

Myositis in a child with murine typhus

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Abstract

A 12-year-old boy presented with fever, lower extremity pain and weakness. Examination revealed paraparesis, thigh and calf tenderness. Labs showed high creatinine phosphokinase and *Rickettsia typhi* titers. This case illustrates endemic typhus should be considered in the differential diagnosis of myositis especially in areas with high prevalence of the disease. To our knowledge, this is the first reported case of myositis and paraparesis associated with a case of murine typhus.

Introduction

Myositis is an acute, sub-acute, or chronic inflammation of skeletal muscles. Myositis can be due to infectious or non-infectious etiologies. Influenza is the most common cause of infectious myositis.¹⁻³ Infectious myositis caused by *Rickettsia typhi* has not been reported widely in the literature.

Case Report

A previously healthy 12-year-old boy was admitted to Driscoll Children's Hospital in Corpus Christi, TX, USA, with a 9 day history of fever, and 7 day history of pain and weakness in the lower extremities. Three days prior to admission, he was seen by a nurse practitioner and diagnosed with otitis media and pharyngitis. He received intramuscular penicillin and was prescribed cefixime for 3 days without improvement. He progressed and he became unable to walk without assistance. He had no gastrointestinal, respiratory or genitourinary complaints. On admission, his temperature was 36.8°C and the physical examination was significant for antalgic, broad-based gait and tender gastrocnemius – soleus muscles. Biceps, quadriceps and psoas muscle strength was graded at 3/5. Sensation and deep tendon reflexes were normal with absent Romberg's and Babinski's sign. The white blood cell count was 8300 cells per cubic mm with 60% neu-

trophils and 40% lymphocytes, hemoglobin was 13.5 g/dL, and the platelet count was 172,000 cells per cubic mm. His CRP was 1.5 mg/dL. The ESR and urine analysis were normal. Creatinine phosphokinase (CPK) was elevated at 2394 µ/L, aspartate aminotransferase (AST) was 222 µ/L and, alanine aminotransferase (ALT) was 143 µ/L.

A diagnosis of myositis was made and the patient was given analgesics and oral prednisone as dermatomyositis and polymyositis were amongst the differential diagnosis. Rhabdomyolysis was considered in the differential diagnosis and the patient was started on one and a half maintenance intravenous fluids. He did not have dark urine or hyperkalemia or myoglobinuria or renal failure. Our patient's clinical course was not severe and did not develop the complications usually associated with rhabdomyolysis. On day 2 of his hospital stay, he was able to stand up with support and CPK levels came down to 1713 U/L. Cerebrospinal fluid analysis showed a protein concentration of 62 mg/dL and white blood cell count of 4. Electromyography and nerve conduction studies did not show evidence of Guillain Barre Syndrome. A multiplex respiratory viral PCR was positive for rhinovirus and negative for Influenza A and B, parainfluenza, metapneumovirus and adenovirus. Lyme disease serology and monospot for Epstein Barr Virus were reported negative. Arboviral titers for West Nile virus was negative and so was the Rocky Mountain spotted fever titers. On the day 3 of his hospitalization, his upper extremity strength significantly improved to 5/5 and lower extremity to 4/5. Hence he was able to sit up and walk down the hallway without support. *Rickettsia typhi* IgM was elevated at 512 and IgG at 1024. Serum was evaluated by use of an indirect immunofluorescence antibody (IFA) test kit for immunoglobulin G (IgG) to *Rickettsia typhi* and *Rickettsia rickettsii* (Focus Diagnostics, Cypress, CA, USA). Reciprocal titers >64 were considered positive. CPK, ALT and AST levels were noted to have a downward trend. Blood and cerebrospinal fluid cultures showed no growth. The complete recovery of the patient took about 48 hours which included 100 mg of doxycycline given twice daily by mouth. He was discharged home on doxycycline to complete a 10 day course and prednisone was discontinued.

Discussion

Myositis can be caused by strenuous activity, muscle trauma, illicit drug injections, genetic diseases, connective tissue disorders, diabetes and infections.^{4,5} Infectious myositis can involve single or multiple muscle groups in

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the limbs with the proximal muscles being predominantly affected the exception being trichinosis which commonly involves orbital muscles.⁴ Infectious myositis is more frequently seen in young adults and has a male predilection.⁴

Signs and symptoms of myositis include fever, malaise, muscle swelling, weakness and pain that is worse with movement. With this presentation, other diseases that should be considered are polymyositis, dermatomyositis, rhabdomyolysis, Guillain Barre Syndrome, cellulitis, osteomyelitis, deep vein thrombosis, metabolic and other inflammatory myopathies (Table 1).⁴ Rhabdomyolysis was considered as one of the top differential diagnosis for our patient and given intravenous fluids. He had a mild manifestation of rhabdomyolysis. He did not have myoglobinuria or show signs of renal failure.

Murine typhus is an infectious illness caused by *Rickettsia typhi*. It presents 1-2 weeks after the bite of an infected flea although a history of such exposure is rarely elicited.⁶ Symptoms of murine typhus include fever, severe headache and rash. The rash may not be present in 50% of the patients with murine typhus.⁴ Rats, opossums, cats and dogs can serve as hosts.⁵ Doxycycline is the treatment of choice,⁵ which our patient was prescribed at the time of discharge. It has been known that murine typhus resolves even without treatment.⁷

To our knowledge, this is the first pediatric case reported of *Murine typhus associated with myositis and paraparesis*.

Table 1. Reported causes of infectious myositis.

Viruses	Group B coxsackievirus (epidemic myalgia) HIV-1 (one of the most common causes of myositis) Influenza (benign acute childhood myositis)
Bacteria	<i>Escherichia coli</i> <i>Klebsiella pneumoniae</i> <i>Pseudomonas aeruginosa</i> <i>Staphylococcus aureus</i> (most common, 70%) <i>Streptococcus viridans</i> <i>Streptococcus pyogenes</i> <i>Streptococcus pneumoniae</i>
Spirochetal	<i>Borrelia burgdorferi</i>
Mycobacterial	Mycobacterium avium-intracellulare complex
Parasitic	<i>Echinococcus granulosus</i> <i>Taenia solium</i> <i>Toxoplasma gondii</i> <i>Trichinella spiralis</i>
Fungus	<i>Aspergillus</i> species <i>Candida</i> species <i>Coccidioides</i> species Cryptococcus neoformans Histoplasma capsulatum

Conclusions

Murine typhus continues to occur frequently in South Texas children.⁸ Physicians practicing in or near *Rickettsia typhi*-endemic areas need to consider this in the differential diagnosis of children with evidence of myositis.⁹ Making this diagnosis may have a significant

impact on the course of the disease because of the availability of antimicrobial therapy against rickettsial organism.⁵

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