Low sensitivity of *Bartonella henselae* PCR in serum samples of patients with cat-scratch disease lymphadenitis

Cat-scratch disease (CSD) is caused by *Bartonella henselae* and usually presents as self-limiting lymphadenitis. Invasive procedures are often needed to confirm the diagnosis by PCR on lymph node or other material, because culture and serological tests have low sensitivity (Bergmans *et al.*, 1997; La Scola & Raoult, 1999; Fournier *et al.*, 2002). Recently, Arvand & Schäd (2006) described isolation of *B. henselae* DNA from peripheral blood of a CSD patient 3 and 4 months after a cat scratch. They suggest that detection of *B. henselae* DNA in blood may prove useful, especially in cases where lymphadenectomy or biopsy is not feasible or serological results are equivocal.

We evaluated the use of *B. henselae* DNA detection in serum samples of a group of 18 CSD patients (mean age 29 years) with lymphadenopathy whose lymph node specimens tested positive by *B. henselae* PCR. *B. henselae* DNA was detected in lymph node material by a genotype-specific 16S rRNA PCR as described previously (Bergmans *et al.*, 1996, 1997). Genotype I was detected in 13 (72 %) cases and genotype II in 5 (28 %) cases. Serological testing by immunofluorescence assay showed positive *B. henselae* IgM in 15 (83 %) cases and IgG in 12 (67 %) cases. The patients had symptoms for 8–42 days (median 20 days), with suppuration in 15 cases. Cat contact was noted in 13 cases (5 unknown). The collection of serum occurred 0–17 days (median 5 days) before tissue sampling. A 'control' group consisted of 50 patients (mean age 35 years) who were clinically suspect for CSD but tested negative for *B. henselae* IgM antibodies using an in-house-prepared immunofluorescence assay as described previously (Bergmans *et al.*, 1997; Vermeulen *et al.*, 2007). A real-time PCR assay targeted at the heat-shock protein *groEL* was used to detect *B. henselae* DNA in all serum samples (Diederer *et al.*, 2007a).

Of the 18 patients with proven CSD, 3 (18 %) sera tested positive in real-time PCR for *B. henselae* DNA, with a mean cycle threshold value of 38 (range 37.7–39.3). Two of these patients were infected with *B. henselae* genotype I and one with genotype II. The 50 'control' serum samples all tested negative in PCR.

Detection of *B. henselae* DNA has been described consistently in feline blood samples, reflecting long-lasting bacteraemia in cats. In humans, detection of *B. henselae* DNA in peripheral blood of CSD patients has been described sporadically (Del Prete *et al.*, 2000a, b; Tsukahara *et al.*, 2001; Arvand & Schäd, 2006). We confirm that in a small proportion of CSD cases it is possible to detect *B. henselae* DNA in serum. This may reflect temporary bacteraemia or the shed of bacterial breakdown products during the phase of suppuration. The low sensitivity (18 %) found in our study suggests that PCR using serum has limited value in a routine clinical microbiology laboratory.

Generally, serum samples from patients with lymphadenopathy are readily available as these are often stored after serological testing. Detection of bacterial DNA in serum samples has proven to be useful in other diseases such as Legionnaires' disease (Diederer *et al.*, 2007b). However, we found a low sensitivity of PCR on serum samples in CSD. This may be due to loss of bacterial DNA after centrifugation and storage at –20 °C. Also, DNA may be absent in serum as *B. henselae* can invade erythrocytes (Pitassi *et al.*, 2007). Based on that theory, PCR could be more valuable on plasma or whole blood specimens. Therefore, we collected both plasma and whole blood samples from five new CSD patients with positive serological results (IgM *B. henselae* positive) and/or positive *B. henselae* PCR on lymph node specimens. None of the plasma nor whole blood

samples tested positive in real-time PCR for *B. henselae* DNA. The number of samples tested is too small to draw strong conclusions, though taking plasma or whole blood is probably not the ideal. Further prospective studies are needed to determine the exact sensitivity and specificity of *Bartonella*-specific PCR in serum, plasma and whole blood samples and to determine the optimal moment of sample taking during CSD.

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