

## Case Report

### Diagnostic challenges of toxoplasmosis in pregnancy: a case report

Asrul Abdul Wahab<sup>1</sup>, Ezura Madiana Md Monoto<sup>2</sup>, Osman Emelia<sup>3</sup>

#### Abstract:

Toxoplasma infection during pregnancy is an important condition to be recognized as it can result in significant morbidity to the fetus. This case described a 23-year-old lady in her first pregnancy was diagnosed with toxoplasmosis when her serology test was positive for *Toxoplasma gondii* specific IgM and IgG antibodies. She was asymptomatic at the time of diagnosis and continuously to be asymptomatic throughout her pregnancy. The pregnancy was uneventful with no abnormalities detected in the fetus. The laboratory diagnosis of toxoplasmosis and its application in pregnancy will be further discussed.

**Keywords:** IgM; IgG avidity test; *Toxoplasma gondii*; Toxoplasmosis

Bangladesh Journal of Medical Science Vol. 22 No. 01 January'23 Page : 222-224  
DOI: <https://doi.org/10.3329/bjms.v22i1.61851>

#### Introduction

Toxoplasmosis is an infective disease caused by the obligate intracellular parasite or protozoa known as *Toxoplasma gondii*. The infection usually results in asymptomatic condition in the immunocompetent host but can cause significant morbidity in immunocompromised host. The risk of acquiring toxoplasmosis during pregnancy is mainly through eating uncooked meat and contact with soil<sup>1</sup>. *Toxoplasma gondii* can cross the placenta and results in fetus infection. Congenital toxoplasmosis has wide spectrum of clinical manifestations including birth defects involving various organs but in approximately 75% of the cases it is subclinical<sup>2</sup>. Birth defect in general can contribute to various neonatal issues including sepsis, asphyxia, hypoglycemia, and electrolyte imbalance that requires intensive medical intervention<sup>3</sup>. Thus, it is important to diagnose and treat the infection as early as possible to prevent intrauterine infection.

Serology diagnosis by detecting specific *Toxoplasma gondii* IgM and IgG is the routine laboratory method for diagnosis of toxoplasmosis. However, serology screening for toxoplasmosis is not part of the routine pregnancy screening in many countries unless the clinical situation arises.

#### Case report

A 23-year-old Malay female was attending her antenatal clinic for booking of her first pregnancy following positive urine pregnancy test at five months period of amenorrhea. She had no specific complaint other than symptoms related to pregnancy. Physical examination revealed normal parameters with blood pressure of 120/70mmHg and pulse rate of 82 beats per minute. The abdominal ultrasound scan showed presence of intrauterine single fetus with adequate amniotic fluid. However, fetal femur length was noted to be smaller than gestational age. Otherwise, other parameters were within the calculated gestational age. The possibility of that the fetus was smaller than

1. Asrul Abdul Wahab, Department of Medical Microbiology and Immunology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras Kuala Lumpur, Malaysia.
2. Ezura Madiana Md Monoto, Department of Family Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras Kuala Lumpur, Malaysia.
3. Osman Emelia, Department of Parasitology and Medical Entomology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras Kuala Lumpur, Malaysia.

**Correspondence:** Asrul Abdul Wahab, Department of Medical Microbiology and Immunology, Faculty of Medicine, Universiti Kebangsaan Malaysia, 56000 Cheras, Kuala Lumpur, Malaysia; Email: [asrulwahab@hotmail.com](mailto:asrulwahab@hotmail.com)

gestational age was being considered. The condition was discussed with the patient and her blood was taken for several laboratory tests namely full blood count and infectious diseases serology that include hepatitis B, human immunodeficiency virus (HIV), syphilis, toxoplasma, cytomegalovirus and herpes simplex virus. She was allowed to go home and was scheduled for subsequent visit in two weeks.

During the next appointment, her blood investigation results were traced. Her hemoglobin was normal at 12.9 g/dL. The hepatitis B surface antigen, HIV serology and rapid plasma regain were all non-reactive. The IgM for cytomegalovirus and herpes simplex virus were also negative. The only abnormality was positive for toxoplasma IgM and IgG. Upon further questioning, she did not recall any history of contact with cat and she did not keep any pet at home. The repeated abdominal ultrasound scan during this time showed normal growing fetus with the length of the femur already corresponded to the gestational age. Another blood taking was done whereby the toxoplasma serology was repeated at two weeks interval from the initial blood sample revealed the similar result with positive for both IgM and IgG.

Her pregnancy was closely monitored. The serial abdominal ultrasounds scan showed no fetus malformation. The pregnancy went uneventfully and she delivered her baby at 38 weeks period of gestation without any complications. The baby had detailed assessment by pediatrician and no gross abnormality was detected. In the postpartum ward, the baby also showed good response to the hearing-screening test.

## Discussion

Toxoplasmosis is a zoonotic disease that caused significance concern to pregnant women and the treating obstetrician. The prevalence of the infection in pregnancy varies from one region to another. In most reports, the prevalence is determined serologically by detecting *Toxoplasma gondii* IgM, IgG or both. Recent study from Malaysia showed overall seroprevalence of 35.3% positive IgM/IgG among pregnant women<sup>4</sup>. Another study in Egypt and Iran demonstrated seroprevalence of 29.5%<sup>5</sup> and 34.4%<sup>4</sup> respectively. Report from Brazil that included the use of IgA showed overall seroprevalence of 43.5% among high-risk pregnancy population<sup>7</sup>. Often time the risk factor contributing to the acquisition of toxoplasma during pregnancy is difficult to be determined, as described in this case. According to a study in Europe, the most important

risk factor for toxoplasmosis in pregnancy includes consumption of undercooked meat and contact with soil<sup>1</sup>. Perhaps the similar risk would be applicable here particularly history of contact with soil that is commonly contaminated with the infected cat feces.

The laboratory diagnosis of toxoplasma infection in pregnancy remains a challenge as most laboratories offer serology test that includes *Toxoplasma gondii* specific IgM and IgG. The important aspect to diagnosing toxoplasmosis in pregnancy is to determine the chronicity of this infection as it implicates the management. The risk of infection transmission from mother to fetus is greater if it occurred in the third trimester than in the first trimester but the infection in the first trimester frequently resulted in unfavorable outcome to the fetus<sup>8</sup>. The serology test that detecting toxoplasma IgM and IgG maybe helpful but there is certain limitation in determining chronicity of toxoplasmosis particularly in cases where both IgM and IgG were positive such as in this case. It is known that IgM can be detected for few months after the initial infection even after the IgG is already detected as demonstrated by the previous study<sup>4</sup>. The use of IgG avidity assay that detect the functional aspect of IgG is perhaps more beneficial and informative. IgG avidity is low if the infection is very recent and borderline or high if the infection occurred in the past. In fact, a study demonstrated that all pregnant women with positive for both toxoplasma IgM and IgG had borderline or high IgG avidity indicating infection in the past<sup>4</sup>. Perhaps this patient may belong to this group but there was no IgG avidity test available at that time for confirmation. Molecular diagnosis by detecting toxoplasma DNA through polymerase chain reaction (PCR) from the amniotic fluid can provide early diagnosis of congenital toxoplasmosis<sup>9</sup>. In one study, the PCR detecting toxoplasma DNA was positive in all samples with low IgG avidity result but not detected in those with intermediate IgG avidity result<sup>10</sup>. Thus, PCR assay is particularly useful to rule out recent infection in those with the intermediate IgG avidity<sup>10</sup>. However, molecular method is particularly expensive and required special technical skills thus maybe difficult to be offered as a routine diagnostic test for this condition. Furthermore, IgG avidity assay was shown to be as good as PCR-based assay in determining acute toxoplasmosis in relation to pregnancy<sup>11</sup>. Perhaps, in the resources limiting situation, performing IgG avidity test for *Toxoplasma gondii* is the best option for diagnosis of

toxoplasmosis in a pregnant woman.

In conclusion, the positive toxoplasma IgM and IgG played very limited role in diagnosis of toxoplasmosis in pregnancy perhaps it may result in diagnosis uncertainty. IgG avidity assay or molecular method should be persuaded to confirm the diagnosis of toxoplasmosis in pregnancy and congenital toxoplasmosis.

#### Acknowledgement

We would like to thank the Dean of the Faculty of Medicine, Universiti Kebangsaan Malaysia the

support to publish this article.

**Source of fund (if any):** none

**Conflict of Interest:** none

**Ethical clearance:** not applicable

#### Author's Contributions

Data gathering: Asrul Abdul Wahab

Study design and writing: Asrul Abdul Wahab, ExuraMadiana Md Monoto, Osman Emelia

Editing and approval of final draft: Asrul Abdul Wahab

#### References:

1. Cook AJC, Gillbert RE, Buffolano W, Zufferey J, Petersen E, Jenum PA, et al. Sources of toxoplasma infection in pregnant women: European multicenter case-control study. *BMJ*. 2000; **321**: 142-147. <http://doi.org/10.1136/bmj.321.7254.142>
2. McAuley JB. Congenital toxoplasmosis. *J Pediatric Infect Dis Soc*. 2014; **3**(Suppl 1): S30-S35. <http://doi.org/10.1093/jpids/piu077>
3. Afroze S, Mannan M, Dey SK, Moni SC, Shabuj MKH, Jahan I, et al. Risk factors and complications of newborns with birth defect. a hospital based case-control study. *Bangladesh Journal of Medical Science*. 2019; **19** (1): 133-140. <https://doi.org/10.3329/bjms.v19i1.43886>
4. Emelia O, Rahana AR, Mohamad Firdaus A, Cheng HS, Nursyairah MS, Fatinah AS, et al. IgG avidity assay: A tool for excluding acute toxoplasmosis in prolonged IgM titer sera from pregnant women. *Tropical Biomedicine*. 2014; **31**(4): 633-640.
5. Kamal AM, Ahmed AK, Abdellatif MZM, Tawfik M, Hassan EE. Seropositivity of toxoplasmosis in pregnant women by ELISA at Minia University Hospital, Egypt. *Korean J Parasitology*. 2015; **53**(5): 605-610. <https://doi.org/10.3347/kjp.2015.53.5.605>
6. Babaie J, Amiri S, Mostafavi E, Hassan N, Lotfi P, EsmaeiliRastaghi AR, Golkar M. Seroprevalence and risk factors for *Toxoplasma gondii* infection among pregnant women in Northeast Iran. *Clin Vaccine Immunol*. 2013; **20**(11):1771-3. <https://doi.org/10.1128/CVI.00125-13>.
7. Morata FHA, Ferreira MN, Camargo NS, Santos GS, Spegiorin LCJF, Silveira-Carvalho AP, et al. Frequency of anti-*Toxoplasma gondii* IgA, IgM and IgG antibodies in high-risk pregnancies in Brazil. *Rev. Soc. Bras Med Trop*. 2016; **49**(4): 512-514. <https://doi.org/10.1590/0037-8682-0046-2016>
8. Chaudhry SA, Gad N, Koren G. Toxoplasmosis and pregnancy. *Canadian Family Physician*. 2014; **60**: 334-336.
9. Thirumudi I, Vetrivel U, Mahalakshmi B, Lily Therese K, Madhavan HN. Insights on drug targeting of *Toxoplasma gondii* host invasion proteins: a review. *Asian Journal of Pharmaceutical and Clinical Research*. 2015; **8**(3): 52-57.
10. Berredjem H, Aouras H, Benlaifa M, Becheker I, Djebbar MR. Contribution of IgG avidity and PCR for the early diagnosis of toxoplasmosis in pregnant women from the North-Eastern region of Algeria. *Afr Health Sci*. 2017 Sep; **17**(3):647-656. <https://doi.org/10.4314/ahs.v17i3.7>
11. El-Settawy MA, Fathy GM, Dahrog ME. Comparison between avidity test and real-time PCR in diagnosis of recent toxoplasmosis in pregnancy. *Life Science Journal*. 2016; **13**(6): 65-71. <https://doi.org/10.7537/marslsj13061609>