 mg/kg), rifampin (15 mg/kg) and pyrazinamide (20 mg/kg). The lesion improved markedly approximately 1 month after the treatment. The patient was treated for 6 months, with a daily anti-tuberculous regimen (isoniazid and rifampin for 6 months and pyrazinamide for 2 months) and she remained in good health during the 1st year of follow-up.

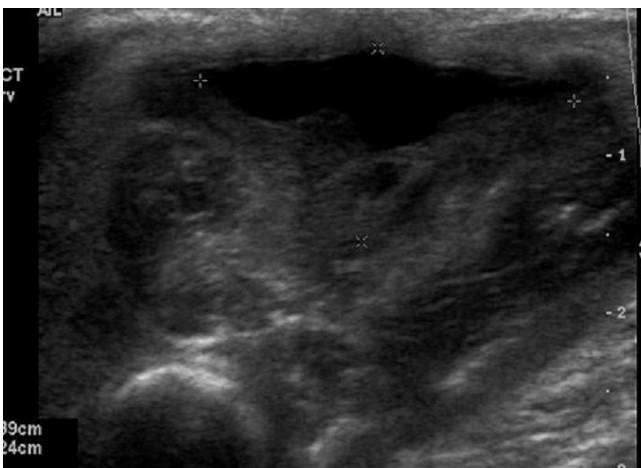


Fig. 1. Ultrasonography shows echogenic fluid collection in deep subcutaneous & muscular layer.

Discussion

Pyomyositis is a subacute, deep bacterial infection of the skeletal muscle. Pyomyositis usually affects the lower extremities, mainly the buttocks and thighs, and most commonly it is a focal lesion involving a single muscle^{3, 4}. The mechanism of pyomyositis is poorly understood⁵. Local mechanical trauma at the time of an incidental bacteremia is frequently postulated as a mechanism that could explain its high incidence in tropical areas and also the male preponderance. Underlying conditions, such as immunodeficiency or chronic illness like diabetes mellitus or malnutrition may predispose a person to pyomyositis. *Staphylo-*

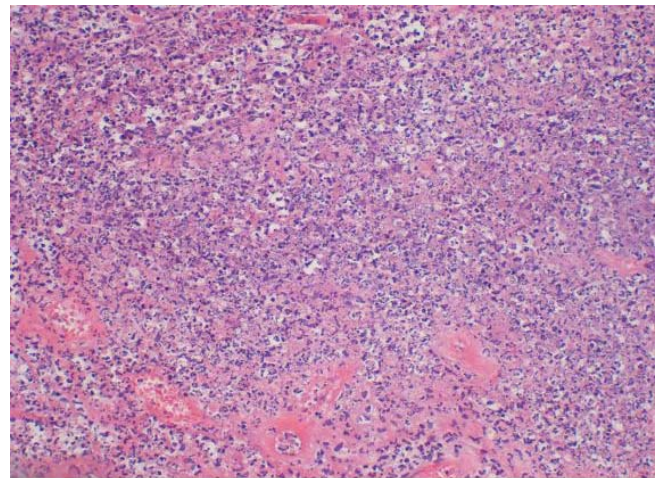


Fig. 2. Microscopic finding showing acute inflammation and necrotic debris (H & E, ×100).

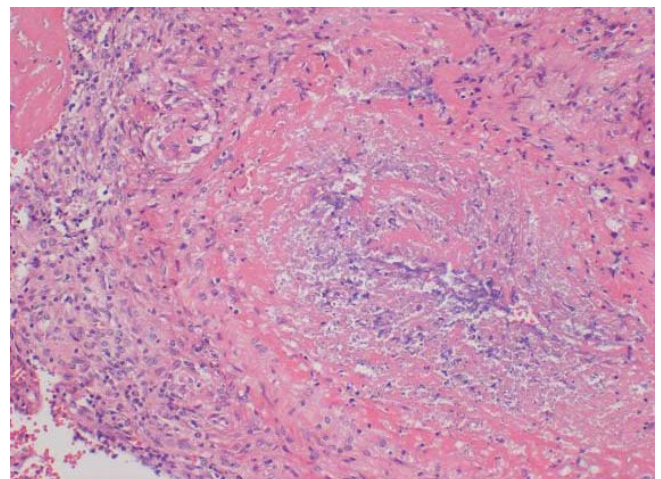


Fig. 3. Microscopic finding showing chronic granulomatous inflammation with necrosis (H & E, ×100).

coccus aureus causes 90% of the cases, and the remaining 10% are caused by *Streptococcus pyogenes*, *Streptococcus viridans*, *Mycobacterium tuberculosis*, *Nocardia asteroides* and *Cryptococcus neoformans*^{6,7}. *Mycobacterium tuberculosis* primarily affects the lungs and the prevalence of active pulmonary tuberculosis co-existing with musculo-skeletal tuberculosis has been found to be about 30%³. In our patient, there was no evidence of involvement of the lungs or any other organ by tuberculosis. BCG is a live attenuated strain of *M. bovis* that was first used for immunization against tuberculosis in 1921, and it has been considered safe. After the BCG vaccination, localized abscesses, regional lymphadenopathy and disseminated disease in immunocompromised hosts are the uncommon, but well-recognized complications⁸. Abscesses at the region of the BCG vaccination have been reported in healthy hosts^{9,10}. This case is not assumed to be related with the BCG vaccination because the abscess of the BCG complication is usually noted within several months after the BCG vaccination.

Sporadic reports have appeared in literature indicating that primary tuberculosis in muscle can be transmitted by syringes. Heycock and Noble reported 4 cases when a nurse, who had pulmonary tuberculosis, had given injections to babies and 4 babies developed a primary gluteal abscess¹¹. Debré et al also report on a case in which the syringe was contaminated with tubercle bacilli when a pediatric patient with a tuberculous abscess was given an injection of penicillin, and the same syringe was used for other patients¹². During the era of the previously cited reports, needles and syringes were often repeatedly used after being sterilized and nurses were not annually screened for tuberculosis. It is difficult to assume that the infection in the arm of our patient was syringe-transmitted, considering that all needles and syringes are now disposable. Tuberculosis of the striated muscle is rare, and only a few cases of tuberculous myositis have been reported in Korea. Kim et al reported two cases of tuberculous myositis in children¹³. The age at diagnosis were 6 months and 16 years. Sohn et al reported tuberculous pyomyositis after transplantation in adult¹⁴.

The natural history of pyomyositis has been divided into three stages by various authors⁵. The initial, invasive stage, during which the organism enters the muscle, is characterized by an insidious onset of dull, cramping pain, with or without fever and anorexia. The symptoms include

localized edema, sometimes described as indurated or woody, but usually with little or no tenderness; this stage lasts from 10 to 21 days. The second purulent or suppurative stage, during which time most patients present, is when a deep collection of pus has developed in the muscle. The muscle is usually but not always tender, with fever and chills being commonly noted. The overlying skin may be normal or show mild erythema. The third or late stage of generalized infection is characterized by exquisite tenderness of the site, which is red and fluctuant. The patient has a high fever and can occasionally be in a septic shock.

The diagnosis of pyomyositis can be difficult. Laboratory tests are generally nonspecific and they are of a limited value. Imaging studies are of paramount importance in the diagnosis of pyomyositis. Ultrasound, computerized tomography (CT) and magnetic resonance imaging (MRI) are the most frequently used techniques in such cases.

The mainstay of the treatment is usually a surgical operation, although surgery may sometimes be avoided if antibiotic therapy is employed early on.

In summary, we report here on a case of a healthy pediatric patient with tuberculous pyomyositis at the upper arm after a hepatitis A vaccination. As there was no evidence of coexistent active tuberculosis, the pathogenesis of this tuberculous pyomyositis is still not clear. However, this case of infection is assumed to have originated incidentally at the hepatitis A vaccination site, rather than being a syringe-transmitted injection or that it was associated with the BCG vaccination.

한글 요약

17개월 여아에서 발견된 근육내 결핵 1례

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화농근육염은 골격근의 원발성 세균 감염으로, 주로 대퇴사두근이나 둔근에 발생한다. 화농근육염의 병리기전은 잘 알려져 있지 않으나 국소부위의 외상과 동반된 균혈증에 의한 것으로 설명되며, *Staphylococcus aureus*가 가장 흔한 원인균이다.

*Mycobacterium tuberculosis*은 폐결핵을 일으키는 경우가 가장 흔하며, 활동성 폐결핵과 근골격계 결핵이 동반되는 경우는 약 30%이다. 근육내 결핵은 폐결핵을 일으키는 *Mycobacterium tuberculosis*가 근육 내로 침입하여 발병하는 것으로, 폐외 결핵 중 비교적 드문 형태이다. 저자들은 17개월 여아에서 다른 부위의 결핵을 동반하지 않은 근육내 결핵 1례를 경험하였기에 문헌

고찰과 함께 보고하는 바이다.

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