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Case Report

Bartonella and Coxiella infective endocarditis in Brazil: molecular evidence from excised valves from a cardiac surgery referral center in Rio de Janeiro, Brazil, 1998 to 2009

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SUMMARY

PCR was used to detect *Coxiella burnetii* and *Bartonella spp* in heart valves obtained during the period 1998–2009 from patients operated on for blood culture-negative endocarditis in a cardiac surgery hospital in Brazil. Of the 51 valves tested, 10 were PCR-positive; two were positive for Bartonella and one for *C. burnetii*.

1. Introduction

Coxiella burnetii, the agent of Q fever, and *Bartonella spp*, are zoonotic agents that have recently been recognized as the main etiologic agents in blood culture-negative endocarditis (BCNE) in the largest series published so far.[1] Other reports have shown a strong prevalence of *Bartonella spp* in North Africa and of *C. burnetii* in several countries in Africa, in Canada, and in several European countries. In Brazil, a developing country, studies based essentially on serological results have shown the circulation of both microorganisms.[2,3]

Establishing the diagnosis of Bartonella and *C. burnetii* infections requires laboratories with expertise in specific serological assays and/or molecular biology techniques, and few such labs exist in Brazil. Infective endocarditis (IE) is a serious condition and its diagnosis may be a challenge, especially when blood cultures are negative. In Brazil, these microorganisms are not systematically searched for, and there are few reports of Bartonella and Q fever endocarditis.[4,5] Therefore, the aim of this study was to estimate the prevalence of *C. burnetii* and *Bartonella* IE and to characterize the affected patients in a cardiac referral hospital in Rio de Janeiro, in the southeast of Brazil.

2. Methods

Paraffin-embedded excised heart valves, kept in the Pathology Department of the Instituto Nacional de Cardiologia, were sent to the Unité de Rickettsies for study. The valves were collected over the period 1998–2009, a 12-year time span. Valves were tested by PCR for the detection of *C. burnetii*, *Bartonella spp*, *Tropheryma whipplei*, *Staphylococcus aureus*, *Streptococcus oralis* group, *Streptococcus bovis* group, *Enterococcus spp*, *Mycoplasma spp*, and fungi following reported protocols.[1] All valves were also analyzed histologically. Ethics committee approval was obtained from the Instituto Nacional de Cardiologia.

3. Results

Sixty-four patients with BCNE were submitted to surgery during the 12-year period. Of these, 51 (79%) had valves available

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Table 1
Patients with Bartonella and Coxiella infective endocarditis at Instituto Nacional de Cardiologia, 1998–2009: clinical, laboratory, and demographic aspects of infection

Year	Age/sex	Agent	Valves/ predisposition	Fever	New valvular regurgitation	LVF	Time to admission (months)	Hemoglobin levels	ESR	CRP[a]	Treatment	Time from antibiotics to surgery (days)	Outcome
1998	25 M	Bartonella	Native aortic + mitral (RHD)	Yes	Yes	No	5	10.1	63	NA	Penicillin + gentamicin	35	Active follow-up
2006	9 F	Bartonella + *S. oralis*	Native aortic	No	Yes	Yes	12	11.1	7	0.38	Cefepime	30	In-hospital death
2008	43 F	*Coxiella burnetii*	Mitral bioprosthesis (RHD)	Yes	Yes	Yes	4	10.0	72	16	Penicillin + gentamicin	23	Active follow-up

CRP, C reactive protein; ESR, erythrocyte sedimentation rate; F, female, LVF, left ventricular failure; M, male, NA, not available; RHD, rheumatic heart disease.
[a] Reference value for CRP <0.5 mg/dl.

for analysis; 10 of 51 (19%) had microorganisms detected by PCR. *S. oralis* was found in six, *S. oralis* + Bartonella in one, *Bartonella spp* in one, *C. burnetii* in one, and *S. aureus* in one. Details of the Bartonella and Q fever cases are presented in Table 1. All three cases were classified as possible by the modified Duke criteria before histopathological analysis, and all had subacute clinical presentations and were community-acquired. The two adult patients who survived are followed up regularly in the outpatient clinic at the Instituto Nacional de Cardiologia and remain well. Histopathology documented all three cases.

4. Discussion

Bartonella was responsible for 2/51 (3.9%) cases of surgical BCNE as determined by molecular and histological analysis of the excised valves. It represented 2/10 (20%) cases in which the etiology was determined. Considering another case of Bartonella IE seen at the Instituto Nacional de Cardiologia in 2005,[5] bartonellae represent an even larger proportion of BCNE. This represents the gold standard of diagnosis in valve tissue, and can be compared to the prevalence of 10% positive for *Bartonella spp* (23 positive out of 227 tested valves) and 13% for *C. burnetii* (30/227 valves) by PCR as reported by Fournier et al.[1] Exposure history was not available for the 9-year-old child, nor for the case from 1998. The presence of a mixed infection (Bartonella and *S. oralis*) was also documented, and we speculate that this 9-year-old patient had a fatal outcome due to a delay in diagnosis and surgery, lack of aminoglycoside therapy, and mainly the unfavorable aortic involvement, with cardiogenic shock in the immediate post-operative period being the principal cause of death. In the female patient with Q fever endocarditis, a mitral bioprosthesis that had been in place for 11 years was affected (*C. burnetii* is well known for its predilection for prostheses), and she had a strong exposure history (newborn puppies in the household a few months prior to presentation). Her infection was essentially cured surgically, as no specific treatment was given for *C. burnetii*.

We conclude that Bartonella and *C. burnetii* are frequent and under-diagnosed zoonoses in Brazil, and systematic serological testing for these pathogens seems appropriate in the context of BCNE in the country. This will lead to more frequent diagnosis and better treatment and outcomes.

Ethical approval: Approval was obtained from the Ethics Committee at Instituto Nacional de Cardiologia.

Conflict of interest: No conflict of interest to declare.

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