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Synopsis on Human Babesiosis and Health Implication: A Commentary

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This review on Babesiosis by Miguel PSB et al. [1] is quite unique by describing the illness caused by Babesia spp., as well as emphasizing the travelers' health aspects of the diseases. Human Babesiosis is a tick transmitted zoonosis normally associated with two protozoa of the family Piroplasmorida: *Babesia microti* (in the United States) and *B. divergens* (in Europe) [2]. In this review, the authors mentioned a newer organism known as *Babesia venatorum* that was reported as a cause of the disease in China and previously reported in Europe as well as cases of infection by *Babesia duncani* which were reported in California and Washington State. Over 100 species was mentioned in this study to infect several wild and domesticated non-human models with few confirmed as causative agents in humans, with variations depending on the region. *Ixodes dammini* is the deer tick that transmits the spirochetes that cause Lyme disease known as *Borrelia burgdorferi* in the northeastern United States and belongs to a morphologically similar group of "black-legged ticks" that includes *I. ricinus* known as the wood tick of Europe as well as *I. persulcatus* known as the taiga tick of Asia. This tick also transmits human Babesiosis in the United States and tick-borne encephalitis in Europe and Asia [3]. Worthy of note as mentioned in this review is that this diseases is of concern to health authorities in regards to travelers' from non endemic areas to endemic areas as well as the risk of exposure to this infection. The organism has similarity to the protozoa of the genus *Plasmodium falciparum* including its life cycle with few differences mentioned in the review. In addition to the United States and countries in Europe, the review also mentioned report of sporadic cases in Asia countries including Australia, South Korea, Japan, and Taiwan, as well as countries in the African continent. Asplenic and immune compromised patients are at increased risk for infections with *B. microti* organism [4]. Both humoral and cellular responses are involved in immunity to babesiosis [5].

The disease is basically diagnosed by thin or thick blood smear with Giemsa staining and detection is achieved by visualizing the characteristic intra erythrocytic ring which is morphologically similar to those of *Plasmodium sp*. as well as rare tetrads (thin arrow (Figure1)) and Howell–Jolly body (thick arrow) (Figure 2) [6]. Confirmation of the organism is based on molecular or serologic diagnostic tests. Polymerase chain reaction (PCR), a molecular diagnostic test is normally used in situations where parasite is difficult to detect in patients presenting with suggestive symptoms of the disease. Immunological diagnosis is normally achieved by indirect immunoflourescence (IFA) which is considered the standard assay for detection of the parasite antibodies. There are other techniques such as Imunoblot, immunochromatography, and ELISA (enzymelinked immunosorbent assay) that were mentioned in the review. In similarity to malaria infection, the diseases also cause decreased hematocrit and hemoglobin counts consistent with hemolytic anemia with variations depending on the species. Wooley et al. [7] reported cases of post-babesiosis warm autoimmune hemolytic anemia (WAHA) in patients who did not have a history of autoimmunity particularly with asplenic patients appearing to be at risk.

The most commonly used antibiotics for treatment of symptomatic cases as reported in the review are (1) atovaquone, azithromycin, and a combination of the two; and (2) clindamycin, quinine, and a combination of the two. There has so far been no report of resistance to the drugs. In the United states, patients with severe infection are generally treated

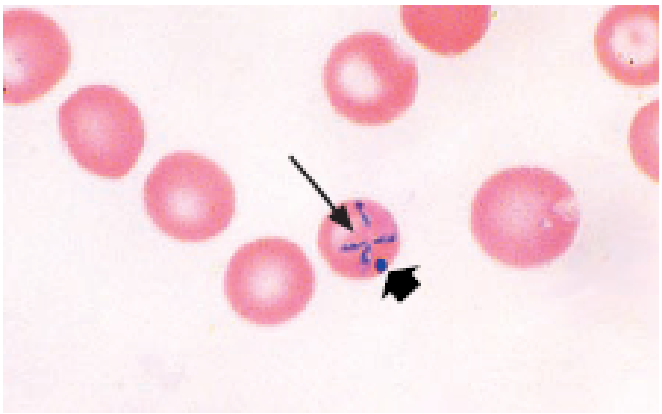

Figure 1: The rare tetrads (thin arrow) and Howell–Jolly body (thick arrow) of Babesia spp [6].

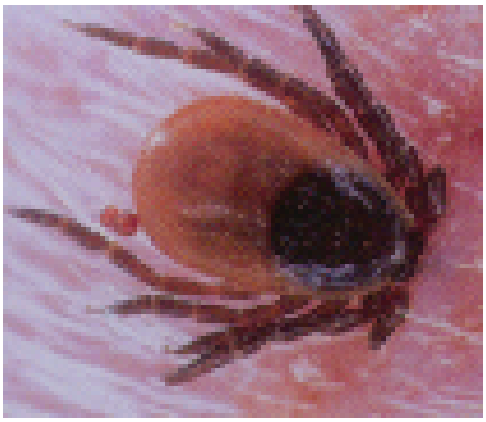

Figure 2: Adult deer tick attached to host [3].

with clindamycin 300-600 mg four times daily (by intravenous route), associated with quinine 650 mg thrice daily (by oral route) for seven to ten days. Patients with low parasitaemia recover without therapy. Critical patients may require supportive therapy. Feder et al. [8] reported treating the disease in pregnancy with Clindamycin and quinine because both drug cross the placenta and also because quinine has been used to treat malaria in pregnancy. Weiss et al. [9] reported that they have been using atovaquone and azithromycin as an alternative treatment for babesiosis since 1993 with a combination of azithromycin at a dose of 12 mg per kilogram of body weight per day and atovaquone at a dose of 40 mg per kilogram per day in neonates with success and without toxic effects. Also, they used a combination of 500 to 1000 mg of azithromycin daily and 750 mg of atovaquone twice daily with success in immunocompromised patients with human immunodeficiency virus infection, elderly patients, and a patient with IgM myeloma.

Measures to prevent infection vary from simple avoidance to habitat modification as mentioned in the publication. Simple avoidance measures include wearing of long-sleeves pants, and socks, use of tick repellents before entering a tick-infested area, avoidance of or minimization of exposure to tick-infested areas and thorough examination of skin after exposure. Before attachment, ticks should be removed, and those found after attachment should also be removed within 24 h after attachment to reduce transmission [5]. In addition, a decrease in the risk of transfusion-transmitted babesiosis among Blood-donation screening for antibodies to and DNA from *B. microti* was reported by Moritz et al. [10]

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