Prevalence of Abortion among Toxoplasma Gondii Seropositive Pregnant Women in Community Hospital of Mardan

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ABSTRACT

BACKGROUND: As there is conflicting evidence about the relationship between Toxoplasma Gondii and abortion. So there is a dire need to screen and assess the relationship between Toxoplasma Gondii and abortion in our community.

OBJECTIVES: The study was aimed to determine the Prevalence of Abortion in Toxoplasma Gondii seropositive females, visiting outpatient department of the Gynecology and Obstetrics, Mardan Medical Complex Teaching Hospital, Mardan

MATERIALS & METHODS: The study included 360 pregnant females visited Gynaecology and Obstetric Outpatient Department. The collected samples were screened for specific ToxoIgM and ToxoIgG antibodies by using Enzyme Linked Immunosorbent Assay (ELISA).

RESULTS: The study group showed 12.8% IgM seropositive women with recent infection of Toxoplasma gondii. Latent infection was 23.9% as shown by positive IgG antibodies. Where as 3.8% females were found positive for both IgM and IgG antibodies. Overall seroprevalence of Toxoplasmosis was 40.5% in the study group versus 7.2% in the control group. Abortion was the most frequent type of pregnancy loss in the study group accounting for 54.4%.

CONCLUSION: Considering the subclinical type of the disease pattern, routine serological investigations are recommended for all women of child bearing age.

Key words: Toxoplasma gondii, Abortion, ELISA. IgM, IgG antibodies.

INTRODUCTION

Recurrent pregnancy loss is a term widely used for any unfavorable fetal outcome in an ongoing pregnancy.¹ It includes two or more than two consecutive abortions, history of intrauterine fetal death, still birth, intra uterine growth retardations, preterm birth and congenital anomalies in newborns.² Three causes may be genetic, maternal hormonal derangements, pregnancy induced hypertension, diabetes mellitus and various infections during pregnancy. Primary infection caused by various organisms including, Toxoplasma gondii, rubella virus, cytomegalo virus and herpes simplex virus II collectively known as (TORCH), Brucella and Chlamydia trachoma may result in fetal wastage. If they remain untreated they cause recurrent pregnancy loss in the affected female.³ Toxoplasmosis is caused by an obligate intracellular protozoan Toxoplasma gondii. The organism has the potency to infect wide variety of warm blood animals including human beings.⁴ Feline animals (Cat family) are the primary host where the sexual cycle takes place.⁵, ⁶ Human beings along with other warm blooded animals are the intermediate hosts. They are infected by ingesting food contaminated with the cysts passed by the feline(cat) in their litter or through transplacental transmission from an infected mother to her developing fetus.⁷ The prevalence rate of the infection varies in different geographical areas throughout the world. Variations in climate, cooking methods, living and sanitation conditions affect the rate of transmission and its prevalence. Western European countries and United States of America shows a much less prevalence because of high living standards and much more developed health care system.⁸

The infection in healthy adults is usually asymptomatic and may pass unnoticed.⁹ Immunocompromised individuals and pregnant females are at risk. The infection poses a serious threat to pregnant women. It may cause early abortions. If the disease continues it may result in retarded fetal growth which may lead to still birth, premature birth. Some time the neonate is born with birth defects like hydrocephalus, brain calcifications and chorioretinitis.¹⁰ The severity of fetal disorders depends on the time of acquiring infection. The earlier the infection the worst will be the fetal consequences. Congenital infection in newborns varies widely in its manifestations. These may range from prematurity, retinal defects, sensory defects and psychomotor defects. According to researchers the classical triad consists of hydrocephalus, intra cerebral calcifications and chorioretinitis.¹¹ It is considered as a significant risk factor for recurrent pregnancy loss. Acquiring infection at start of pregnancy or mothers who are infected prenatally will be at high risk for abortions. Keeping in view this background transmission from an infected mother to her developing fetus.⁷ The prevalence rate of the infection varies in different geographical areas throughout the world. Variations in climate, cooking methods, living and sanitation conditions affect the rate of transmission and its prevalence. Western European countries and United States of America shows a much less prevalence because of high living standards and much more developed health care system.⁸

The infection in healthy adults is usually asymptomatic and may pass unnoticed.⁹ Immunocompromised individuals and pregnant females are at risk. The infection poses a serious threat to pregnant women. It may cause early abortions. If the disease continues it may result in retarded fetal growth which may lead to still birth, premature birth. Some time the neonate is born with birth defects like hydrocephalus, brain calcifications and chorioretinitis.¹⁰ The severity of fetal disorders depends on the time of acquiring infection. The earlier the infection the worst will be the fetal consequences. Congenital infection in newborns varies widely in its manifestations. These may range from prematurity, retinal defects, sensory defects and psychomotor defects. According to researchers the classical triad consists of hydrocephalus, intra cerebral calcifications and chorioretinitis.¹¹ It is considered as a significant risk factor for recurrent pregnancy loss. Acquiring infection at start of pregnancy or mothers who are infected prenatally will be at high risk for abortions. Keeping in view this background
we attempted to determine the frequency of abortions in those mothers who were found seropositive with anti Toxoplasma antibodies.

MATERIALS & METHODS:
This was a cross sectional study conducted in the physiology department, Bacha Khan Medical College, Mardan, in collaboration with Gynecology and Obstetrics department of Mardan Medical Complex Teaching Hospital, Mardan, from December 2012 to July 2013. It included a total of 360 women of child bearing age; among them 180 pregnant women with previous history of recurrent pregnancy loss were the study group. The control group included 180 females of approximately the same age and parity with no history of previous pregnancy loss. They were from various rural and urban areas of district Mardan. An informed written consent was taken. All personal, clinical and obstetrical information were recorded in the questionnaire from females participating in the study. Other possible factors which affect pregnancy outcome like rubella virus, cytomegalovirus, herpes simplex virus II, Brucella and Chlamydia trachoma infections were excluded from the study. Similarly subjects having Rhino compatibility and consanguinity were also excluded. Random blood sugar level was determined of each participant to exclude gestational diabetes. The collected 4ml blood from cubital vein after observing strict aseptic technique was allowed to clot and centrifuged at 4000 revolutions per minute for 7 minutes. The clear transparent serum was transferred to gel tube bearing serial number, date and name of person. It was kept at -20C° in freezer for future serological analysis. The collected samples were screened for specific ToxoIgM and ToxoIgG antibodies by using Enzyme Linked Immunosorbent Assay (ELISA) Kit (BioCheck USA). The tests were interpreted as, ToxoIgM and IgG index less than 0.9 (<321IU/ml) was considered as negative. While Ig index equal or between 0.9-0.99 were considered equivocal. ToxoIgM and ToxoIgG index 1.0 and above (321= IU/ml) were considered as positive. Calculations were made by absorbance of each tested sample including negative and positive controls.

The collected data was compiled in Microsoft Excel Sheet. Biostatistical analysis was performed using SPSS version 20 (SPSS Inc. Chicago, IL, USA).

RESULTS
Table 1 shows number of females found positive with anti toxoplasma antibodies among study group (females with history of recurrent pregnancy loss). Females with recent infection i.e. IgM positive were 12.8% (n=23). Whereas IgG positive were 23.9% (n=43). Latent infection/seroconversion were found in 3.8% (n=7) cases and an overall seropositivity in the study group was 40.5%. The number of females found positive with anti-toxoplasma antibodies among the control group (females with no history of recurrent pregnancy loss). Among the controls 6.1% (n=11) were positive with Toxo IgG antibodies, while 1.1% (n=2) females were positive with IgM and none of them showed latent infection. Overall seropositivity in control group was 7.2%. An overall, very high rate of 40.5% was found in the study group for anti-toxoplasma antibodies as compared to the control group i.e. 7.2%, having p-value< 0.001 showing statistically highly significant difference between the two groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of cases</th>
<th>No (%) of IgG positive</th>
<th>No (%) of IgM positive</th>
<th>No(%) of cases positive for both IgG IgM</th>
<th>Total no (%) of positive cases</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>180</td>
<td>43 (23.9)</td>
<td>23 (12.8)</td>
<td>7 (3.8)</td>
<td>73 (40.5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Control</td>
<td>180</td>
<td>11 (6.1)</td>
<td>2 (1.1)</td>
<td>0</td>
<td>13 (7.2)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>360</td>
<td>54 (15)</td>
<td>25 (6.9)</td>
<td>7 (1.9)</td>
<td>86 (23.89)</td>
<td></td>
</tr>
</tbody>
</table>
Graph 1. Seroprevalence of Toxoplasma antibodies in study group

Frequent Type of Pregnancy loss: Abortion was the most frequent type of pregnancy loss found in these females accounting for 54.4% followed by perinatal death which was 38.33%.

Graph 2. Prevalence of Abortion in Seropositive Gondii Infection

DISCUSSION
Toxoplasmosis is a zoonotic disease distributed worldwide. It acquires its importance due to its serious effects on pregnant mothers leading to abortion, fetal abnormalities even fetal demise. It is documented that toxoplasmosis is associated with mental retardation, epilepsy and blindness in newborns. It has been considered as potential cause of recurrent abortions. Seropositivity for Toxoplasma gondii was found quite high in the region (40.5%). This can be explained by the fact that the dwellers are mostly comprised of an agricultural community where contact with animals like cat, dog and cattle are frequent. The females residing at home look after them as most of the cattle and other animals are kept inside houses. Other contributing factors are low education, poor hygienic conditions and low socioeconomic conditions which play an important role in enhancing the chances of getting the infection. Worldwide seroprevalence ranges from 7% to 51.3%. In Pakistan the seroprevalence is 39.8% among females with history of recurrent pregnancy loss. In the present study seropositivity was found to be high in the region (40.5%). Study conducted at Andra Pradesh India by Sarkar et al. showed 49.52% prevalence among women with bad obstetric history and the control group had lower rate of 12.38%. In a similar study conducted in China by Zhou et al., reported 12.3% prevalence rate. In Japan the prevalence rate is 10.3% in pregnant females in study done by Makiko et al.. The high prevalence rate in developed countries like China and Japan could be attributed to the cooking methods in these countries. They eat partially cooked food specially meat. These increase chances of ingestion of food contaminated with cysts. Toxo IgM antibodies were present in 12.8% of cases which signify acute/recent disease. While serum IgG antibodies were 23.9% which shows past contact with the causative organism and 3.8% females were positive for both IgM and IgG antibodies. These are considered as individual who were in seroconversion state from acute to chronic form. Abortion was the most frequent type of pregnancy loss found among the tested females 54.4% followed by perinatal deaths 38.3%, preterm delivery 4.4%, congenital anomalies of newborns 1.6% and intrauterine growth retardation 1.1%. The association of contact with pets specially cats, dogs and cattle with human toxoplasmosis is usually difficult to assess by simple epidemiological studies because it is the soil, water and food contaminated with the cysts that is the risk not the pet itself as the oocysts are not found on the pets fur or body, they are excreted along feces in to the external environment.

CONCLUSION
Abortion was found to be the most frequent type of pregnancy loss, with higher seroprevalence of IgG Toxoplasma antibodies. Being the subclinical type of the disease pattern, routine serological investigations are recommended for all women of child bearing age.

REFERENCES


