Bartonella quintana and *Coxiella burnetii* as Causes of Endocarditis, India

To the Editor: In industrialized countries, blood culture is negative for 2.5%–31% of infectious endocarditis cases (*1*). In developing countries such as South Africa (*2*), Algeria (*3*), and Pakistan (*4*), culture is negative for 48% to 56%. Negative cultures delay diagnosis and treatment, which profoundly affects clinical outcome. Negative blood cultures commonly result from previous administration of antimicrobial drugs, right-sided endocarditis, or fastidious or noncultivable pathogens (*1*). Our aim was to identify fastidious agents of blood culture–negative endocarditis by serology**.** Because of recent attention to zoonotic microorganisms as agents of this condition in developing countries (*1*), we investigated the prevalence of *Coxiella burnetii*, *Bartonella* spp., and *Brucella melitensis* among endocarditis patients in India.

We cultured blood from 111 patients admitted to the Government General Hospital, Chennai, India, from August 2005 through December 2006, with a diagnosis of infectious endocarditis according to the Duke criteria (*5*). Informed consent was obtained from all patients. Three blood samples from each patient, collected at hourly intervals, were inoculated into brain–heart infusion broth supplemented with 0.04% sodium polyanethol sulfonate (HiMedia, Mumbai, India). Cultures were incubated at 37°C in a 5% CO_2 atmosphere for 14 days and checked each day for turbidity. Subcultures were made on 5% sheep blood and MacConkey agar at 37°C at 24 hours, 48 hours, and when culture broth appeared turbid.

Blood cultures were negative for 80 (72%) of the 111 patients. Serum from 63 patients was available for serologic testing. Of these patients, 30 were male and 33 were female; age range was 5–65 years and mean age was 25.5 years. Endocarditis involved the native valve for 60 (95.23%) and a prosthetic valve for 3 (4.76%). The most frequent predisposing factor was rheumatic heart disease, found in 38 (60.31%). Of the 60 with native valve endocarditis, the involved valve was mitral for most (36, 60.0%), followed by aortic (8, 13.33%), tricuspid (7, 11.66%), and pulmonary (1, 1.66%); 8 (13.33%) had both valvular and nonvalvular endocarditis. Of the 3 patients with prosthetic valve endocarditis, the involved valve was mitral for 2 and aortic for 1.

Serum samples were screened for *Bartonella* spp. and *C. burnetii* by microimmunofluorescence (*6*,*7*). A diagnosis of endocarditis was based on an immunoglobulin (Ig) G titer ≥800 to phase I *C. burnetii*; this titer has a positive predictive value of 98% (*6*). A diagnosis of *Bartonella* infection was based on the combination of a positive microimmunofluorescence titer (IgG to *B. quintana* or *B. henselae* ≥200) and a Western blot profile consistent with endocarditis (*8*).

Identification of the causative species was obtained by Western blot after cross-adsorption with either *B. henselae* or *B. quintana* antigens (*8*).

Table. Clinical findings and causative agent for 9 patients with blood culture–negative endocarditis, India, August 2005–December 2006*

Patient age, y/sex	Underlying cardiac condition	Echocardiographic findings	IgG titer to *Bartonella* spp.	IgG titer to *Coxiella burnetii* phase I	Causative agent
25/F	Right atrium fistula	Vegetation attached to tricuspid valve	400	100	*Bartonella quintana*
46/M	Rheumatic heart disease	Vegetation attached to anterior mitral leaflet	0	800	*Coxiella burnetii*
14/M	Rheumatic heart disease	Vegetation attached to tip of anterior mitral leaflet	200	0	*B. quintana*
13/M	Rheumatic heart disease	Vegetation attached to anterior mitral leaflet	200	0	*B. quintana*
28/M	Bicuspid aortic valve disease	Vegetation attached to anterior coronary cusp of aortic valve	400	0	*B. quintana*
30/M	Rheumatic heart disease	Vegetation attached to both anterior and posterior mitral leaflet extending to chordae tendinae	200	0	*B. quintana*
50/F	Rheumatic heart disease	Vegetation attached to noncoronary cusp of aortic valve	400	0	*Bartonella* spp.
40/M	Bicuspid aortic valve disease	Calcified aortic valve	400	0	*B. quintana*
40/M	Double chamber right ventricle and subaortic perimembranous ventricular septal defect	Vegetation attached to right atrium anterior leaf of tricuspid valve and lateral cusp of pulmonary valve	800	0	*B. quintana*

*Ig, immunoglobulin.

Antibodies to *B. melitensis* were detected by agglutination by using the Rose Bengal and *Brucella* Wright tests (both from BioRad, Hercules, CA, USA). Of the 63 patients, 9 had a positive antibody response against a tested antigen (Table): 1 to phase I *C. burnetii* and 8 to *Bartonella* spp. (IgG ≥200). Of these, 7 had a 1-fold dilution higher titer to *B. quintana* than to *B. henselae*, including 1 with a low-level cross-reaction with *C. burnetii*, and 1 with identical titers to both. For all 8 patients, Western blot results were consistent with *Bartonella* endocarditis. For 7, cross-adsorption identified *B. quintana* as the causative species; for the other, the infecting *Bartonella* species remained undetermined because adsorption with *B. quintana* and *B. henselae* antigens removed all antibodies. Serologic results for *B. melitensis* were negative for all patients.

B. quintana is mostly associated with human body lice but has also been found in fleas (*9*). The predisposing factors for *B. quintana* endocarditis are homelessness, alcoholism, and exposure to body lice (*10*). For our patients, the common predisposing factors were poor hygiene and low socioeconomic status, which may expose them to ectoparasites including lice and fleas. In contrast with previous study findings, *B. quintana* infectious endocarditis developed on preexisting valvular lesions in all patients (*10*). This finding may reflect a different clinical evolution than in Europe, where studies have suggested that *B. quintana* infectious endocarditis followed chronic bacteremia in patients who did not have previous valvular defects (*10*).

In summary, prevalence of negative blood culture among patients with infectious endocarditis was high (72%). The most commonly associated risk factor was rheumatic heart disease (Table). *C. burnetii* and *Bartonella* spp. were responsible for 8% of all infectious endocarditis cases and 14% of blood culture–negative cases. No case of infectious endocarditis caused by *B. melitensis* was identified.

Our preliminary study suggests that zoonotic agents, especially *Bartonella* spp., are prevalent causative organisms of blood culture–negative endocarditis in India. We recommend serologic screening for antibodies to zoonotic microorganisms as diagnostic tools for this disease in India.

Nandhakumar Balakrishnan,* Thangam Menon,* Pierre-Edouard Fournier,† and Didier Raoult†

*University of Madras, Taramani, Chennai, India; and †Universite de la Mediterranee, Marseille, France

DOI: 10.3201/eid1407.071374

References

1. Brouqui P, Raoult D. New insight into the diagnosis of fastidious bacterial endocarditis. FEMS Immunol Med Microbiol. 2006;47:1–13. DOI: 10.1111/j.1574-695X.2006.00054.x
2. Koegelenberg CF, Doubell AF, Orth H, Reuter H. Infective endocarditis in the Western Cape Province of South Africa: a three-year prospective study. QJM. 2003;96:217–25. DOI: 10.1093/qjmed/hcg028
3. Benslimani A, Fenollar F, Lepidi H, Raoult D. Bacterial zoonoses and infective endocarditis, Algeria. Emerg Infect Dis. 2005;11:216–24.
4. Tariq M, Alam M, Munir G, Khan MA, Smego RA Jr. Infective endocarditis: a five-year experience at a tertiary care hospital in Pakistan. Int J Infect Dis. 2004;8:163–70. DOI: 10.1016/j.ijid.2004.02.001
5. Li JS, Sexton DJ, Mick N, Nettles R, Fowler VG Jr, Ryan T, et al. Proposed modifications to the Duke criteria for the diagnosis of infective endocarditis. Clin Infect Dis. 2000;30:633–8. DOI: 10.1086/313753
6. Dupont HT, Thirion X, Raoult D. Q fever serology: cutoff determination for microimmunofluorescence. Clin Diagn Lab Immunol. 1994;1:189–96.
7. Fournier PE, Mainardi JL, Raoult D. Value of microimmunofluorescence for diagnosis and follow-up of *Bartonella* endocarditis. Clin Diagn Lab Immunol. 2002;9:795–801. DOI: 10.1128/CDLI.9.4.795-801.2002
8. Houpikian P, Raoult D. Western immunoblotting for *Bartonella* endocarditis. Clin Diagn Lab Immunol. 2003;10:95–102. DOI: 10.1128/CDLI.10.1.95-102.2003
9. Marie JL, Fournier PE, Rolain JM, Briolant S, Davoust B, Raoult D. Molecular detection of *Bartonella quintana, B. elizabethae, B. koehlerae, B. doshiae, B. taylorii,* and *Rickettsia felis* in rodent fleas collected in Kabul, Afghanistan. Am J Trop Med Hyg. 2006;74:436–9.
10. Fournier PE, Lelievre H, Eykyn SJ, Mainardi JL, Marrie TJ, Bruneel F, et al. Epidemiologic and clinical characteristics of *Bartonella quintana* and *Bartonella henselae* endocarditis: a study of 48 patients. Medicine (Baltimore). 2001;80:245–51. DOI: 10.1097/00005792-200107000-00003

Address for correspondence: Didier Raoult, Unite des Rickettsies, IFR 48 CNRS, UMR 6020 Universite de la Mediterranee, Faculté de Médecine, 27 blvd Jean Moulin , 13385 Marseille Cedex 05, France; email: didier.raoult@gmail.com

Acute Gastroenteritis Caused by GI/2 Sapovirus, Taiwan, 2007

To the Editor: Sapovirus is an etiologic agent of human gastroenteritis. Although many of the previously reported cases were of mild, sporadic infections in young children (*1–3*), several recent sapovirus-associated gastroenteritis outbreaks have affected adults, which suggests that the virus's virulence, prevalence, or both, may be increasing (*4–6*). In this study, we describe a sapovirus-associated outbreak of gastroenteritis that occurred during May 4–8, 2007, and involved college students in northern Taiwan.

A total of 55 students had clinical symptoms of gastroenteritis, including diarrhea (45), vomiting (22), abdominal cramps (17), and fever (2). The clinical symptoms continued for up to 10 days (mean 4.7 days). Stool