Full Length Research Paper

Seroprevalence of *Toxoplasma* infection in stored sera of HIV individual in Sokoto, Nigeria

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Accepted 27 December, 2011

An investigation was carried out to determine the prevalence of antibodies to *Toxoplasma gondii*, an obligate intracellular protozoan parasite that cause toxoplasmosis among HIV positive individuals in Sokoto, Nigeria. Twenty-two (26.1%) of the 84 HIV screened positive sera had antibody to *T. gondii* infection. Lower titer of 1:4 occurred in 2(9.1%) of the sera, and the sera from patients that were in the age group 50-59 had the highest prevalence (33.3%). Based on the value of the IgG obtained with enzyme Immunosorbent Assay (EIA), using the ImmunoComb® IgG(Orgenics) the concentration of >50 IU/ml were observed among 14 (63.6%) of the sera sampled, an indication of chronic phase of toxoplasmosis. These results showed that the HIV sero-negative patients need to be adequately counseled on the prevention of toxoplasmosis and any other infections that can always aggravate the illness and to initiate appropriate prophylaxis.

Key words: HIV-positive, seroprevalence, Sokoto, toxoplasma infection.

INTRODUCTION

Toxoplasmosis is caused by an obligate intracellular protozoan parasite, *Toxoplasma gondii*. Most of the *Toxoplasma* infections are asymptomatic or benign, but may cause severe or fatal consequences in immunodeficient patients, transplant recipients and in the foetuses (Yaneza and Kumari, 1994). Toxoplasmosis is of zoonotic importance and this is increasingly being recognized especially in the tropics and sub-tropics of the world where high antibody rates have been recorded (Esteban-Rendondo et al., 1999). In immunocompromised individuals, *T. gondii* infections could cause central nervous system diseases as encephalitis or brain abscess (Krevets and Fedman, 2004; Walker and Zunt, 2005). Transmission may occur by eating uncooked or undercooked meat, contaminated vegetables, by blood transfusion, organ transplantation and across the placenta from the mother to the foetus (Bisson et al., 2000; Dubey, 2004; Alvarado-Eguivel et al., 2007). Toxoplasmic encephalitis (TE) occurs almost exclusively because of reactivation of latent tissue cysts (Luft et al., 1984; Israelisk et al., 1993). The primary infection occasionally is associated with acute cerebral or disseminated disease. It has been reported that in the pre-ART (pre-anti retroviral treatment) era, for patient with advanced immunosuppression who were seropositive for *T. gondii* and not receiving prophylaxis with drugs active against *T. gondii*, the 12 months incidence of Toxoplasma encephalomyelitis (TE) was approximately 33% (Kaplan et al., 2009).

There are several reports of toxoplasmosis among immunodeficient patients especially those with defects in
Table 1. Prevalence of antibody to Toxoplasma infection in sera of HIV sera in relation to sex in Sokoto.

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. examined</th>
<th>No. positive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>50</td>
<td>10 (20)</td>
</tr>
<tr>
<td>Females</td>
<td>34</td>
<td>12 (35.3)</td>
</tr>
<tr>
<td>Total</td>
<td>84</td>
<td>22 (26.1)</td>
</tr>
</tbody>
</table>

Table 2. Latex slide agglutination test- distribution of antibody titers in 22 sera of HIV positive sera in Sokoto.

<table>
<thead>
<tr>
<th>Titres</th>
<th>No. positive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in 2</td>
<td>0</td>
</tr>
<tr>
<td>1 in 4</td>
<td>2 (9.1)</td>
</tr>
<tr>
<td>1 in 8</td>
<td>6 (27.3)</td>
</tr>
<tr>
<td>1 in 16</td>
<td>5 (22.7)</td>
</tr>
<tr>
<td>1 in 32</td>
<td>4 (18.2)</td>
</tr>
<tr>
<td>1 in 64</td>
<td>5 (22.7)</td>
</tr>
</tbody>
</table>

T-cell mediated immunity such as those with haematologic malignancies, bone marrow transplants and HIV/AIDS patients (Ferreria and Borges, 2002). Individuals under immunosuppressive therapy such as organ transplant recipients or patients with malignant diseases, who had been previously infected with *T. gondii* might show an altered serological profile of this protozoan compatible with reactivation, such as increased IgG antibody titers or less frequently increased titers of acute phase antibodies. There is dearth of information on the presence and activities of opportunistic infections in immunocompromised individuals in the study area. This study was therefore carried out to investigate the presence and prevalence of antibody to *T. gondii* (an opportunistic pathogen) infection in HIV positive human sera obtained from patients who had presented themselves for HIV screening at a Sokoto Hospital, Nigeria.

MATERIALS AND METHODS

The study area was Sokoto town, in the Northwest Nigeria. Previously confirmed HIV positive sera at one of the tertiary hospitals in Sokoto (Specialist Hospital), were obtained and used, after obtaining ethical approval from the Hospital Management Board. The sera had been screened and confirmed positive with the use of Determine® HIV-1/2 (Inverness Medical, Japan), a qualitative immunoaassay; Trinity biotec Uni-Gold™, a rapid immunoassay and/or HIV1/2 STAT-PAK® assay(Chembio), a single use chromatography at the Haematology Department of the Specialist Hospital, Sokoto. Inscribed on the vial was the laboratory number which was used to obtain corresponding information such as the sex and age of the individual patient from the laboratory register. All these sera were already frozen at -20°C and not more than 2 weeks in storage. The sera were subsequently conveyed to Veterinary Parasitology Laboratory, Faculty of Veterinary Medicine, Usmanu Danfodiyo University, Sokoto for further analysis for the presence of Toxoplasma antibodies.

Statistical analysis

Prevalence of infection was given as the percentage parasitological positive and chi-square test was used to examine whether there were significant differences on the results obtained. For the statistical test *p*≤0.05 is considered statistically significant.

RESULTS

Out of the 84 HIV positive sera obtained, 50(59.5%) were from males while 34(40.5%) were from females. The age range was 18-52 years with a mean of 33 years. *T. gondii* antibodies were detected in 22(26.1%) of the HIV positive sera analysed with latex slide agglutination techniques (Table 1).

Table 2 shows the frequency distribution of the antibody titers in the positive sera, in which 63.6% had titers higher than 1 in 8 by the latex slide agglutination test while only 2(9.1%) had lower titer of 1 in 4.

The summary of the age- distribution of antibody titer is shown in Table 3. The peak of infection was observed among patients in the age group of 50-59 (33.3%) in both sexes, while the lowest prevalence 20% was observed among patients in the age group of 20-29 years. The infection is independent of age as there was no significant difference (χ² =0.83; *p*>0.05).

The value of IgG obtained with enzyme ImmunoComb® IgG (Orgenics) at concentration of >50 IU/ml was observed in 14(63.6%) of the sera sampled and observed among patients above the age group of 30-39 years.

DISCUSSION

Although numerous studies on the seroprevalence of *T. gondii* in patients infected with HIV have been conducted...
in other countries, few studies have however, been carried out in Nigeria especially in the Northwest area.

Toxoplasmosis is an infection caused by the parasite *T. gondii* and is one of the common opportunistic infection associated with AIDS (Ferreire and Borges, 2002). The disease toxoplasmosis has been described as neglected disease, (Hughes, 1985).

With the emergence of HIV, *T. gondii* has assumed an opportunistic agent role and is being frequently recorded as co-infection in some case of AIDS presenting in approximately 5% of new cases of AIDS (Morlat and Leport, 1997).

In this study, a combination of Latex slide agglutination test (LSAT) and IgG Enzyme Immunosortant Assay (IgG-EIA) were used. Latex slide agglutination has been described to be a rapid valuable tool in the detection of antibody to *Toxoplasma* infection (Ogunba and Thomas, 1979; Babatunde et al., 2009). The IgG-EIA was used to validate the result obtained by the LSAT and to determine the course of the infection in the sera of the HIV/AIDS patients. Since the conventional single-serum assay alone does not make a clear distinction between a recent primary and chronic infection the measurement of IgG, therefore is important (Lappalainen and Hedman, 2004).

The prevalence of antibody to *Toxoplasma gondii* in the HIV/AIDS seropositive sera was found to be 26.1% with LSAT in Sokoto.

In some recent studies carried out in two different towns located in North central of Nigeria, 38.8% and 41.1% prevalences were obtained in Jos and Ilorin respectively (Uneke et al., 2007; Babatunde et al., 2009). These values are higher than that obtained in this study.

### Table 3. Latex slide Agglutination test-age distribution of antibody titers in 22 sera from HIV sera in Sokoto.

<table>
<thead>
<tr>
<th>Age range (Year)</th>
<th>No. Examined</th>
<th>No. Positive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-19</td>
<td>4</td>
<td>1 (25)</td>
</tr>
<tr>
<td>20-29</td>
<td>25</td>
<td>5 (20)</td>
</tr>
<tr>
<td>30-39</td>
<td>43</td>
<td>13(30)</td>
</tr>
<tr>
<td>40-49</td>
<td>9</td>
<td>2(22)</td>
</tr>
<tr>
<td>50-59</td>
<td>3</td>
<td>1(33.3)</td>
</tr>
</tbody>
</table>

which are of different types and on sale in every nook and cranny in northern parts of the Nigeria. Because of the roasting temperature that may not be sufficient enough to during processing to eliminate meat parasites (Faleke and Ogundipe, 2003). This may be most important mode of infection. However, cats are also kept in close proximities with man in the study area and could therefore produce an important source of infection through ingestion of oocysts shed in their feaces.

In this study, 18 sera were found to have IgG antibody combination of >50 U/L an indication of chronic phase of toxoplasmosis. This is an indication of probable infection of about one year. Delgado-Iribarren et al. (1998) stated that in HIV/AIDS patients, regular toxoplastic diagnosis is desirable to prevent T.E.

In conclusion, *Toxoplasma* antibody was detected in the sera of HIV patients in Sokoto, which might induce encephalitis in affected individuals (Luft and Remington, 1988). The 22(26.1%) of sera from 84 HIV/AIDS patients were sero-positive to *T. gondii* infection and may be at risk of developing toxoplastic encephalitic.

This first report on toxoplasmosis in HIV patients in this area is an indication for a comprehensive study on *T. gondii* infection in HIV/AIDS patients, to establish the status of individual with the infection in the entire State for effective surveillance.

### ACKNOWLEDGEMENTS

The Management Board of the Specialist Hospital, Sokoto is appreciated for the ethical approval; we also appreciate the Laboratory Staff of the Hospital for their assistance.

### REFERENCES

