QUADRICEPS INJURY

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Northwell Health - North Shore University Hospital, Manhasset, NY
AOASM 2018 Conference Presentation

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CLINICAL CASE

• HISTORY:
A 53 year old male accompanied by his wife presented to the ED after 5 weeks of persistent pain, difficulty with ambulation, malaise, intermittent chills and swelling of right anterior thigh. Reported that he travelled to Israel 2 weeks prior, and has been gradually increasing his walking activity up to a 12 mile run recreationally. Due to difficulty with ambulation, a day after he noted significant swelling, he was seen by his PCP a week prior to ED visit.

His PCP was concerned about a DVT, and he was sent for an outpatient venous doppler of the lower extremity a week ago (which was negative). He is unsure why he has swelling and pain with ambulation. He denies any trauma.
REVIEW OF SYSTEMS

Pertinent Negatives

General: - fevers, - night sweats, weight loss

HEENT: -visual changes, sore throat

Cardiac: -chest pain, palpitations

Respiratory: - shortness of breath, dyspnea on exertion, cough

GI: -abd pain, n/v/d

MSK: - knee pain, calf pain, ankle pain.

Dermatology: - skin rash, - insect bites

Neurologic: -headache, dizziness, lightheadedness, numbness or paresthesias

GU: - dysuria, hematuria, hx of renal stones
MEDICAL HISTORY

• Social Hx: Not a smoker, recreational alcohol use, married, no recreational drug usage (IV, PO)

• PMHx – No significant PMHx, PSHx or Psyx. No hx of DM, HTN.
## Physical Examination: Vitals

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<tbody>
<tr>
<td>Temp (F)</td>
<td>99.2</td>
<td>99.9</td>
<td>98.4</td>
<td>98.8</td>
<td>98.1</td>
<td>98.5</td>
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<tr>
<td>Temp (C)</td>
<td>37.3</td>
<td>37.7</td>
<td>36.9</td>
<td>37.1</td>
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<td>Temp Site</td>
<td>oral</td>
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<tr>
<td>Heart Rate (beats/min) Method</td>
<td>noninvasive blood pre</td>
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<tr>
<td>Heart Rate Rhythm</td>
<td>79</td>
<td>81</td>
<td>79</td>
<td>83</td>
<td>78</td>
<td>81</td>
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<tr>
<td>Diastolic (mm Hg)</td>
<td>117 / 68</td>
<td>136 / 73</td>
<td>111 / 66</td>
<td>143 / 80</td>
<td>146 / 71</td>
<td>136 / 80</td>
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<tr>
<td>Mean (mm Hg) Site Method</td>
<td>right upper arm electronic</td>
<td>right upper arm electronic</td>
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<td>electronic</td>
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<td>left upper arm electronic</td>
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<td>Rate (breaths/min) SpO2 (%) Patient On</td>
<td>18 / 99</td>
<td>18 / 99</td>
<td>18 / 97</td>
<td>16 / 97</td>
<td>16 / 98</td>
<td>18 / 100</td>
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<td></td>
<td>room air</td>
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PHYSICAL EXAMINATION

- The patient was alert and oriented with normal vital signs, and in no acute respiratory distress.
- Normal cardiopulmonary exam.
- MSK Examination of the right lower extremity reveals the following:

  **General:** Antalgic gait with cane. Well appearing

  **Inspection:** Increased circumference of the right thigh, without any erythema, purulence, discharge.

  **Palpation:** Palpable tenderness in the anterior mid-thigh.

  **Knee:** No medial or lateral joint line tenderness. No tenderness over patellar or quadriceps tendon. No posterior knee tenderness.

  **ROM:** Limited knee flexion to 90 PROM. Limited extension to 120 PROM due to pain. Normal hip flexion.

  **Strength:** Hip flexion 5/5, Knee extension 4/5 (limited due to pain), Knee flexion 5/5

  **Special Tests:** Negative anterior drawer/posterior drawer, McMurry grind

  **Vascular:** Normal distal pulses bilaterally

  **Neuro:** Normal L4-S1 reflexes bilaterally, normal sensory exam
### PERTINENT LABS (WITHIN HOUR 1 OF VISIT)

<table>
<thead>
<tr>
<th>General Chemistry</th>
<th>Hematology</th>
<th>Coagulation</th>
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<tbody>
<tr>
<td>C-Reactive Protein, Serum</td>
<td>Sedimentation Rate, Erythrocyte</td>
<td>Prothrombin Time, Plasma</td>
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<tr>
<td>Sodium, Serum</td>
<td>WBC Count</td>
<td>INR</td>
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<td>Potassium, Serum</td>
<td>RBC Count</td>
<td>Activated Partial Thromboplastin Time</td>
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<td>Chloride, Serum</td>
<td>Hemoglobin</td>
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<td>Carbon Dioxide, Serum</td>
<td>Hematocrit</td>
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<td>Anion Gap, Serum</td>
<td>Mean Cell Volume</td>
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<td>Blood Urea Nitrogen, Serum</td>
<td>Mean Cell Hemoglobin</td>
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<td>Creatinine, Serum</td>
<td>Mean Cell Hemoglobin Conc</td>
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<td>Glucose, Serum</td>
<td>Red Cell Distrib Width</td>
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<tr>
<td>Calcium, Total Serum</td>
<td>Platelet Count - Automated</td>
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<td>eGFR if Non African American</td>
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<tr>
<td>eGFR if African American</td>
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<tr>
<td>Protein Total, Serum</td>
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<td>Albumin, Serum</td>
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**Lactic Acid**: 2.2

Growth in aerobic bottle: Coag Negative Staphylococcus. Single set isolate, possible contaminant. Contact Microbiology if susceptibility testing clinically indicated.

***Blood Panel PCR results on this specimen are available approximately 3 hours after the Gram stain result.***

Gram stain, PCR, and/or culture results may not always correspond due to difference in methodologies.
FEMUR X-RAYS
IMAGING (WITHIN 2\textsuperscript{ND} HOUR OF VISIT)

- MSKUS of Right knee (Point of Care Imaging): Knee effusion. Heterogeneous hypoechoic density at the quadriceps tendon that is similar to that of an abscess or hematoma.
CT FEMUR WITH IV CONTRAST 8/30/17
• CT Femur: Findings: There was a multi-loculated rim-enhancing collection in the anterior thigh within the vastus intermedius muscle, measuring 6.6 x 3.6 x 26.3 cm with associated fat stranding and soft tissue edema, and no subcutaneous emphysema. Abscess is said to communicate with the joint space.
TREATMENT AND OUTCOMES

1. General Surgical Consultation
   Recommended Interventional Radiology drainage of abscess pockets.
   No surgical intervention given aseptic presentation & morbidity risk. Potential joint seeding risk

2. Orthopedic Surgery Consultation
   Admitted patient for an incision and drainage of the vastus medialis muscle.
   Intraoperatively noted a liter of purulent discharge during wash out. No immediate post-operative complications.

3. Infectious Disease consultation – For pyomyositis with negative tissue; wound culture growth. The patient was discharged on vancomycin via PICC line.

CT FEMUR WITHOUT CONTRAST
(POST OP)
POST OPERATIVE COURSE

Post operative visit 1 (3 weeks) - OR cultures negative, possible that blood cultures were contaminant? Likelihood of soft tissue mass. Treated for pyomyositis.

4 weeks – ID - PICC line discontinued after 4 weeks of IV Vancomycin

Post operative visit 2 – 5 weeks - Ambulates with minimal pain. Starts PT, limited extension 110 deg.

Post operative visit 3 – 8 weeks – Increased ROM extension 120.

Post operative visit 4 – 11 weeks – Mechanical fall, extension 120. Similar exam.
ATRAUMATIC LEG SWELLING WITH THIGH PAIN

Differential Diagnosis:

Quadriiceps
- Hematoma
- Benign Growth
- Malignancy
- Abscess

Thromboembolism

Injury - >Acute compartment syndrome

Myositis Ossificans (Heterotopic Ossification)
Pyomyositis

It is most often seen in young adults. Pyomyositis, or bacterial myositis, was once considered a tropical disease but is now seen in temperate climates, particularly with the emergence of HIV infection. Other risk factors for infectious myositis include:

- Rhabdomyolysis/ muscle trauma
- cellulitis
- infected insect bites
- injection of illicit drugs
- diabetes mellitus
Treatment and prognosis
Depending on the infective agent systemic antibiotics are administered. If an abscess has formed, then it should usually be drained either surgically or percutaneously.

Potential complications of untreated infectious myositis include:

• compartment syndrome
• spread of infection to adjacent structures
• Osteomyelitis
• septic arthritis
• systemic spread
• septic shock
• distant abscess formation
Abstract
INTRODUCTION:
Non-tropical pyomyositis is a commonly reported infection in immunodeficient patients' muscle but is rare without immunodeficiency.

CASE DESCRIPTION:
We report the case of a 40-year-old woman admitted in the physical medicine and rehabilitation department for a motor and sensory loss of the lower limb; this disorder appeared after rhabdomyolysis due to prolonged lying position (suicide attempt). The initial diagnosis of sciatic nerve compression was not consistent with motor loss of adductor muscles. Clinical examination revealed soft tissue swelling in the proximal part of her lower limb. CT scan displayed pyomyositis of the thigh (hip adductors and gluteus medius), which was successfully treated by surgical incision and drainage in combination with antibiotherapy.

CONCLUSION:
Non-tropical pyomyositis is rarely described without immunodeficiency but this diagnosis should be borne in mind when previous muscle trauma is associated to leukocytosis. Computed tomography and MRI are the tests of choice to confirm the diagnosis of pyomyositis and to differentiate it from other entities.

PMID: 12832142
Staphylococcus aureus pyomyositis compared with non-Staphylococcus aureus pyomyositis.

Burdette SD¹, Watkins RR, Wong KK, Mathew SD, Martin DJ, Markert RJ.

Abstract

OBJECTIVES:
Pyomyositis is an acute bacterial infection of skeletal muscle not arising from contiguous infection. It is often hematogenous in origin and typically associated with abscess formation. Our objective was to determine if there were any differences in the clinical presentation of disease between Staphylococcus aureus (SA) and non-Staphylococcus aureus pyomyositis. We also sought to determine if methicillin-resistant SA (MRSA) occurred more frequently during the final years of the study period.

METHODS:
A retrospective chart review study at three institutions in two cities.

RESULTS:
Sixty cases of pyomyositis were identified between 1990 and 2010. Twenty-nine patients were infected with SA while 31 had other bacterial etiologies or were culture negative. Those with a traumatic event prior to the onset of infection were more likely to have a SA infection while SA infected patients were younger. Our first documented case of MRSA occurred in 2005, but the frequency of MRSA infection remained static over the following five years.

CONCLUSIONS:
Pyomyositis is an emerging infection that is underappreciated by many physicians. While MRSA has emerged as the foremost cause of SA infections in a majority of clinical conditions, in this series most patients still had methicillin-sensitive SA as their cause of pyomyositis. In light of the severity of pyomyositis and the potential for bacteremia (either as a source or complication of the infection), empiric SA therapy should be initiated in all patients until the culture results are available.
Thigh pyomyositis caused by group A streptococcus in an immunocompetent adult without any cause.
Minami K¹,², Kenzaka T³,⁴, Kumabe A¹, Matsumura M¹.

Author information
Abstract
BACKGROUND:
Pyomyositis is typically caused by Staphylococcus aureus, and is rare in temperate climates, although its prevalence has been recently increasing. This infection often involves the thigh, and is associated with immunodeficiency.

CASE PRESENTATION:
We report the case of a healthy 20-year-old Japanese woman who experienced a fever and continuous pain for several days. She was admitted to our hospital and was diagnosed with pyomyositis after we discovered an abscess between the muscles of her dorsal distal left thigh using computed tomography. This is a rare case of thigh pyomyositis, as it was caused by group A streptococcus and occurred in an immunocompetent adult from a temperate climate.

CONCLUSIONS:
Our review of the literature revealed that group A streptococcus pyomyositis typically occurs in temperate climates, among young adults without any underlying disease, and is associated with a poorer prognosis, compared to general pyomyositis. We suggest that pyomyositis should be considered when immunocompetent adults present with apparently idiopathic inflammatory muscle lesions.
POST PRESENTATION QUESTIONS

1) Which of the following properties on CT scan differentiates a soft tissue malignancy from an abscess?
   a) Peripheral rim enhancement
   b) Nodular enhancement
   c) Adjacent nodal uptake
   d) Cortical erosion

2) Which of the following is true regarding pyomyositis:
   a) It only happens in temperate climates
   b) It is a disease process that happens solely in an immunocompromised patient
   c) It can manifest secondary to muscle injury/rhabdomyolysis
   d) All of the above

3) Which of the following diagnostic modalities is/are the test(s) of choice to confirm clinical pyomyositis?
   a) CT
   b) MRI
   c) Ultrasound
   d) A & B
   e) All of the above
Thank you. 😊