Rickettsia

First detection of spotted fever group rickettsiae in Ixodes ricinus and Dermacentor reticulatus ticks in the UK.

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Abstract

SUMMARY: A preliminary study was conducted to determine the presence of spotted fever rickettsiae in two species of British tick (Ixodes ricinus and Dermacentor reticulatus).

Ticks positive for rickettsiae were collected from various hosts and from vegetation from eight counties across Great Britain. The distribution of R. helvetica in various engorged and unfed stages of I. ricinus suggests that R. helvetica is widespread. R. raoultii was found in questing adult D. reticulatus in Wales and England. This is the first evidence of potentially pathogenic spotted fever rickettsiae in British ticks.

PMID: 21087541 [PubMed - in process]

Babesia/Anaplasmosis

The Common Shrew (Sorex araneus): A Neglected Host of Tick-Borne Infections?

[JOURNAL ARTICLE]


Bown KJ, Lambin X, Telford S, Heyder-Bruckner D, Ogden NH, Birtles RJ


Tick samples were collected from common shrews (Sorex araneus) and field voles (Microtus agrestis), a known reservoir of various tick-borne infections, from sites located within a
plantation forest in northern England over a 2-year period. Of 647 blood samples collected from shrews, 121 (18.7%) showed evidence of infection with *Anaplasma phagocytophilum* and 196 (30.3%) with *Babesia microti*. By comparison, of 1505 blood samples from field voles, 96 (6.4%) were positive for *A. phagocytophilum* and 458 (30.4%) for *B. microti*.

These findings suggest that common shrews are a reservoir of tick-borne infections and that the role of shrews in the ecology and epidemiology of tick-borne infections elsewhere needs to be comprehensively investigated.

**Babesia divergens, a Bovine Blood Parasite of Veterinary and Zoonotic Importance**

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The parasite was first positively identified in a splenectomized deep-sea fisherman from Northern Ireland, who probably contracted the disease during a camping holiday.

To date, 31 human cases of autochthonously acquired babesia infections have come to medical attention in Europe, all of which occurred in splenectomized individuals.

Human cases of *B. divergens* infection have been reported in France, Britain, Ireland, Spain, Sweden, Switzerland, the former Yugoslavia, and the former USSR (38, 65). Geographically they coincide with *B. divergens*-infected cattle populations and *I. ricinus*-infested areas.

*I. ricinus* is generally regarded as the tick species responsible for the transmission of *B. divergens* to humans, and experimental evidence shows that human isolates can be transmitted by *I. ricinus*.

**Babesiosis: under-reporting or case-clustering?**

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Describes 3 cases of Babesia among farmers in the Galway region (1989)
Babesia sp. EU1 from roe deer and transmission within Ixodes ricinus.

Author: Bonnet, Sarah; Jouglin, Maggy; L’Hostis, Monique; Chauvin, Alain
Publication: Emerging Infectious Diseases Date: Aug 1, 2007

http://www.thefreelibrary.com/Babesia+sp.+EU1+from+roe+deer+and+transmission+within+Ixodes+ricinus.-a0167507681

In Europe, [approximately equal to] 30 human cases of babesiosis have been reported over the past 50 years and have been traditionally attributed to infection with the bovine parasite B. divergens transmitted by Ixodes ricinus (2,3). However, in 2003, Herwaldt et al. described the first molecular characterization of a new Babesia species, Babesia sp. EU1, isolated from 2 persons in Austria and Italy (4). Since this description, EU1 has been recovered from roe deer in Slovenia (5) and from I. ricinus in Slovenia (6) and Switzerland (7,8).

Babesia species EU1 merits increased attention as a potential agent of emerging tickborne disease in humans because its suspected vector, L ricinus, is the most prevalent and widely distributed tick in Europe and frequently bites humans.

Conclusions

Isolation of EU1 from roe deer in France confirms that these animals are reservoir hosts of the parasite and that EU1 is not restricted to 1 geographic area in Europe. A survey conducted in Slovenia showed that 21.6% of 51 roe deer tested were infected with EU1 (5) and a similar prevalence (23%) was observed.

Babesiosis

Babesiosis is an infection of rodents, cattle, wild animals and man and is spread by the bites of ixodid (hard-bodied) ticks which are also the vectors for Lyme disease (25% of babesiosis patients have both diseases).

There are over a hundred different Babesia species; human disease is usually caused by B. divergens in Europe.

Patients who are immunosuppressed (including HIV-infected patients), splenectomised or elderly are most susceptible to babesial infection. B. microti infection can occur in non-splenectomised individuals and be transmitted by blood transfusion.

http://www.patient.co.uk/doctor/Babesiosis.htm
**Ehrlichiosis (Anaplasmosis)**

Ehrlichiosis is a tick-borne infection of mononuclear cells and granulocytes that affects various mammals, including mice, cattle, dogs, deer, horses, sheep, goats, and humans.

Ehrlichial pathogens are distributed globally, mainly in temperate regions, and have been reported throughout Europe.

[http://www.patient.co.uk/doctor/Ehrlichiosis.htm](http://www.patient.co.uk/doctor/Ehrlichiosis.htm)

**Coinfections Acquired from Ixodes Ticks**

*Clinical Microbiology Reviews, October 2006, p. 708-727, Vol. 19, No. 4*

Stephen J. Swanson,¹,² David Neitzel,² Kurt D. Reed,³ and Edward A. Belongia³*

In Europe, including the British Isles, *I. ricinus* is the primary vector for LD, HA (human anaplasmosis) and probably Babesiosis.

In Europe, human HA infection was first reported for a Slovenian woman, aged 70 years, with evidence of potential coinfection with *B. burgdorferi* sensu lato determined through a rise in the IgG antibody titer (151). Serologic evidence of HA infection has since been reported widely across Europe, in more than 17 countries. Seroprevalence rates among examined populations range from zero or low to 28%.

Evidence of potential coinfection with the pathogens of LD and HA has since been demonstrated in Belgium (73), the Czech Republic (92), Germany (115), Italy (169), Norway (13), Poland (81), Slovenia (10), Switzerland (28), Sweden (24), and the United Kingdom.

As with babesiosis, clinicians should consider additional laboratory tests for HA when LD patients demonstrate a more intense and persistent array of nonspecific, influenza-like symptoms, especially fever, chills, and headache. Coinfection with HA is also suggested when LD patients fail to respond to appropriate β-lactam antimicrobial therapy (amoxicillin, ampicillin, or ceftriaxone) (104, 131) or demonstrate laboratory evidence of neutropenia and thrombocytopenia (14, 104). For suspected coinfection with HA or babesiosis, clinicians might consider a complete blood count with a Giemsa-stained blood smear a reasonable initial evaluation.

**RESEARCH NEEDS**

Our knowledge of individual tick-borne zoonoses has increased dramatically during the past 2 decades, but relatively little progress has been made in our understanding of coinfections. Funding agencies should focus on research that can be applied to the recognition, treatment, or prevention of tickborne coinfections among humans. Additional prospective studies are needed.
in North America and Europe to assess the immunologic and clinical effects of the most common coinfections, including Lyme borreliosis with either HA or babesiosis.

The sensitivity, specificity, and predictive value of laboratory markers of coinfection should be evaluated to facilitate prompt clinical detection.

In addition, clarification is needed on the geographic distribution of *B. burgdorferi* sensu lato genogroup, *B. microti* / *divergens* and *A. phagocytophilum* for all areas of the world, including nontemperate climates. Limited or no information exists on the incidence or effects of coinfection with other tick-borne pathogens (e.g., TBE and Powassan flaviviruses, spotted fever group rickettsiae, *Francisella tularensis*, and *Bartonella* spp.).

Prospective cohort studies involving healthy persons with frequent exposure to tick habitats are needed to assess the absolute risk for coinfection.

http://cmr.asm.org/cgi/content/full/19/4/708

**Bartonella**

**Evidence supporting tick co-infection with Bartonella Species**

*Medical and Veterinary Entomology* (2008) 22, 1-15

Of 92 *I. ricinus* ticks collected in France in 2002, 9.8% were *Bartonella* PCR positive. Furthermore, 4% of these ticks were co-infected with *Bartonella* and *Babesia*, 1% with *Bartonella* and *Bo. burgdorferi* and one tick harboured all three organisms.

In a 2003 and 2004 study, *Carios kelleyi* Cooley and Kohls, an argasid tick found on bats, was found to harbour both *Bartonella* and a *Rickettsia* spp.


**Transmission of Bartonella henselae by Ixodes ricinus**

Violaine Cotté,* Sarah Bonnet,* Danielle Le Rhun,* Evelyne Le Naour,* Alain Chauvin† Henri-Jean Boulouis,‡ Benoit Lecuelle,‡ Thomas Lilin,‡ and Muriel Vayssier-Taussat*

Emerging Infectious Diseases · www.cdc.gov/eid · Vol. 14, No. 7, July 2008

... new potential vectors are suspected of transmitting *B. henselae*, in particular, *Ixodes ricinus*, the most abundant ixodid tick that bites humans in western Europe.

http://www.cdc.gov/eid/content/14/7/pdfs/1074.pdf
Bartonella henselae and the Potential for Arthropod Vector-Borne Transmission

Mark E. Mosbacher, Stephen Klotz, John Klotz, Jacob L. Pinnas.
Vector-Borne and Zoonotic Diseases.

Online Ahead of Print: October 25, 2010


Although cat fleas are well-established vectors for B. henselae (7–10), transmission by other arthropods, in particular ticks, has been suggested (11–13). Ixodes ricinus is the most widespread and abundant ixodid tick in western Europe and is frequently associated with bites in humans. It is a vector of emerging zoonotic pathogens including Borrelia burgdorferi sensu lato (14), Anaplasmaphagocytophilum (15), and Babesia spp. (16).

Vector transmission of Bartonella species with emphasis on the potential for tick transmission.


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Polymerase chain reaction (PCR) or culture methods have been used to detect Bartonella in ticks, either questing or host-attached, throughout the world. Case studies and serological or molecular surveys involving humans, cats and canines provide indirect evidence supporting transmission of Bartonella species by ticks.


PMID: 18380649 [PubMed - indexed for MEDLINE]