**Ticked Off: Early Consideration of a Tick-borne Illness**

Bayar-Masood, Taimur, MD; Waghray, Shefali; Ward, Lawrence, MD; Choudary, Mohammed O, DO; Syed, Muhammad R, MD

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**Introduction**

Tick-borne illnesses can be fatal if not treated early. We describe a severe case of Ehrlichiosis with a Babesia coinfection (from the uncommon Babesia Duncani) with excellent clinical outcome from early empiric treatment with Doxycycline.

**Case Presentation**

- A 44-year-old Delawarean presented with a one-day history of fever (Tmax 103°F), lethargy and hypotension.
- **Labs:** Pancytopenia with a WBC count of 1.3 K/µL, Hb 9.9 g/dL, Hct 29%, Platelet count of 36 K/µL, Neutropenia with an ANC of 0.6. K/µL, elevated aminotransferases with an AST of 376 U/L and ALT of 133 U/L, with negative blood cultures, urinalysis, viral respiratory and Gi PCR’s.
- CT chest, abdomen and pelvis unremarkable for a septic source.
- **Rx:** Empiric with Vancomycin, Piperacillin-Tazobactam and Meropenem.
- After 48 hours without clinical improvement, the patient was questioned about tick exposure and confirmed a recent tick bite.
- Addition of empiric doxycycline resulted in complete resolution of symptoms and lab abnormalities within 48 hours of initiation.
- After discharging home, a comprehensive tickborne panel resulted positive for Ehrlichia Chaffeensis DNA PCR and Babesia Duncani WA1 IgG >1:256.

**Discussion**

- The CDC\(^1\) describes Babesiosis and Ehrlichiosis to range from flu-like symptoms to being fatal.
- Common findings include thrombocytopenia, elevated aminotransferases and a low hematocrit.
- Babesia Duncani is commonly spread by the winter tick (Dermacentor Alibiptics)\(^2\), which is a one-host species usually affecting moose, found more commonly in Canada.
- The IDSA guidelines recommend Quinine or atovaquone with Clindamycin or Azithromycin for Babesiosis.
- Though this patient did not receive the recommended treatment for Babesiosis, the complete resolution of her illness questions whether Babesia Duncani was an incidental finding in a case of Ehrlichiosis or that it demonstrates a good clinical response of Babesia Duncani to Doxycycline.
- There is currently limited data in treating Babesia Duncani WA1 with insufficient evidence for use of Doxycycline monotherapy.
- Early suspicion of tick-borne illnesses and empiric treatment with doxycycline has demonstrated a 49% decrease in ICU admission rates, decrease in ARDS and multiorgan failure and a 43% reduction in need for mechanical ventilation\(^3\).

**Fig 1:** Adult male winter tick (Dermacentor alibiptics)  (Image: Cooperative extension: Tick lab, University of Maine)

**Fig 2:** Babesia and Ehrlicia Cases reported to the CDC in 2018 showing endemic areas for the two tick-borne illnesses. (Image source: CDC, NCEZID, DVBD)

**Conclusions**

With the increasing incidence of tick-borne illnesses worldwide\(^4\), we emphasize:

1. Consideration of tick-borne illnesses as a differential diagnosis for septic patients in endemic areas.
2. The need for thorough history-taking of septic patients.
3. The need for further research on the use of doxycycline monotherapy for babesia species.

- The patient described here presented with typical symptoms and labs for ehrlichiosis with a relatively uncommon tickborne co-infection, Babesia Duncani WA1, but by identifying her symptoms and lab derangements early in the disease course, early empiric treatment with doxycycline resulted in an excellent clinical outcome.

**References**

1. Center for Disease Control and Prevention: Babesiosis

