A Traumatic Tick Bite: A Case Report

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Introduction: Human granulocytic anaplasmosis is a tick-borne disease with an increasing incidence associated with morbidity and mortality. Uncertainty remains whether a prophylactic dose of doxycycline is effective in prevention.

Case Report: We present a case of an 80-year-old female with syncope, resultant facial trauma, and fever two weeks after a tick bite for which she received prophylaxis. Workup revealed anaplasmosis, and treatment led to symptomatic improvement.

Conclusion: We review the presenting symptoms, laboratory findings, and treatment of anaplasmosis, as well as give caution about the limitations in prescribing a prophylactic dose of doxycycline following a tick bite. [Clin Pract Cases Emerg Med. 2021;5(2):210–213.]

Keywords: Case report; trauma; anaplasmosis; tick.

INTRODUCTION

Human granulocytic anaplasmosis (HGA) is a tick-borne illness caused by the rickettsial bacterium Anaplasma phagocytophilum and transmitted by the Ixodes scapularis tick (Image).1 Symptoms are typically mild resembling viral illness and often self-resolve; however, as many as 3% of victims may have significant morbidity, with up to 1% having meningoencephalitis and 1% mortality.1,2 The incidence has been increasing since the disease was first recognized in the mid-1990s. In 2018, the most recent year for which data is available, there were 4008 reported cases in the United States. The highest incidence for the disease is in New York, Connecticut, and Wisconsin.3,4 Coinfection with Lyme disease and babesiosis is common as they are transmitted by the same vector.2 Studies in affected areas show a seroprevalence of 8.9-36%.1

We present a case of HGA that may have contributed to a syncopal episode leading to traumatic facial injury in a patient who had taken doxycycline prophylaxis for a tick bite.

CASE REPORT

An 80-year-old female with history of mild chronic obstructive pulmonary disease, mitral valve prolapse, and herniated discs presented to the emergency department (ED) by private vehicle for a facial injury after being struck in the face by a dresser drawer. Leading up to the injury she reported feeling lightheaded, and at the point of losing consciousness she attempted to steady her balance by grabbing a dresser, causing it to fall on her chest pinning her against the wall for approximately five hours. She denied significant pain and noted that the top of her scalp superior to the laceration was
insensate. She experienced persistent oozing from the wound and her nose since the injury. A 10-point review of systems was otherwise negative with the exception of fever during the preceding two days to a maximum of 103.3°F on the day of presentation. Notably, she had a tick, which she had removed approximately two weeks prior that was attached for about 24 hours. She was prescribed a one-time dose of 200 milligrams (mg) of doxycycline for Lyme disease prophylaxis, which she had taken on the day of removal by her primary care provider.

On exam, vital signs were notable for heart rate of 102 beats per minute and were otherwise unremarkable. She had a six-centimeter laceration over her left upper forehead with evidence of an open fracture of the frontal sinus on exam with bone fragments visible within the wound. Given the mechanism of injury and her age, we ordered computed tomography of the head, maxillofacial, cervical spine, chest, abdomen, and pelvis, which demonstrated left frontal calvarial fractures. Lab work included the following: a complete blood count; complete metabolic panel; troponin; creatinine kinase; prothrombin time and international normalized ratio; tick panel (Lyme disease immunoglobulin G/immunoglobulin M, *Ehrlichia chaffeensis* polymerase chain reaction [PCR]; *Anaplasma phagocytophilum* PCR; *Babesia microti* PCR; respiratory viral panel; coronavirus disease 2019 PCR; and lactic acid. Notable results are shown in Table 1. An electrocardiogram demonstrated normal sinus rhythm, and the patient was maintained on the cardiac monitor without event. The patient was treated empirically with tetanus toxoid and ampicillin/sulbactam for coverage of the open sinus fracture. Plastic surgery was consulted for evaluation of the open sinus fracture and facial laceration, which they repaired at bedside surgery. Plastic surgery was consulted for admission of the patient to their service in the ED. Intravenous fluids were also administered, and trauma surgery was consulted for admission of the patient to their service for further workup and management.

During the hospital course, the patient continued to spike fevers and had worsening thrombocytopenia, hyponatremia, and leukopenia as demonstrated in Table 1. To further evaluate for a cardiac etiology of her syncope, an echocardiogram was performed, which did not demonstrate any abnormalities. The *Anaplasma phagocytophilum* PCR ultimately returned positive on hospital day two revealing the diagnosis. She was started on doxycycline 100 mg twice daily with improvement of symptoms and hematologic parameters, and she was subsequently discharged on hospital day six.

**DISCUSSION**

*Anaplasmosis* typically presents with nonspecific symptoms including fever, chills, headaches, and myalgias with associated leukopenia, thrombocytopenia, and elevated

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**CPC-EM Capsule**

- What do we already know about this clinical entity? 
  *Human granulocytic anaplasmosis is a tick-borne disease with an increasing incidence associated with morbidity and mortality.*

- What makes this presentation of disease reportable? 
  *We discuss a rare disease with a presentation including a syncopal episode and traumatic injury found to have findings consistent with anaplasmosis.*

- What is the major learning point? 
  *This report highlights the classic historical and laboratory findings of anaplasmosis with caution about limitations of doxycycline in Lyme disease prophylaxis.*

- How might this improve emergency medicine practice? 
  *This case may lead to increased recognition of a rare tick-borne illness to assist with timely diagnosis and treatment.*

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**Table 1.** Lab results for 80-year-old patient with history of tick exposure.

<table>
<thead>
<tr>
<th>Lab</th>
<th>Facility lab range</th>
<th>Admission</th>
<th>Hospital day two</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium</td>
<td>135-145 mEq/L</td>
<td>134 mEq/L</td>
<td>133 mEq/L</td>
</tr>
<tr>
<td>Potassium</td>
<td>3.4-5.2 mEq/L</td>
<td>4.1 mEq/L</td>
<td>3.3 mEq/L</td>
</tr>
<tr>
<td>Chloride</td>
<td>99-109 mEq/L</td>
<td>100 mEq/L</td>
<td>103 mEq/L</td>
</tr>
<tr>
<td>Bicarbonate</td>
<td>21-30 mEq/L</td>
<td>24 mEq/L</td>
<td>22 mEq/L</td>
</tr>
<tr>
<td>Blood urea</td>
<td>7-22 mg/dL</td>
<td>24 mg/dL</td>
<td>13 mg/dL</td>
</tr>
<tr>
<td>Creatinine</td>
<td>0.6-1.2 mg/dL</td>
<td>1.77 mg/dL</td>
<td>0.95 mg/dL</td>
</tr>
<tr>
<td>Glucose</td>
<td>65-99 mg/dL</td>
<td>124 mg/dL</td>
<td>135 mg/dL</td>
</tr>
<tr>
<td>Aspartate</td>
<td>5-45 IU/L</td>
<td>99 IU/L</td>
<td></td>
</tr>
<tr>
<td>Ala transaminase</td>
<td>5-60 IU/L</td>
<td>60 IU/L</td>
<td></td>
</tr>
<tr>
<td>Creatine kinase</td>
<td>30-225 IU/L</td>
<td>1495 IU/L</td>
<td></td>
</tr>
<tr>
<td>Troponin I</td>
<td>0-0.04 ng/mL</td>
<td>0.05 ng/mL</td>
<td>0.03 ng/mL</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>11.0-14.7 g/dL</td>
<td>12.1 g/dL</td>
<td>10.0 g/dL</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>33.0-44.0%</td>
<td>36.3%</td>
<td>30.6%</td>
</tr>
<tr>
<td>WBC</td>
<td>4.1-9.3 10³/uL</td>
<td>3.7 10³/uL</td>
<td>1.7 10³/uL</td>
</tr>
<tr>
<td>Platelets</td>
<td>130-350 10³/uL</td>
<td>81 10³/uL</td>
<td>40 10³/uL</td>
</tr>
</tbody>
</table>

*mEq, milliequivalent; L, liter; mg, milligrams; dL, deciliter; IU, international units; ng, nanograms; mL, milliliter; g, grams; ul, microliter.*
The tick has been attached for ≥36 hours based on time of exposure or engorgement. The tick is identified as an adult or nymph *Ixodes scapularis*. Prophylaxis is started within 72 hours of removing tick. Local rate of infection is ≥20%. Doxycycline is not contraindicated. The tick has been attached for ≥36 hours based on time of exposure or engorgement.

**Table 2. Criteria for doxycycline prophylaxis after tick bite.**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tick identification</td>
<td>Non-Lyme tick-borne illness</td>
</tr>
<tr>
<td>Infection rate</td>
<td>≥20%</td>
</tr>
<tr>
<td>Prophylaxis start</td>
<td>Within 72 hours of tick removal</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>Not contraindicated</td>
</tr>
</tbody>
</table>

**REFERENCES**


**CONCLUSION**

Anaplasmosis is an emerging disease that is increasing in frequency in endemic areas. In the evaluation of fever, hematologic abnormalities, and elevated transaminases with the proper travel history or location, human granulocytic anaplasmosis should certainly be considered as a possible cause. The effectiveness of doxycycline in prophylaxis of HGA has not been evaluated, and the emergency clinician should be aware of its limitations.

The authors attest that their institution requires neither Institutional Review Board approval, nor patient consent for publication of this case report. Documentation on file.