Molecular and Immunological test for detection of Toxoplasma gondii in pregnant women and patients with prostate cancer

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Abstract
A cross-sectional study had achieved in Baghdad government from March 2016 to March 2017”. 100 patients with prostatic cancer were involved in this study. The age of the patients was between (30-75) years, control bunch who were coordinated to the patients, including 100 pregnant patients and 100 solid people (blood givers). Five ml of blood have gathered from every patient, and the control gathering took a crack at this examination. Blood tests were set into two cylinders; one of the tubes was contained anticoagulant EDTA for an atomic trial of Toxoplasma gondii, another tube was 2 ml have centrifuged. “The obtained sera was aspirated, and stored for identification of specific Toxoplasma gondii IgM and IgG by using ELISA technique”. “The study found that 40% of prostate cancer patients were positive to T. gondii by RT-PCR compared with 30% in pregnant patients and 13% of non-diseased (control). The study revealed that 55% of patients with cancer of prostate with result +ve ELISA was also +ve by PCR compared with 0% of patients with –ve ELISA results, Current study that appearance 60% of cancer of prostate patients with T. gondii IgM+ IgG+ and 58.33% IgM+ IgG- antibodies were positive by PCR. “Our study revealed that the high rate of T. gondii infection” “was founded among patients with prostatic cancer older than 70 years (53.86%) and low rate (20%) was within patients between (30-39) year and we were observed,” That Toxoplasma gondii infection increased proportionally with increase of patients age. In conclusion, a high rate of prevalence of T. gondii DNA (as detected by RT-PCR), as well as its antibodies, have observed in prostate cancer and RT PCR was the precise manner in the detection of T.gondii.

Keyword: prostate cancer; Toxoplasma gondii; Immunological test, real-time PCR; immunocompromised

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Introduction
Prostatic inflammatory disease is an imaginable reason for infections like benign prostatic hyperplasia and cancer of the prostate in young & elderly men. Variables are known to aggravate the prostate incorporate certain infections, microbes, and steroids, just as ecological and dietary components (1). Notwithstanding, researchers knew of the specific cause of each factor in prostatic irritation. T. gondii, which contaminates most well evolved creatures, is available everywhere in the world; disease rates arrive at 80 percent in certain peoples (2). The incitement of the safe reaction by T. gondii or hindrance of angiogenesis may clarify the biologic premise of these perceptions. In creature, it has been demonstrated that specific parasites or parasitic mixes had the option to repress disease growth (3). Nevertheless, in low immunity people, reactivation of the idle T. gondii bradyzoites transformed to the proliferative tachyzoite stage that can cause toxoplasmic encephalitis (TE) (4). The danger of toxoplasmic encephalitis increments with perishing in CD4+ T lymphocyte tally (5). A few examinations reported fluctuating size of inactive T. gondii disease in HIV-contaminated people. Seroprevalence of T. gondii in HIV patients has found in a large portion of the literature, with a high incidence of TE between AIDS patients not having prophylaxis (6). Rather than the generally ideal course of toxoplasmosis in practically all immunocompetent people, immunologically debilitated patients, for
the most part, build up a terrifying and regularly dangerous illness \(^{(7)}\). Immunocompromised patients at higher hazard for toxoplasmosis incorporate those with malignancies, bone marrow transplant, strong organ transplant (counting heart, lung, liver, or kidney), or AIDS \(^{(8)}\). The aim of the study focused on the detection of DNA of Toxoplasma in plasma of prostate cancer compared with pregnant patients and healthy control.

**Material and Methods**

A cross-sectional study had applied in Baghdad government from March 2016 to March 2017\(^{11}\). The number of prostate malignancy patients 100. There are times of the patients were between 30-75 years of age. “The control bunch, who were coordinated to the patients, included 100 pregnant ladies and 100 sound people (relatives of patients)”. “Five ml of blood was gathered from all patients and the control”. Blood tests were put into two cylinders tube, one of tube contain anticoagulant EDTA for DNA detection of *Toxoplasma gondii* (using Sacace biotechnology-Italy, Toxo-DNA Real-TM Quality).

**Statistical analysis**

Computerized statistically analysis was performed using Mintab ver 18.0 statistic program for determination of the *P*. value (*P*<0.05: significant).

**Findings**

This hospital-based study was included 300 persons (100 Prostate cancer, 100 pregnant women and 100 apparently healthy individuals (blood donors)), characteristics of age and sex were mentioned in Table 1.

### Table 1: Clinical data of the study groups

<table>
<thead>
<tr>
<th>Study group</th>
<th>Status and underlying disease</th>
<th>No.</th>
<th>Sex (%)</th>
<th>Mean age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>Immunocompromised</td>
<td>100</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Pregnant patients</td>
<td>Pregnancy</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Healthy control</td>
<td>Blood donors and patients relatives</td>
<td>100</td>
<td>64</td>
<td>36</td>
</tr>
</tbody>
</table>

The study found that 40% of prostate cancer patients were positive to *T. gondii* by ELISA compared with 30% in pregnant patients and 13% of healthy control as shown in Table 2.

### Table 2: Prevalence of anti -Toxoplasma IgM & IgG +ve in studied group

<table>
<thead>
<tr>
<th>Studied groups</th>
<th>No.</th>
<th>Result of ELISA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>+ve n (%)</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>Pregnant patients</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>Control group</td>
<td>100</td>
<td>13</td>
</tr>
</tbody>
</table>

P. value: 0.003

It was shown that 55% of patients with prostate cancer with IgM & IgG positive yield +ve PCR comparing with 0% of negative IgM & IgG.

### Table 3: Toxoplasma DNA positive as detected by PCR in prostate cancer patients

<table>
<thead>
<tr>
<th>IgM &amp; IgG</th>
<th>No.</th>
<th>PCR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
</tbody>
</table>

It was observed that 60% of prostate cancer with *T. gondii* IgM+ IgG+ and 58.33% IgM+ IgG- were positive by PCR, Table 4.

### Table 4: Rate of IgM & IgG antibodies against Toxoplasma corresponding the result of PCR in p prostate cancer patients

<table>
<thead>
<tr>
<th>ELISA test</th>
<th>No.</th>
<th>RT-PCR</th>
<th>Number</th>
<th>%</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>IgM(+)IgG(+)</td>
<td>10</td>
<td></td>
<td>6</td>
<td>60</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>IgM(+)IgG(-)</td>
<td>12</td>
<td></td>
<td>7</td>
<td>58.33</td>
<td>5</td>
<td>41.67</td>
</tr>
<tr>
<td>IgM(-)IgG(+)</td>
<td>18</td>
<td></td>
<td>9</td>
<td>50</td>
<td>9</td>
<td>50</td>
</tr>
<tr>
<td>IgM(-)IgG(-)</td>
<td>60</td>
<td></td>
<td>0</td>
<td>0</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td>7</td>
<td>23.33</td>
<td>23</td>
<td>76.67</td>
</tr>
</tbody>
</table>

P. value < 0.001

The study revealed that most of *T. gondii* contamination (analysis by PCR) were recording among prostate malignancy inside the age bunch ≥70 years (53.86%) and the least percentage (20%) were inside age bunch 30-39 years and it was seen that *T. gondii* contamination tainted was relatively increments with increment of patients age (table-5).

### Table 5: Frequency of *T. gondii* infection in regarding to age prostate cancer patients

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>Number</th>
<th>PCR results</th>
<th>+ve</th>
<th>%</th>
<th>-ve</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>10</td>
<td></td>
<td>2</td>
<td>20</td>
<td>8</td>
<td>80</td>
</tr>
<tr>
<td>40-49</td>
<td>17</td>
<td></td>
<td>6</td>
<td>35.29</td>
<td>11</td>
<td>64.71</td>
</tr>
<tr>
<td>50-59</td>
<td>22</td>
<td></td>
<td>9</td>
<td>40.91</td>
<td>13</td>
<td>59.09</td>
</tr>
<tr>
<td>60-69</td>
<td>38</td>
<td></td>
<td>16</td>
<td>42.11</td>
<td>23</td>
<td>57.89</td>
</tr>
<tr>
<td>≥70</td>
<td>13</td>
<td></td>
<td>7</td>
<td>53.86</td>
<td>6</td>
<td>46.15</td>
</tr>
<tr>
<td>36-45</td>
<td>100</td>
<td></td>
<td>40</td>
<td>40</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

P. value > 0.05

**Discussion**

Toxoplasmosis of low immunity patients is routinely the delayed consequence of reactivated subclinical infection, which can reveal as neurological signs, including cerebral agony; reflex changes; tiredness; hemiparesis; seizures and disarray. Extraordinary picked up *Toxoplasmosis gondii* sullying in low immunity patients may moreover found and incorporate different organs. Retinochoroiditis; Pneumonia as well as other spread basic contaminations, can in like manner be found, anyway are not as fundamental as encephalitis in low immunity patients. The harm can reactivate inactive *Toxoplasmosis gondii* ailment during the treatment of cancer. Many type of malignancies, including multiple myeloma; lymphoma and leukemia that can reactivate toxoplasmosis. Robert et al. showed that toxoplasmosis could be jumbled & can be seen as a real ailment in low immunity patients, where the
reactivation of idle pollution may be lethal. The frequency of reactivated toxoplasmosis may depend on the commonness & centralization of IgG antibodies (9). Due to the absence of concentrates on the job of toxoplasmosis in prostate malignant of growth patients, the commonness of parasite 40% in prostate disease patients contrasted with 30% in pregnant ladies showed the job of safe weakening in prostate malignancy patients due to accepting chemotherapy, which thus kills the invulnerable cells, and at last prompts a flare-up of ailments that adventures the powerless safe framework, which obviously will be more extrapolated than pregnant ladies and control gathering. Hardy any investigations were inspected the likelihood T. gondii in instigating of prostatic irritation and receptive hyperplasia and they examine the job of low insusceptible reaction toward contamination, including T. gondii during carcinoma (6-9). Hostile to tumor exercises of T. gondii parasite have been appeared in changed examinations (10, 11). Infusion of rodents with Toxoplasma lysate antigen brought about a huge decrease in tumor development (12). Finally, the inhibition impact of Toxoplasmosis gondii on cancer development has additionally been appeared in cell culture (13). Toxoplasma gondii disease brings about the foundation of an incessant responsive provocative microenvironment in prostate (14, 28). During typical fix and recuperation homeostatic procedures, cells taking out harm because of toxic improvements, animate epithelial recovery, and stromal rebuilding, elevate angiogenesis to finish mending and reestablish ordinary tissue work. Following these occasions, aggravation regularly subsides (15, 27). Nevertheless, in cases in which the safe framework moves toward becoming deregulated, or the poisonous upgrades or contamination continues, the irritation can end up ceaseless by a self-supporting endless loop. T.gondii contamination instigated a receptive microenvironment with considerable multiplication & hyperplasia of basal and luminal epithelial compartments, including the extension of travel enhancing cells, the proliferative cells embroiled in fix and recovery (16, 17).

Aggravation in this model brought about hyperplasia and development of the glandular epithelium in a microglandular design. It is conceivable this later reactivation of the tachyzoite arrange a later time focuses advances a proceeding of the fiery reaction in the prostate (18, 19). In a deliberate survey study led by Ahmad et al., 2014 to analyze general seroprevalence pace of toxoplasmosis in malignancy patients, 45.0% were certain, in addition in a deliberate survey and meta-analysis in China, seroprevalence of Toxoplasmosis gondii in malignancy patients were observed to (20.59)% contrasted with (6.31)% in sound people (20, 21). Most contaminations of Toxoplasma in people are asymptomatic yet as to sidestep the insusceptible reaction the parasite changes over to an encysted structure, along these lines building up an interminable disease. These pimples, which for the most part structure in neural and strong tissues, are not static idle structures. Parasites keep on separating inside the growth divider and sores can crack discharging parasites that proceed to attack other cells (22, 23). The assortment impales of Toxoplasmosis gondii ABs may credit to the way that different techniques and different associations, each change in affectability & unequivocally, whilst wide assortment in the rates inside different and some countries may be a direct result of differentiation in sterile, budgetary, & social segments. Seroprevalence of T. gondii in human populace shifts enormously among various nations, topographical regions inside a similar nation, and among the ethnic gatherings living in similar territory, so T. gondii has a cosmopolitan circulation because of quality of numerous creatures that can oblige the parasite and pursue its scattering (25, 26). We concluded that the high rate of prevalence of T. gondii DNA (as diagnosed by RT-PCR) as well as its antibodies have been observed in prostate cancer and RT PCR was precise manner in detection of T. gondii.

Conflict of interest: None

Source of findings: self-findings.

Ethical clearance: This research was carried out with the patient's verbal and analytical approval before the sample was taken.

References.


