Study of Prevalence of Toxoplasma Gondii among Hemodialysis Patients in Thi-Qar Province

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Abstract

Toxoplasmosis is a widespread zoonotic disease caused by one of opportunistic parasite called Toxoplasma gondii. The current study was conducted in Thi-Qar province to investigate the parasite Toxoplasma gondii among hemodialysis patients using Enzyme Linked Immunosorbent Assay test and study some of the factors that may affect in the prevalence of infection, such as age, sex and a number of hemodialysis. 100 was collected samples of blood from hemodialysis patients from Hussein Teaching Hospital for the period from October 2015 to the end of March 2016 and prepared a questionnaire form for each person to get their information, as well as the collection of 50 blood samples from healthy persons for the purpose of comparison between them with the current study. The results of the current study showed that the prevalence of toxoplasmosis in Thi-Qar province in renal dialysis patients and a comparison group of 28% and 24% respectively. Recorded results of Enzyme Linked Immunosorbent Assay ELISA test results for a positive antibody IgG in hemodialysis patients and a comparison, 25% 22% respectively. As for the IgM antibody study did not record any positive result in hemodialysis patients group while in comparison group was 2%. The ratios antibodies IgG & IgM together in hemodialysis patients and comparison group 3%, 0.0% respectively. The highest infection rates for hemodialysis patients was in the age group (40-49 years) was 26.67% and the lowest rates of infection in the age group (>60 years) 23.08% and reported significant differences P <0.05 to infection rates in males highest compared to females where it was 35.18% and 19.56% respectively. For factor number of hemodialysis show high infection rates in patients who have been exposed to more than >6times of hemodialysis 25.53% as for those who were exposed to 1-6 was ratios have 16.67%.

Keywords: Toxoplasma gondii, Toxoplasmosis, Hemodialysis patients, Prevalence, ELISA, risk factors.

Introduction

Toxoplasmosis is a widespread zoonotic disease caused by one of opportunistic parasite called Toxoplasma gondii. It has economic relevance to both veterinary and human medicine [1]. Parasite infection occurred as a result of a transmission of three phases of middle and terminal hosts of oocytes with contaminated water and food, tissue cysts, in addition to it can catch it from contaminated meat or tachyzoites which is transmitted to baby from infected mother [2].

Innate and acquired immunity play an important role to control infections and can prevent it causing disease later. However, immune system can be employed to decrease of parasite infection and transferred it into oocytes within tissue and this can be probably transferred from chronic to acute and this leads to make the parasite active again [3].

Toxoplasmosis is especially serious for people who have weakened immune systems such as cancer, organ transplant recipient who have taken immune inhibitor drugs and Haemodialysis and ADIS that make them more infected by multiple diseases [4].

From previous decades T. gondii is the parasite that causes toxoplasmosis for patients that have weakened immune systems like ADIS [5]. Toxoplasmosis differs from person to person depending on infection intensity and immune status therefore most people who have toxoplasmosis never have any symptoms at all due to their good immune status or no signs or symptoms.
while people who develop symptoms may experience for example a fever, swollen lymph nodes for uterus, especially in the neck, a headache, muscle aches and pains and sore throat [6]. Toxoplasmosis is especially serious for people who have weakened immune systems. For these people, they’re at risk of developing Spleenomegaly, Chorioretinitis, and Pneumonitis and encephalitis [7].

Materials and Methods

Data Collection

The current study was conducted on hemodialysis patients at different ages in both genders. Samples were collected from Al Hussein teaching hospital during January 2015 to March 2016. The survey form included the age and number of dialysis for each patient.

Elisa Test

An Elisa assay (Bio Check) was used to measure toxoplasma IgG antibodies in human serum using antigen-coated polystyrene beads as a solid phase and anti-human IgG-horse radish peroxidase conjugate as an enzymatic tracer and then the samples were incubated and washed twice by washing buffer to remove unconjugated antibodies and finally Tetramethylbenzidine was added and the reaction was stopped using HCL (IN) as a stop solution. The results were taken compared to control.

Statistical analysis

The data were analyzed by t-test and Chi-square using Spss software [8].

Results

Prevalence of Parasite

The results of the immunological diagnosis of the study showed that 28 (28%) samples were positive and (72%) were Negative Compared with healthy persons which resulted in 12 samples positive and by 24% and 38 samples negative and by 76%. Table (1).

Distribution of Toxoplasma Gondii Antibodies

In the control group rate IgG, IgM and IgG & IgM antibodies were 22%, 2% and 0% respectively showed a significant difference at P <0.05. In hemodialysis patients IgG, IgG&IgM and IgM, were 25%, 3% and 0% respectively, at P <0.05. Table (2).

Categorize Toxoplasmosis Infection According to the Age

In the current study, it has been found that the morbidity to toxoplasmosis through ELISA detection was higher in Age category between 30 to 39 years among healthy persons. Subsequently, there was no significant difference among variant age categories. Whereas in hemodialysis patients, morbidity was higher in 40-49 years categories by 26.67% Also, lower morbidity was >60 years in age category by 23.08 %. Hence, there was no significant differences at P>0.05 level as shown in Table (3).

Categorize Toxoplasmosis Infection According to Gender

Also this study has been detected that morbidity was higher in male by 33.33% meanwhile in female was 13.04 % for healthy people as well as there was no significant differences. Nevertheless in hemodialysis patients, morbidity was higher in male by 35.18 % comparing to female by 19.56 % as corresponding statistical analysis. There was notably.

In Term Number of Dialysis

Patients who underwent renal dialysis more than six times were 25.53% either less than that 16.67%. Consequently, there were higher significant differences at level p<0.05 (Table 5).

Table 1: Rate of Toxoplasma gondii in fecion in hemodialysis patients compare with comparison group (healthy)

<table>
<thead>
<tr>
<th>Group</th>
<th>ELISA test</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Control</td>
<td>12</td>
<td>24.0</td>
<td>38</td>
<td>76.0</td>
</tr>
<tr>
<td>hemodialysis Patients</td>
<td>28</td>
<td>28.0</td>
<td>72</td>
<td>72.0</td>
</tr>
</tbody>
</table>

Table 2: Distribution of Toxoplasma gondii parasite according anti-bodies type using ELISA test

<table>
<thead>
<tr>
<th>Group</th>
<th>Antibody</th>
<th>ELISA test</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>IgG</td>
<td>11</td>
<td>22</td>
<td>39</td>
<td>78</td>
</tr>
</tbody>
</table>
It is well established that Toxoplasma gondii has high virulence in patients with immunodeficiency. That was throughout epidemiological studies using serological tests [9, 11]. Current study documented morbidity toxoplasma in patients with hemodialysis and comparing that with healthy people by using ELISA technique by 28% and 24% respectively.

This result was corresponding with previous studies have been done by [12] and [13]. As referring to high morbidity could happened highly in patients with hemodialysisas comparing to control group. Where renal dialysis patients are suppressed in cellular and intercostal immunity and thus decrease in T-Cell and the patient is unable to recover the weakness of the immune system [14]. IgG antibodies for dialysis patients and control group were 25% and 22% respectively. While IgM antibody was 0%, 2% respectively and IgG & IgM 3% and 0% respectively. The IgG antibody was higher in the study group compared to the other antibodies.

The comparable results of previous study were comparability with other studies have been reffered by [15, 17] and [18] in Thi-Qar province. All these studies showed different concentration of immunoglobulinby 1.73%, 17.5%, 27.5 and 11.91% for IgG as well as...
56.09%, 3.5%, 3.44 and 5.33% for IgM respectively. IgG may be more likely to be IgG-induced and longer-term, indicating that there is an initial infection, a re-activation of the infection, or a persistent response to the underlying injury [19]. In the dialysis patients, the incidence in males was higher than that of females. The rate of infection was 35.18% for males and 19.56% for females. The result was similar to the study [20], which showed that the rates of infection of males 51.4% and females 50.5% of people with kidney failure.

The study differed with [21] where showed the rate of infection in females higher compared with males were (55.81%), (44.18) respectively. The issue of gender difference in response to parasites is incomprehensible but may involve differences in host and pathogen interactions or relationships between the pathogen and the host that may be affected by the system or subject to endocrine effects [22].

In the prevalence of infection and age groups, the study showed that in patients with renal dialysis the highest rates of infection were in the age group (40-49) years and the lowest in (60> years), which was 26.67% and 23.08% respectively. It was observed that the infection increased as age increased and this was consistent with both. [23] conducted in Iran, which showed that the highest rate of infection in the category (34 years) and with [24], where the infection was the highest in the category (> 35 years) and also agreed with the study [25], which recorded high rates of infection in the category (36-40) years and did not agree with the study reported [26] in a study conducted in Wasit which found that the highest rate of infection falls within the category (21 - 30) years and amounted to 71.7% and the lowest incidence in the advanced age groups also differed study with the study [27] in Tikrit, which recorded the highest rates of infection in the category (26-30) years and by 35.71% and the lowest in the category (36-40) years did not agree with [28,29]. Between the age groups of less than 30 years. The increased effectiveness of the immune system decreases gradually as age increases, exposing these groups to parasitic infection [30].

This may also be due to the longer exposure to risk factors associated with parasite infection [31]. The study found that there was a relationship between the length of dialysis and treatment with positive parasitic infection, where the infection in patients who had repeated dialysis more than six times and above the proportion of infection (25.53%) or less than the rate of infection (16.66%) and the results agreed with [32], who observed that as the number of dialysis times increased, the ELISA for toxoplasmosis was increased and also with [33] in Egypt and [34, 35] in Turkey. Where patients with chronic renal failure gradually get cellular and amniotic immunity and receive a deficiency in T-Cell cells and thus become susceptible to several diseases [36].

References


