SHORT COMMUNICATION

Use of the paired samples (cerebrospinal fluid and serum) in immunodiagnostic of active and inactive human neurocysticercosis

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Paired samples of cerebrospinal fluid (CSF) and serum of 30 patients – 10 with active, 10 with inactive neurocysticercosis (NCC), and 10 control subjects – were evaluated by enzyme-linked immunosorbent assay (ELISA) using two Taenia crassiceps metacestode extracts as antigen in order to detect IgG antibodies. In active NCC, high levels of IgG were detected (p < 0.05). The CSF samples showed 80% (CI 72-88) of reactivity in the saline extract (S) and 90% (CI 84-95) in sodium dodecyl sulphate (SDS) and the serum samples were reactive in 90% (CI 84-95) and 100% (CI 98-100) in the S and SDS antigenic extracts, respectively. The use of the paired samples of CSF and serum in active NCC showed equivalent results suggesting that the serum samples could be used as a screening in those patients whose CSF puncture is counter-indicated.

Key words: Taenia crassiceps - neurocysticercosis - enzyme-linked immunosorbent assay - serum - cerebrospinal fluid

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of 10 samples from patients (4 male and 6 female, mean age: 32 years) with other neurological disorders and normal imaging results.

ELISA for the detection of IgG antibodies was carried out according to Barcelos et al. (2001), using two different antigenic extracts: saline (S) and sodium dodecyl sulphate (SDS), obtained from *T. crassiceps* metacestodes, and used at a protein concentration of 10 µg/ml. CSF samples were tested undiluted and serum samples were diluted 1:200 in phosphate buffered saline (PBS, 0.1M, pH 7.2) containing 0.05% Tween 20. The conjugate goat IgG anti-human IgG-peroxidase (Fc chain specific; Sigma) was diluted at 1:2000. The cut off was established by the mean optical density (OD) obtained from three negative control samples plus two standard deviations. Statistical analysis was performed using the software Statistic for Windows (Stat soft, Inc. 1993) for the comparative analysis between two proportions, considering significance level at p < 0.05. A 95% confidence interval (CI) was stipulated.

The results of ELISA from the three patient groups are showed in the Table, the values of OD were significantly higher in the active NCC than the other two groups (p < 0.05). The Figure shows the relationship between the values of OD in the CSF and serum samples obtained from patients with active NCC using two antigenic extracts. The results indicate that there were high correlate index using of S extract.

In the present study, we used the *T. crassiceps* heterologous cysticerci as an alternative source of antigens for the immunological diagnosis of the human NCC. In a previous ELISA study using *T. crassiceps* S and SDS antigens in the CSF samples from patients with NCC, Barcelos et al. (2001) demonstrated 85 and 87.5% of sensitivity and 100 and 97.9% of specificity, respectively. Pardini et al. (2002), in an ELISA study for detection of IgG antibodies in CSF samples in NCC, showed 100% of sensitivity and specificity, using antigen extracts obtained from the vesicular fluid of *T. crassiceps* cysticerci and from fractions purified by affinity chromatography with lectin concanavalin A and the glycoprotein antigen separated by electrophoresis.

Serology for NCC can produce false-positive results in samples of patients coming from endemic countries for cysticercosis, such as Brazil, because there is a production of specific antibodies due to previous infections that did not progress for the establishment of metacestodes or because these latter are located outside the neural tis-

### Table

<table>
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<tr>
<th>Patient</th>
<th>% (CI)</th>
<th>% (CI)</th>
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<tbody>
<tr>
<td>Active NCC</td>
<td>80 (72.0-88.0)</td>
<td>90 (84.0-95.0)</td>
</tr>
<tr>
<td>Inactive NCC</td>
<td>0</td>
<td>10 (4.0-16.0)</td>
</tr>
<tr>
<td>Control</td>
<td>0</td>
<td>20 (12.0-28.0)</td>
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</table>

CI: confidence interval

![Graph](image)
The ELISA cross-reactivity among helminthiases was found with the use of antigens (Echinococcus granulosus hydatid fluid, T. solium cysticerci saline extract, and vesicular fluid of T. crassiceps) belonging to phylogenetically related parasite species, by sharing same antigenic components (Ishida et al. 2003). By analyzing CSF samples of patients with NCC using excretion/secretion antigens of T. solium metacestodes, a significant difference between ELISA results in the detection of IgG antibodies was shown in order to distinguish the active NCC from the inactive one (Molinari et al. 2002). The results of this study showed that patients presenting the active form of NCC showed the highest levels of specific IgG antibodies in both samples analyzed, since the immune response is maximized when the parasite goes into the degenerative phases. In the control group analyzed here none of the individuals showed reactivity.

In conclusion the used of the paired samples of CSF and serum in active NCC showed equivalent results suggesting that the serum samples could be used as a screening of those patients whose CSF puncture is contra-indicated.

REFERENCES


