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Case Report

Clin Infect Immun. 2018;3(3-4):83-86

Pyomyositis After Hepatitis B Vaccine in a Two Months Old Child

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Abstract

Pyomyositis is a rare pyogenic infection of striated skeletal muscle in childhood. We present a pediatric case where a child was admitted with swelling and erythema in the leg after hepatitis B vaccine, diagnosed with pyomyositis as a result of clinic, laboratory and radiologic examination and treated with appropriate antibiotherapy. By presenting this case we aim to highlight that although pyomyositis is rare in tropical regions, it should be considered for patients admitted with swelling at the vaccine site, and we want to share some rare radiologic findings in non-tropical regions.

Keywords: Pyomyositis; Child; Hepatitis B vaccine

Introduction

Pyomyositis (PM) is a rare childhood bacterial infection of the skeletal system and it may have a life-threatening course. PM is an intramuscular acute deep bacterial infection that occurs with the hematogenous spread of the microorganism in the skeletal muscle or with the direct spread of the infection; and its clinical manifestation is often accompanied by abscess formation [1]. While *Staphylococcus aureus* is the most frequent agent in all age groups, *Streptococcus spp*., *Pseudomonas spp.* and other gram-negative bacteria are the other agents, and fungi were also reported as factors in individuals with immune deficiency [1].

Mild side effects are common after vaccination in childhood. The most frequent ones are fever, rash, pain and erythema in the vaccine site and recovery is achieved within a few days by applying proper treatment [2]. Complication rate after intramuscular injection varies and is reported to be between 0.4-19.3% in the literature [3]. In addition to mild side effects, rare life-threatening and serious side effects (e.g. intramuscular abscess formation) can be seen as well [3].

Pathology like hematoma, cellulite, osteomyelitis, muscular strain, deep vein thrombosis, soft tissue sarcoma, septic arthritis are among the differential diagnosis of PM. Due to its rarity and non-specific clinical characteristics, it can be diagnosed late and the treatment lasts longer accordingly.

This case report aims to present the findings of magnetic resonance imaging (MRI) and ultrasonography (USG) in a child with PM and the clinic and radiologic response to the treatment.

Case Report

A previously healthy 2 months old girl was admitted with swelling and erythema in the right leg, erythema in the body and fever. The patient had no trauma history at birth or afterwards and she had routine hepatitis B vaccine 20 days before the admission. The patient body temperature was 38 °C, heart rate was 98 beats/min, subcutaneous oxygen saturation was 99% and normal blood pressure. In physical examination there was an apparent swelling, erythema, sensitivity in the right thigh and mobility restriction in the lower right extremity. There was maculopapular rash around the whole body, being more apparent in the thigh and lower abdomen, with sporadic peeling off. In the complete blood cell count, white blood cells (WBC) count was $30.3 \times 10^3/\mu L$, (turbidimetric) serum C-reactive protein (CRP) value was 5.98 mg/dL and all other fundamental hemogram and biochemical values (urea, creatinine, serum electrolytes, transaminase levels, urine microscopy) were within the normal ranges. The patient was hospitalized.

Patient's X-ray radiography showed edematous appearance in the soft tissue along the right thigh; however, there was no apparent destruction in the femur (Fig. 1). Patient's USG examination showed thickened skin along the lateral section of the right thigh, increased echogenicity in the subcutaneous adipose tissue due to edema and widespread heterogeneous increased echogenicity in muscle planes and the appearance was evaluated as consistent with inflammation (Fig. 2). The right thigh MRI examination showed apparent thickness and heterogeneous signal increase on the T2-weighted images, hypointense signal on the T1- weighted images in the m. vastus lateralis, m. vastus intermedius and m. vastus medialis, After gadolinium intense contrast uptake in the muscle planes defined in the T1-weighted post-contrast series, a rim-shaped en-

Manuscript submitted September 16, 2018, accepted October 3, 2018

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doi: https://doi.org/10.14740/cii69

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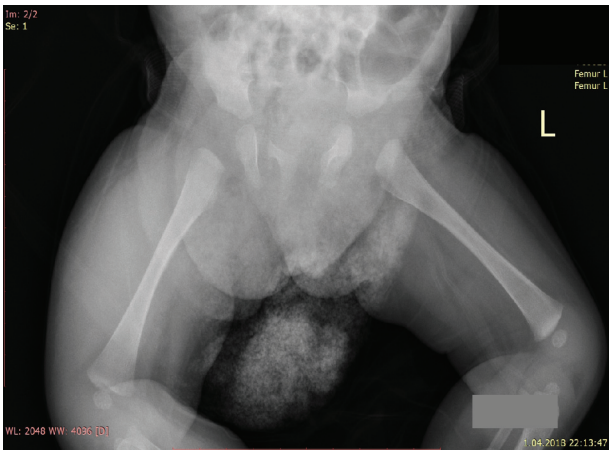


Figure 1. X-ray radiography showed edematous appearance in the soft tissue along the right thigh; however, there was no apparent destruction in the femur.

hancement around the three focal abscesses was shown; and the largest one was 1.3 cm (Fig. 3). No pathologic appearance was detected in femur cortex, or medullar signal in all series.

IV ampicillin-sulbactam and clindamycin were administered to the patient. During the follow-up, WBC and CRP values of the patient responded to the treatment, fever decreased and infection was taken under control radiologically. There was no growth in the blood culture and the IV treatment of the patient was completed in 14 days. The general condition of the patient was good, and she was discharged without any sequel.

Discussion

Pyomyositis, the pyogenic infection of the skeletal muscle without any trauma or vascular disorder, is a rare disease in children that may have a serious course. Pyomyositis has an increased prevalence in men and children of 5 - 9 ages [4].

Although the etiology of pyomyositis is not completely known, microorganisms reach the muscle either by hematogenous route or direct spread [1]. The disease is classified as tropical or non-tropical according to the region and as primary or secondary depending on the presence of an underlying disease. The disease is more common in tropical regions and therefore it was called tropical pyomyositis for many years. However, non-tropical pyomyositis was defined later on as similar cases were diagnosed in countries with mild climate [5]. Factors such as immunodeficiency, diabetes mellitus, chronic renal failure, chronic alcoholism, malignancies as well as malnutrition and the use of immunosuppressive drugs may pose a risk in the development of the symptoms; and the disease is called secondary PM in the presence of such underlying pathogen, and as primary PM in the absence of facilitating factors [5, 6]. Among the diseases that should be considered in the differential diagnosis, there are osteomyelitis, septic arthritis, thrombophlebitis, cellulitis, muscle hematoma, contusion, rheumatologic diseases and soft tissue sarcomas [7]. Our patient was in the childhood age group and had hepatitis B vaccine 20 days before, and there was no other underlying disease. After vaccination, hemorrhage, nerve damage, intravenous injection of the agent, tissue necrosis, abscess and cicatrix formation can be seen [8].

The clinical course of PM has three stages. The invasive phase, which causes local swelling, mild pain, fever and anorexia is the first stage, occurring during the first 2 - 3 weeks of infection and is difficult to diagnose at this stage. Later on, the suppurative phase with high fever, trembling, local tenderness, swelling and myalgia findings and abscess is seen. In the third stage, there is a rather severe clinical course that can reach up to toxic shock syndrome [5]. Our patient applied to our hospital during the second phase of the disease.

Laboratory findings are nonspecific and not helpful in differential diagnosis. Leukocytosis is a frequently expected finding. Our patient had leukocytosis as expected. Imaging is the most important method in diagnosis.

The diagnostic value of direct radiography is very low. USG, computed tomography (CT) and MRI are the most commonly used diagnostic methods. USG is an easy and inexpensive method, but cannot always help to diagnose the disease in the early stages. MRI is the most valuable diagnostic method that helps differential diagnosis and determines the localization and extension of the disease [5, 9]. In the MRI, increased thickness in muscle planes, edema and hyperintensity in T2-weighted series, hypointense signal on the T1-weighted series are observed. After administration of gadolinium contrast in the muscle planes and a rim-shaped enhancement formation around abscess, subcutaneous edema and phlegmon can be present around the infection area. In our patient's right thigh

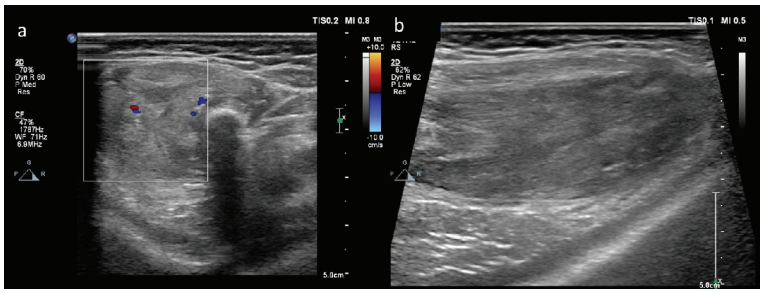


Figure 2. USG examination of the right thigh showed thickened skin, increased echogenicity in the subcutaneous adipose tissue due to edema and widespread heterogeneous increased echogenicity in muscle planes in the (a) transverse view and (b) longitudinal view.

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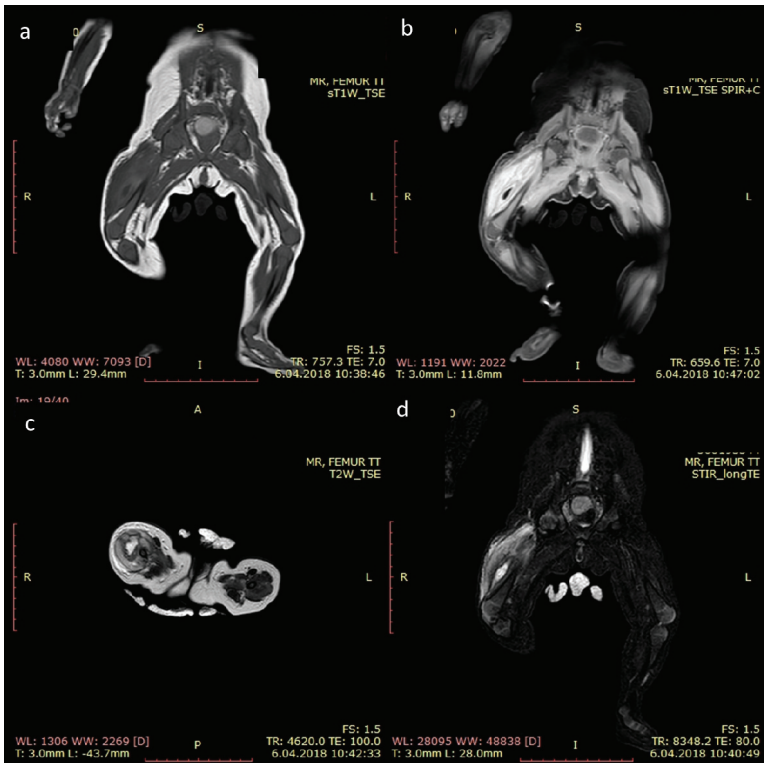


Figure 3. The right thigh MRI examination showed in the m. vastus lateralis, m. vastus intermedius and m. vastus medialis apparent thickness and hypointense signal on the (a) coronal T1-weighted image, and after gadolinium intense contrast uptake in the muscle planes, a rim-shaped enhancement around abscess cavity on the (b) coronal post-contrast T1-weighted image, and heterogeneous signal increase on the (c) axial T2-weighted images, and (d) on the STIR image. No pathologic appearance was detected in femur cortex or medullar signal in all series

MRI examination, there was apparent thickness and heterogeneous signal increase in T2-weighted series on m. vastus lateralis, intermedius and medialis, intense contrast uptake in the muscle planes defined in the T1-weighted post-contrast series, and three focal abscesses with rim-shaped enhancement, and the largest was 1.3 cm.

Pyomyositis is generally unifocal; however multifocal localization is reported in 15-43% of the cases [6]. The most common localization is the large muscles in lower extremities [7]. Our patient also had multifocal localization; and m. vastus lateralis, intermedius and medialis were involved.

In tropical cultures, there is 20-30% growth in blood cultures, whereas, this ratio is around 5% in mild climates [7]. In a study, a growing microorganism was detected in 52.2% of the patients with pyomyositis with an underlying disease, while only 8.3% of the pyomyositis patients without an underlying disease had microorganism growth in their blood cultures [4]. *Staphylococcus aureus* is the most common cause of pyomyositis [1]. Methicillin-resistant *Staphylococcus aureus* (MRSA) is an important pathogen, including community-acquired cases. USG or CT-guided drainage of the abscess and antibiotic treatment are the basis of the pyomyositis treatment. In the early stage of the infection, diffuse inflammatory changes before fluctuation can be effectively treated with sole antibiotic treatment [1, 4, 5, 7]. Initial empirical antibiotic therapy should be directed at staphylococci and streptococci, primarily MRSA subtypes [1, 4, 5, 7].

The duration of antimicrobial therapy should be determined according to clinical and radiographic recovery. Parenteral antibiotic therapy given for 2 - 4 weeks is usually sufficient. The treatment duration of the patients with bacteremia-associated pyomyositis, such as endocarditis and osteomyelitis, should be determined according to the primary infection [7]. We completed the treatment in 2 weeks. Our patient had no osteomyelitis or endocarditis symptoms; and we decided to end the treatment according to the patient's clinic, recovery of the infection parameters and the disappearance of abscess in the MR images acquired during the treatment.

Conclusions

Diagnosis with careful anamnesis, physical examination and imaging methods and drainage of the purulent material and proper antibiotic therapy are very important for patients with pyomyositis developed after vaccination. This case presentation aims to remark a rare clinical picture in our country.

Conflict of Interest

There is no conflict of interest regarding the publication of this

paper.

Grant Support

This study has not grant support.

Disclosure

All authors have no financial disclosures.

References

1. Elzohairy MM. Primary pyomyositis in children. Orthop Traumatol Surg Res. 2018;104(3):397-403.
2. Katz LD. Vaccination-induced myositis with intramuscular sterile abscess formation. Skeletal Radiol. 2011;40(8):1099-1101.
3. Peungjesada S, Gupta P, Rice GD, Ghole V, Ketkar M. Bilateral sterile gluteal abscesses following intramuscular injection of penicillin: CT appearance. Internet J Radiol. 2010;12(1).
4. Crum NF. Bacterial pyomyositis in the United States. Am J Med. 2004;117(6):420-428.
5. Bickels J, Ben-Sira L, Kessler A, Wientroub S. Primary pyomyositis. J Bone Joint Surg Am. 2002;84-A(12):2277-2286.
6. Chiu SK, Lin JC, Wang NC, Peng MY, Chang FY. Impact of underlying diseases on the clinical characteristics and outcome of primary pyomyositis. J Microbiol Immunol Infect. 2008;41(4):286-293.
7. Pasternack MS, Swartz MN. Myositis and Myonecrosispp: 1331-22. In: Mandell GL, Bennet JE, Dolin R (eds) Principles and Practice of Infectious Diseases 7th ed. Philadelphia: Churchill Livingstone, 2010.
8. Polat AV, Bekci T, Dabak N, Ulu EM, Selcuk MB. Vaccine-induced myositis with intramuscular sterile abscess formation: MRI and ultrasound findings. Skeletal Radiol. 2015;44(12):1849-1852.
9. Peckett WR, Butler-Manuel A, Apthorp LA. Pyomyositis of the iliacus muscle in a child. J Bone Joint Surg Br. 2001;83(1):103-105.

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