Chapter 7

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

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INTRODUCTION

Cat-scratch disease (CSD) is caused by Bartonella (B.) 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 [1-3]. Recently Arvand and Schäd described isolation of B. henselae DNA in peripheral blood of a CSD patient 3 and 4 months after a cat-scratch [4]. 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.

PATIENTS AND METHODS

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 RNA PCR as described earlier [1, 5]. Genotype I was detected in 13 (72%) cases and genotype II in 5 (28%). 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), with suppuration in 15 cases. Cat contact was noted in 13 cases (5 unknown). The collection of serum occurred between 0-17 days (median 5) 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 in-house prepared immunofluorescence assay as described earlier [1,6]. A real-time PCR assay targeted at the heat shock protein groEL was used to detect B. henselae DNA in all serum samples [7].

RESULTS

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 (Ct) value of 38 (range 37.7-39.3). Two of these patients were infected with B. henselae genotype I, one with genotype II. The 50 ‘control’ serum samples all tested negative in PCR.

DISCUSSION

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 [4, 8-10].
We confirm that in a small proportion of CSD cases it is possible to detect *B. henselae* DNA in serum. This may reflect temporary bacteriaemia 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 of patients with lymphadenopathy are easily available as these are often stored after serological testing. Detection of bacterial DNA in serum samples has proven to be useful in other diseases like Legionnaires’ disease [11]. However, we found low sensitivity of PCR on serum samples in CSD. This may be due to loss of bacterial DNA after centrifugation and storage at minus 20 °C. Also, DNA may be lacking in serum as *B. henselae* can invade erythrocytes [12]. Based on that theory, PCR could be more valuable on plasma or whole blood specimen.

Therefore, we collected both plasma and whole blood samples from 5 new CSD patients with positive serological results (IgM *B. henselae* positive) and/or positive *B. henselae* PCR on lymph node specimen. None of the plasma nor the 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.
REFERENCES