

Benign Acute Childhood Viral Myositis

Anna Avakian, PA-S, Susan McDiarmid, EdD, MS, PA-C

Westfield State University
Physician Assistant Program



Case

A 6 year old female presented to ED for sudden onset lower extremity muscle pain and difficulty walking. The patient woke up the previous morning complaining of bilateral pain behind her knees and began walking on her toes or crawling everywhere. The patient had gone to bed asymptomatic the night prior. She continued to crawl everywhere for the entirety of the day, but was otherwise playing with siblings normally, eating well, and in a good mood. Upon waking up the following morning, the pain had not gotten any better and she was still unable to ambulate normally. No injuries reported to the area. No relief with ibuprofen or rest. Patient recently had a URI with cough, congestion, headache, and fever. Patient was afebrile for over 48 hours and only had a residual dry cough. This had never occurred before.

History

- No past medical history, allergies, surgeries, medications, or relevant family medical history
- Social history pertinent for recent travel to Italy, returned home via 12 hour airplane 1 week ago
- Pediatric vaccinations up to date, no influenza vaccine this year

Physical Exam

General: Well-appearing, no acute distress

HEENT: Dry cough noted intermittently,

Cardio: Normal rate/rhythm. Normal S1, S2. No murmurs, rubs, gallops.

Resp: Lung sounds clear and equal bilaterally. No accessory muscle use or contractions noted.

MSK: No pain on palpation of the spine. Toe-walking noted. No edema or erythema noted in lower extremities.

Minimal tenderness to palpation of gastrocnemius/popliteus. No tenderness proximally. Passive ROM of hip, knee, ankle intact w/o pain. Active ROM: pain w/ ankle dorsiflexion, knee extension and flexion.

Neuro: CN II-XII intact. Normal muscle tone in lower extremities. No spasticity/hypotonia noted. Muscle strength 3/5 in calf muscles bilaterally. 5/5 in quadriceps, hip flexors, hamstrings bilaterally. 5/5 strength in upper extremities bilaterally. Reflexes intact. Sensations to light touch, pain, temperature, and vibration intact x4 extremities.

Diagnostic Testing

Laboratory Results	
CBC	WNL
CMP	WNL (Cr: 0.5 mg/dL, BUN 10 mg/dL),
D-Dimer	<0.5 mg/L
ESR	16 mm/hr
CK	CK: 5897 U/L
Influenza	Positive for Influenza A
UA	WNL (+2 ketones, no RBC)

Differentials

- Viral Myositis
- Guillain-Barre
- Rhabdomyolysis
- Deep Vein Thrombosis
- Transient Synovitis
- Polymyositis
- Acute Flaccid Paralysis
- Spinal Cord Compression

Diagnosis

Based on the clinical presentation and the isolated finding of a CK of 5897 U/L, the patient was diagnosed with Benign Acute Childhood Viral Myositis (BACM). Viral cultures were positive for Influenza A, which is a known risk factor. CK levels were elevated which was concurrent with the diagnosis.

Furthermore, UA and renal function were normal, which made rhabdomyolysis and an acute kidney injury less likely. No signs of areflexia, ascending weakness, or sensory changes were present, which help to rule out a neurological cause. If the presentation was atypical, a muscle biopsy and MRI could be performed to rule out other chronic causes of myositis.

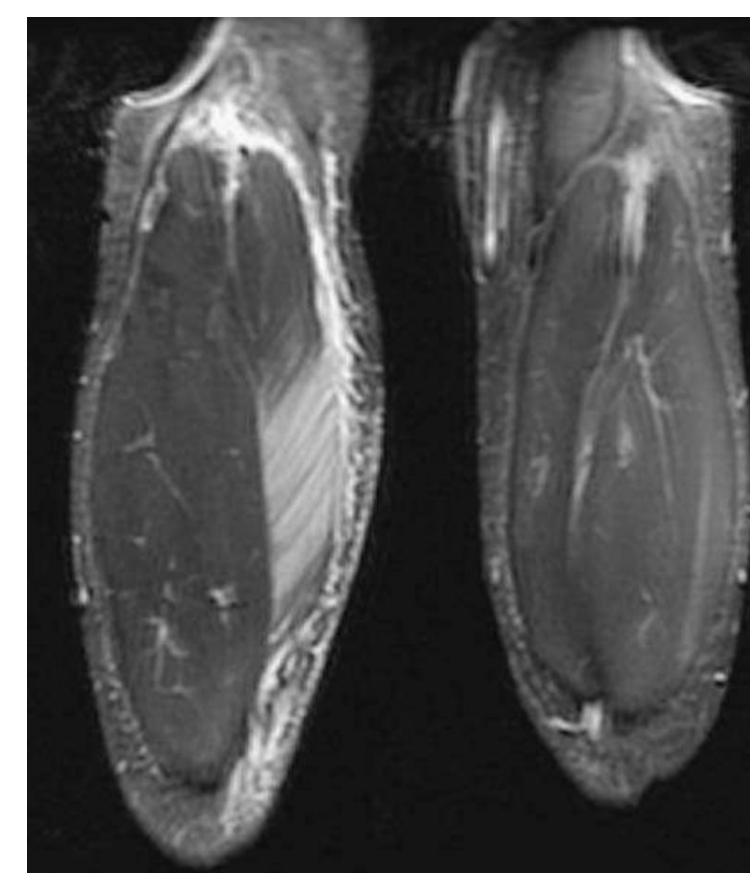


Figure 1: Coronal MRI image in a patient with atypical BACM demonstrating hyperintense signal abnormality of the gastrocnemius muscle with sharp margins.²

Treatment

Viral myositis is typically treated with supportive care with an emphasis on increased hydration. Symptoms should resolve within 1-3 weeks. In the meantime, activity should be modified based on pain level. If Cr and BUN levels were initially elevated, they should be monitored to ensure return to normal values.

Emergency Department Course:

- 20 ml/kg normal saline for a total of 500ml
- Acetaminophen for pain
- Repeat CK 4869 U/L
- Consult w/ inpatient pediatric physician: Not concerned with CK of 5000, happy with improvement with NS. Give another 500mL NS and discharge with f/u PCP appointment. Gait significantly improved.

Complications

- Hospitalization Criteria:¹
 - Red Flag Symptoms:
 - 2nd episode
 - Age <2 years old
 - Family history of neuromuscular diseases
 - Pathological neurological exam
 - Dark urine
 - Abnormal renal levels (increased Cr and BUN)
 - Heme positive UA
 - Heme negative UA with CK > 10x upper limit of normal
- Complications:
 - Rhabdomyolysis
 - Prolonged weakness
 - Compartment syndrome if severe edema

Discussion

Viral myositis is an acute complication from viral infections such as influenza, coxsackie, adenovirus, and EBV. Other than a recent viral illness, no other risk factors have been identified. The virus triggers an immune response in the body causing subsequent injury of muscle fibers leading to myofiber necrosis. Leakage of intracellular contents from the myocytes occurs, causing excess CK, myoglobin, and K⁺ in the bloodstream. Myoglobin is processed by the kidneys, but excess levels can cause a backup and ultimately lead to an AKI and rhabdomyolysis³. Elevated K⁺ and CK levels can also be seen in BACM. Cr and BUN levels can be used to differentiate an uncomplicated case from a complicated one. Recurrence is uncommon and there is no evidence to suggest that one episode of viral myositis makes an individual more prone to another.⁴

Conclusion

Overall, viral myositis is not a common disorder. It is most commonly caused by Influenza B, commonly seen in children, and is more likely during the winter months. About 1-3 days after fever resolution, patients will experience sudden onset muscle pain. Muscle pain is most common in the bilateral lower extremities. Due to this discomfort, abnormal gait is a typical symptom. No neurological deficits should be present. Diagnosis is clinical, but creatinine kinase levels are typically elevated. A significant increase in creatinine kinase levels may lead to rhabdomyolysis and an acute kidney injury. Treatment is mainly supportive care with increased hydration. Symptoms should resolve within 1-3 weeks, but in the meantime, activity should be restricted based on pain level. If needed, repeat labs to monitor kidney function should be obtained at an outpatient follow-up.

References

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