SELECTED REFERENCES ON BARTONELLA

Updated March 17, 2015

RECENT REVIEW ARTICLES

Angelakis E, Raoult D. **Pathogenicity and Treatment of Bartonella Infection**. *Int J of Antimicrob Ag*. 2014; 44(1):16-25. http://www.ncbi.nlm.nih.gov/pubmed/24933445
This review describes the clinical findings in patients with localized Bartonella infections as well as those with systemic manifestations, including bacteremia, endocarditis, and angioproliferative lesions. The review also outlines treatment recommendations for these differing clinical manifestations.

Breitschwerdt EB, Linder KL, Day MJ, Maggi RG, Chomel BB, Kempf VAJ. **Koch's Postulates and the Pathogenesis of Comparative Infectious Disease Causation Associated with Bartonella species**. *J Compar Path.* 2013; 148 (2–3):115–125. http://www.ncbi.nlm.nih.gov/pubmed/23453733
This paper describes the limitations of Koch's postulate in understanding diseases caused by stealth pathogens—those pathogens, such as Bartonella, that evade the immune system and induce chronic infections that can be difficult to diagnose and treat. The paper also highlights the importance of using appropriate animal models to further aid in the diagnosis and treatment of Bartonella in humans.

Breitschwerdt EB, Sontakke S, Hopkins S. **Neurological Manifestations of Bartonellosis in Immunocompetent Patients: A composite of reports from 2005-2012**. *J Neuroparasitol*. 2013;3:1-15. http://www.ashdin.com/journals/jnp/235640.pdf
This article focuses on immunocompetent patients with Bartonellosis, including those with neurologic manifestations such as encephalitis, aphasia and transverse myelitis. It highlights current diagnostic and treatment challenges in Bartonellosis. The authors also describe how to improve diagnosis using serologic testing combined with enrichment culture and PCR.

Harms A, Dehio C. **Intruders below the Radar: Molecular Pathogenesis of Bartonella spp**. *Clin Microbiol Rev*. Jan 2012; 25(1):42-78. http://www.ncbi.nlm.nih.gov/pubmed/22232371
***This review examines the various molecular processes involved in Bartonella pathogenesis. It also* explores the link between these molecular processes and clinical presentation in patients.**

Kaiser PO, Riess T, O'Rourke F, Linke D, Kempf VA. **Bartonella spp.: Throwing Light on Uncommon Human Infections.** *Int J Med Microbiol*. 2011; 301(1):7-15.
http://www.ncbi.nlm.nih.gov/pubmed/20833105
This article describes the range of acute and chronic clinical findings in patients infected with several Bartonella species, including Oroya fever due to Bartonella bacilliformis, trench fever due to B. Quintana and cat scratch disease from B. henselae.

Florin TA, Zaoutis TE, Zaoutis LB. **Beyond Cat Scratch Disease: Widening spectrum of Bartonella henselae Infection.** *Pediatrics*. 2008; 121(5), e1413-e1425.
http://www.ncbi.nlm.nih.gov/pubmed/18443019
This review article expands on the range of clinical manifestations seen in patients with B. henselae infections, from cardiac to ocular manifestations. It also addresses the evolution of diagnostic testing

available for Bartonella (including culture, skin testing, serology and PCR) and describes the sensitivity, specificity and shortcomings of each method.

Merrell DS, Falkow S. **Frontal and Stealth Attack Strategies in Microbial Pathogenesis**. *Nature* 2004; 430(6996): 250-256. http://www.ncbi.nlm.nih.gov/pubmed/15241423
This sentinel article describes the difference between pathogens that employ frontal and stealth assault strategies. It explores how frontal assault pathogens such as Vibrio cholera tend to cause aggressive and acute symptoms, while stealth pathogens such as H. pylori and Bartonella spp. more often induce chronic and persistent disease. The article highlights the need for greater research into stealth pathogens if we are to diagnose, treat and control these chronic infections.

BARTONELLA AND SYSTEMIC ASSOCIATIONS

Cardiac

Chomel, BB, Kasten RW, Williams C, Wey AC, Henn JB, Maggi R, Carrasco S, Mazet J, Boulouis HJ, Maillard R, Breitschwerdt EB. **Bartonella Endocarditis: A Pathology Shared by Animal Reservoirs and Patients**. *Ann NY Acad Sci*. 2009; 1166:120-126. http://www.ncbi.nlm.nih.gov/pubmed/19538271

Das BB, Wasser E, Bryant KA, Woods CR, Yang SG, Zahn M. **Culture Negative Endocarditis Caused by Bartonella henselae in a Child with Congenital Heart Disease**. *Pediatr Infect Dis J*. 2009; 28(10):922-5. http://www.ncbi.nlm.nih.gov/pubmed/19738506

Cutaneous

Holmes NE, Opat S, Kelman A, Korman TM. **Refractory Bartonella quintana Bacillary Angiomatosis Following Chemotherapy for Chronic Lymphocytic Leukaemia**. *J Med Microbiol.* Jan 2011; 60(Pt 1):142-146. http://www.ncbi.nlm.nih.gov/pubmed/20947664

Sala M, Font B, Sanfeliu I, Quesada M, Ponts I, Segura F. **Bacillary Angiomatosis Caused by Bartonella quintana**. *Ann N Y Acad Sci*. 2005; 1063:302-7. http://www.ncbi.nlm.nih.gov/pubmed/16481531

Gastrointestinal

VanderHeyden TR, Yong SL, Breitschwerdt EB, Maggi RG, Mihalik AR, Parada JP and Fimmel CJ. **Granulomatous Hepatitis due to Bartonella henselae Infection in an Immunocompetent Patient.** *BMC Infect Dis.* 2012; 12:17. http://www.ncbi.nlm.nih.gov/pubmed/22269175

Canas-Ventura A, Esteve E, Horcajada JP, Andreu M, Knobel H, Marquez L. **Systemic Bartonella henselae Infection and Crohn's Disease Treatment with Infliximab**. *Inflamm Bowel Dis.* Jan 2012; 18(1):E197-198. http://www.ncbi.nlm.nih.gov/pubmed/21928372

Neurologic

Breitschwerdt EB, Mascarelli PE, Schweickert LA, Maggi RG, Hegarty BC, Bradley JM, Woods CW. **Hallucinations, Sensory Neuropathy, and Peripheral Visual Deficits in a Young Woman infected**

with Bartonella koehlerae. *J Clin Microbiol.* Sep 2011; 49(9):3415-3417. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3165616/

Breitschwerdt EB, Maggi RG, Lantos PM, Woods CW, Hegarty BC, Bradley JM. **Bartonella vinsonii subsp. berkhoffii and Bartonella henselae Bacteremia in a Father and Daughter with Neurological Disease**. *Parasit Vectors*. Apr 2010; 3(1):29. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2859367/

Breitschwerdt EB, Maggi RG, Nicholson WL, Cherry NA, Woods CW. **Bartonella sp. Bacteremia in Patients with Neurological and Neurocognitive Dysfunction**. *J Clin Microbiol*. 2008; 46(9):2856-61. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2546763/

Ocular

Kalogeropoulos C, Koumpoulis I, Mentis A, Pappa C, Zafeiropoulos P, Aspiotis M. **Bartonella and Intraocular Inflammation: A Series of Cases and Review of Literature.** *Clin Ophthalmol.* 2011; 5:817-829. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3130920/

Orthopedic

Graveleau J, Grossi O, Lefebvre M, Redon H, Caignon JM, Pallardy A, Bodet-Milin C, Néel A, Hamidou MA. **Vertebral Osteomyelitis: An Unusual Presentation of Bartonella henselae Infection.** *Semin Arthritis Rheum.* Dec 2011; 41(3):511-516. http://www.ncbi.nlm.nih.gov/pubmed/21840042

Perinatal

Breitschwerdt EB, Maggi RG, Farmer P, Mascarelli PE. **Molecular Evidence of Perinatal Transmission of Bartonella vinsonii subsp. berkhoffii and Bartonella henselae to a Child**. *J Clin Microbiol*. Jun 2010; 48(6):2289-93. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2884525/

Rheumatologic

Maggi RG, Mozayeni BR, Pultorak EL, et al. **Bartonella Spp. Bacteremia And Rheumatic Symptoms In Patients From Lyme Disease-Endemic Region**. *Emerg Infect Dis.* May 2012; 18(5):783-791. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3358077/

Vascular

Cozzani E, Cinotti E, Ameri P, Sofia A, Murialdo G, Parodi A. **Onset of Cutaneous Vasculitis and Exacerbation of IgA Nephropathy after Bartonella henselae Infection**. *Clin Exp Dermatol.* Apr 2012; 37(3):238-240. http://www.ncbi.nlm.nih.gov/pubmed/21981612

Mascarelli PE, Iredell JR, Maggi RG, Weinberg G, Breitschwerdt EB. **Bartonella Species Bacteremia in Two Patients with Epithelioid Hemangioendothelioma**. *J Clin Microbiol.* Nov 2011; 49(11):4006-4012. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3209129/

RISK FACTORS ASSOCIATED WITH BARTONELLA INFECTIONS

General

Boulouis HJ, Chang CC, Henn JB, Kasten RW, Chomel BB. **Factors Associated with the Rapid Emergence of Zoonotic Bartonella Infections**. *Vet Res. 2005*; 36(3): 383-410. http://www.ncbi.nlm.nih.gov/pubmed/15845231

Maggi RG, Mascarelli PE, Pultorak EL, Hegarty BC, Bradley JM, Mozayeni BR, Breitschwerdt EB. **Bartonella spp. Bacteremia in High-Risk Immunocompetent Patients**. *Diagn Microbiol Infect Dis.* Dec 2011; 71(4):430-437. http://www.ncbi.nlm.nih.gov/pubmed/21996096

Sun J, Fu G, Lin J, Song X, Lu L, Liu Q. **Seroprevalence of Bartonella in Eastern China and Analysis of Risk Factors**. BMC Infect Dis. 2010; 10:121. http://www.biomedcentral.com/1471-2334/10/121

Arthropod Vector Transmission

Maggi RG, Ericson M, Mascarelli PE, Bradley JM and Breitschwerdt EB. **Bartonella henselae Bacteremia in a Mother and Son Potentially Associated with Tick Exposure**. *Parasites & Vectors.* 2013; 6:101. http://www.ncbi.nlm.nih.gov/pubmed/23587194

Angelakis E, Billeter SA, Breitschwerdt EB, Chomel BB, Raoult D. **Potential for Tick-Borne Bartonelloses**. *Emerg Infect Dis*. Mar 2010; 16(3):385-91. http://www.ncbi.nlm.nih.gov/pubmed/20202411

Mosbacher M, Elliott SP, Shehab Z, Pinnas JL, Klotz JH, Klotz SA. **Cat Scratch Disease and Arthropod Vectors: More to it than a Scratch?** *J Am Board Fam Med*. Sep-Oct 2010; 23(5):685-6. http://www.ncbi.nlm.nih.gov/pubmed/20823366

Bonilla, DL, Kabeya H, Henn J, Kramer VL, Kosoy MY. **Bartonella quintana in Body Lice and Head Lice from Homeless Persons, San Francisco, California, USA**. *Emerg Infect Dis. 2009*; 15(6): 912-915. http://wwwnc.cdc.gov/eid/article/15/6/09-0054_article

Immunocompromised Status

Lamas CC, Mares-Guia MA, Rozental T, Moreira N, Favacho AR, Barreira J, Guterres A, Bóia MN, de Lemos ER. **Bartonella spp. Infection in HIV Positive Individuals, their Pets and Ectoparasites in Rio de Janeiro, Brazil: Serological and Molecular Study**. *Acta Trop.* Jul-Aug 2010; 115(1-2):137-141. http://www.ncbi.nlm.nih.gov/pubmed/20206113

Mosepele M, Mazo D, Cohn J. **Bartonella Infection in Immunocompromised Hosts: Immunology of Vascular Infection and Vasoproliferation**. *Clin Dev Immunol*. 2012; 17: 612809. http://www.ncbi.nlm.nih.gov/pubmed/22162717

Occupational Exposure

Lantos Paul M., Maggi Ricardo G., Ferguson Brandy, Varkey Jay, Park Lawrence P., Breitschwerdt Edward B., and Woods Christopher W. **Detection of Bartonella Species in the Blood of Veterinarians and Veterinary Technicians: A Newly Recognized Occupational Hazard?** Vector-Borne and Zoonotic Diseases. August 2014, 14(8): 563-570. http://www.ncbi.nlm.nih.gov/pubmed/25072986

Maggi RG, Mascarelli PE, Havenga NL, Naidoo VG and Breitschwerdt EB. **Co-infection with Anaplasma platys, Bartonella henselae and Candidatus Mycoplasma haematoparvum in a Veterinarian**. *Parasites & Vectors* 2013; 6:103. http://www.parasitesandvectors.com/content/6/1/103

Oliveira AM, Maggi RG, Woods CW, Breitschwerdt EB. **Suspected Needle Stick Transmission of Bartonella vinsonii subspecies berkhoffii to a Veterinarian**. *J Vet Intern Med*. Sep-Oct 2010; 24(5):1229-32 http://www.ncbi.nlm.nih.gov/pubmed/20695992

Organ Transplantation

Psarros G, Riddell J, Gandhi T, Kauffman CA, Cinti SK. **Bartonella henselae Infections in Solid Organ Transplant Recipients: Report of 5 Cases and Review of the Literature**. *Medicine (Baltimore).* 2012; 91(2): 111-121. http://www.ncbi.nlm.nih.gov/pubmed/22391473

Transfusions

Mansueto P, Pepe I, Cillari E, Arcoleo F, Micalizzi A, Bonura F, Seidita A, Palillo L, Di Gregorio MF, Affronti M, Di Rosa S, Rini G, Vitale G. **Prevalence of Antibodies Anti-Bartonella henselae in Western Sicily: Children, Blood Donors, and Cats**. *J Immunoassay Immunochem.* Jan 2012; 33(1):18-25. http://www.ncbi.nlm.nih.gov/pubmed/22181817

Magalhaes RF, Pitassi LH, Salvadego M, de Moraes AM, Barjas-Castro ML, Velho PE. **Bartonella henselae Survives after the Storage Period of Red Blood Cell Units: Is it Transmissible by Transfusion?** *Transfus Med.* Oct 2008; 18(5):287-291. http://www.ncbi.nlm.nih.gov/pubmed/18937735

DETECTION OF BARTONELLA

Wolf, Leslie A. et al. **In Pursuit of a Stealth Pathogen: Laboratory Diagnosis of Bartonellosis**. Clinical Microbiology Newsletter. Feb 2014, 36 (5):33-39. http://www.cmnewsletter.com/article/S0196-4399(14)00012-9/abstract

Pultorak, E. L., R. G. Maggi, et al. (2013). "Serial testing from a three-day collection period using the BAPGM platform may enhance the sensitivity of Bartonella spp. detection in bacteremic human patients." J of Clin Micro. http://jcm.asm.org/cgi/content/long/JCM.00123-13v1

Bai Y, Kosoy MY, Boonmar S, Sawatwong P, Sangmaneedet S, Peruski LF. **Enrichment Culture and Molecular Identification of Diverse Bartonella Species in Stray Dogs.** *Vet Microbiol*. Dec 15 2010; 146(3-4):314-319. http://www.ncbi.nlm.nih.gov/pubmed/20570065

Breitschwerdt EB, Maggi RG, Robert Mozayeni B, Hegarty BC, Bradley JM, Mascarelli PE. **PCR Amplification of Bartonella koehlerae from Human Blood and Enrichment Blood Cultures**. *Parasit Vectors*. Aug 24 2010; 3:76. http://www.ncbi.nlm.nih.gov/pubmed/20735840

Cadenas MB, Maggi RG, et al. **Identification of Bacteria from Clinical Samples using Bartonella alpha-Proteobacteria Growth Medium**. *J Microbiol Methods*. Nov 2007; 71(2):147-55. http://www.ncbi.nlm.nih.gov/pubmed/17889384

Duncan AW, Maggi RG, Breitschwerdt EB. **A Combined Approach for the Enhanced Detection and Isolation of Bartonella species in Dog Blood Samples: Pre-enrichment Culture followed by PCR and Subculture onto Agar Plates**. *J Microbiol Meth*. 2007; 69: 273-281. http://www.ncbi.nlm.nih.gov/pubmed/17346836

Lynch T, Iverson J, Kosoy MY. **Combining Culture Techniques for Bartonella: The Best of Both Worlds.** *J Clin Microbiol*. Apr 2011;49(4):1363-1368. http://www.ncbi.nlm.nih.gov/pubmed/21289156

Maggi, R. G., A. W. Duncan, et al. **Novel Chemically Modified Liquid Medium that will Support the Growth of Seven Bartonella Species**. *J Clin Microbiol*. 2005; 43(6): 2651-2655. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1151927/

Pitassi LH, Cintra ML, Ferreira MR, Magalhaes RF, Velho PE. **Blood Cell Findings Resembling Bartonella spp**. *Ultrastruct Pathol*. Feb 2010; 34(1):2-6. http://www.ncbi.nlm.nih.gov/pubmed/20070147

Sontakka S, Cadenas MB, Maggi RG, Diniz PPVP, Breitschwerdt EB. **Use of Broad Range 16s rDNA PCR in Clinical Microbiology**. J Microbiol Methods. 2009; 76(3):217-25. http://www.ncbi.nlm.nih.gov/pubmed/19046999

TREATMENT OPTIONS AND ANTIBIOTIC RESISTANCE

Angelakis E, Raoult D. **Pathogenicity and Treatment of Bartonella Infection**. *Int J of Antimicrob Ag*. 2014; Int J Antimicrob Agents. 2014 Jul;44(1):16-25. http://www.ncbi.nlm.nih.gov/pubmed/24933445

Biswas S, Rolain JM. **Bartonella Infection: Treatment and Drug Resistance.** *Future Microbiol.* Nov 2010; 5(11):1719-1731. http://www.ncbi.nlm.nih.gov/pubmed/21133691

Meghari S, Rolain JM, Grau GE, et al. **Antiangiogenic Effect of Erythromycin: An in vitro Model of Bartonella quintana Infection**. *J Infect Dis.* Feb 1 2006; 193(3):380-386. http://jid.oxfordjournals.org/content/193/3/380.full

Kordick DL, Papich MG, Breitschwerdt EB. **Efficacy of Enrofloxacin or Doxycycline for Treatment of Bartonella henselae or Bartonella clarridgeiae Infection in Cats**. *Antimicrob Agents Chemother.* Nov 1997; 41(11):2448-2455. http://www.ncbi.nlm.nih.gov/pubmed/9371348

Prutsky, Gabriela et al. **Treatment outcomes of human bartonellosis: a systematic review and meta-analysis**. International Journal of Infectious Diseases. 2013; 17(10):811-819. http://www.ncbi.nlm.nih.gov/pubmed/23602630

Antibiotic Resistance

Angelakis E, Raoult D, Rolain JM. **Molecular Characterization of Resistance to Fluoroquinolones in Bartonella henselae and Bartonella quintana**. *J Antimicrob Chemother.* Jun 2009; 63(6):1288-1289. http://jac.oxfordjournals.org/content/early/2009/04/15/jac.dkp133.full.pdf

Angelakis E, Biswas S, Taylor C, Raoult D, Rolain JM. **Heterogeneity of Susceptibility to Fluoroquinolones in Bartonella Isolates from Australia Reveals a Natural Mutation in gyrA**. *J Antimicrob Chemother.* Jun 2008; 61(6):1252-1255. http://www.ncbi.nlm.nih.gov/pubmed/18334491

Biswas S, Maggi RG, Papich MG, Breitschwerdt EB. **Molecular Mechanisms of Bartonella henselae Resistance to Azithromycin, Pradofloxacin and Enrofloxacin**. *J Antimicrob Chemother.* Mar 2010; 65(3):581-582. http://jac.oxfordjournals.org/content/65/3/581.full

Biswas S, Raoult D, Rolain JM. **Molecular Characterisation of Resistance to Rifampin in Bartonella quintana**. *Clin Microbiol Infect.* Dec 2009; 15 Suppl 2:100-101. http://onlinelibrary.wiley.com/doi/10.1111/j.1469-0691.2008.02179.x/full

Biswas S, Raoult D, Rolain JM. **Molecular Mechanism of Gentamicin Resistance in Bartonella henselae**. *Clin Microbiol Infect.* Dec 2009; 15 Suppl 2:98-99. http://onlinelibrary.wiley.com/doi/10.1111/j.1469-0691.2008.02178.x/full

Biswas S, Raoult D, Rolain JM. **Molecular Mechanisms of Resistance to Antibiotics in Bartonella bacilliformis**. *J Antimicrob Chemother.* Jun 2007; 59(6):1065-1070. http://onlinelibrary.wiley.com/doi/10.1111/j.1469-0691.2008.02178.x/full