Clinical Investigation / Araştırma

DOI: 10.4274/tjod.galenos.2025.15088

Turk J Obstet Gynecol

Routine antenatal toxoplasmosis screening, is it necessary?

Rutin antenatal toksoplazmozis taraması gerekli midir?

Gonca Türker Ergün, Dilek Şahin

University of Health Sciences Türkiye, Ankara City Hospital, Department of Obstetrics and Gynecology, Ankara, Türkiye

Abstract

Objective: Toxoplasmosis is an intracellular parasite and one of the most common congenital infections. Currently, there is no clear consensus on routine screening for toxoplasma infection during pregnancy. This study aimed to discuss the results of antenatal toxoplasma screening in a tertiary center.

Materials and Methods: A retrospective study including the data of the antenatal toxoplasmosis screening test results over four years. Toxoplasma immunoglobulin M (IgM), toxoplasma immunoglobulin G (IgG), anti-IgG avidity test results, amniocentesis, and toxoplasma polymerase chain reaction (PCR) were obtained from the hospital records. Patients with missing toxoplasma IgM, IgG, anti-IgG avidity, test results were excluded from the study. In addition, the fetal outcomes and follow-up information for the newborns of pregnant women who gave birth in our hospital were recorded.

Results: During the study period, a total of 49,292 toxoplasma IgM tests were examined. Fifty pregnant women whose toxoplasma IgM was positive with a low-anti-toxoplasma IgG avidity index were enrolled in the study group. Forty percent of the pregnant women are expected to have amniocentesis. There was only one termination of pregnancy with specific ultrasonographic findings. Toxoplasma PCR was found to be negative in the other pregnant women. Of the pregnant women who were followed up, 23 gave birth in our hospital and the Sabin Feldman test was positive in 65.2 percent (15/23) of the newborns.

Conclusion: Antenatal toxoplasmosis screening should be preserved for pregnant women with fetal ultrasonographic findings which may be related to toxoplasmosis. Further studies are needed.

Keywords: Toxoplasmosis, antenatal screening, avidity, high risk pregnancy, fetal infection

Öz

Amaç: Toksoplazmozis, hücre içi bir parazittir ve genellikle en yaygın konjenital enfeksiyonlardan biridir. Günümüzde, gebelikte toksoplazma enfeksiyonu için rutin tarama konusunda net bir fikir birliği söz konusu değildir. Bu çalışma, üçüncü basamak bir merkezde antenatal toksoplazma taramasının sonuçlarını tartışmayı amaçlamaktadır.

Gereç ve Yöntemler: Bu çalışma dört yıl boyunca antenatal toksoplazmoz tarama testi sonuçlarının verilerini içeren retrospektif bir çalışmadır. Toksoplazma immünoglobulin M (IgM), toksoplazma immünoglobulin G (IgG), anti-IgG avidite test sonuçları, amniyosentez ve toksoplazma polimeraz zincir reaksiyonu (PCR) sonuçları hastane kayıtlarından elde edildi. Toksoplazma IgM, IgG, anti-IgG avidite test sonuçları eksik olan hastalar çalışmanın dışında tutuldu. Ayrıca, hastanemizde doğum yapan gebe kadınların yenidoğanlarının fetal sonuçları ve takip bilgileri de kaydedildi.

Bulgular: Çalışma süresince toplam 49.292 toksoplazma IgM testi incelendi. Toksoplazma IgM'si pozitif olan ve anti-toksoplazma IgG avidite indeksi düşük olan 50 gebe kadın çalışma grubuna dahil edildi. Gebe kadınların %40'ı amniyosentez yaptırdı. Sadece bir gebeliğin spesifik ultrasonografik bulgularla sonlandırılması oldu. Diğer gebe kadınlarda toksoplazma PCR negatif bulundu. Takibi yapılan gebe kadınlardan 23'ü hastanemizde doğumunu gerçekleştirdi ve Sabin Feldman testi yenidoğanların %65,2'sinde (15/23) pozitifti.

Sonuç: Toksoplazmozla ilişkili olabilecek fetal ultrasonografik bulguları olan gebe kadınlar için doğum öncesi toksoplazmoz taraması yapılmalıdır. Gelecekteki yönetimin standardize edilmesi için çok daha fazla çalışmaya ihtiyaç vardır.

Anahtar Kelimeler: Toksoplasmosis, antenatal tarama, avidite, yüksek riskli gebelik, fetal enfeksiyonlar

PRECIS:

Corresponding Author/Sorumlu Yazar: Gonca Türker Ergün, MD,
University of Health Sciences Türkiye, Ankara City Hospital, Department of Obstetrics and Gynecology, Ankara, Türkiye
E-mail: drgoncaturker@gmail.com **ORCID ID:** orcid.org/0000-0003-1064-8727

Received/Geliş Tarihi: 09.04.2025 **Accepted/Kabul Tarihi:** 18.06.2025 **Epub:** 07.07.2025

Cite this article as: Türker Ergün G, Şahin D. Routine antenatal toxoplasmosis screening, is it necessary? Turk J Obstet Gynecol. [Epub Ahead of Print]

Introduction

Toxoplasma gondii is an intracellular parasite. It is transmitted to humans by eating infected undercooked meat or by inhaling oocysts left by cats[1,2]. Congenital infection occurs due to transplacental transmission of tachyzoites after primary infection of the pregnant woman[3].

In pregnancy, there is an inverse relationship between maternal-fetal transmission rates and fetal complication rates as the gestational week increases[4]. Whereas the rate of transmission increases as the gestational week increases, the rate of fetal complications decreases[5]. Fetal ventriculomegaly, intracranial and intrahepatic calcifications, hepatomegaly, ascites, and pleural effusion can be seen due to toxoplasmosis during pregnancy[6]. After birth, it can lead to serious conditions such as chorioretinitis, hydrocephalus, mental disorder, psychomotor retardation, and hearing impairment in the newborn[7].

The higher rates of toxoplasma infection are detected in countries in which the population is exposed to contaminated water, undercooked, or raw meat[8]. Changes in eating habits and improved hygiene have been shown to reduce the incidence of toxoplasmosis infections[9].

Currently, there is no clear consensus on routine screening for toxoplasma infection during pregnancy[10]. Although screening for toxoplasma is not recommended by most obstetrician societies, it is held for free in some countries such as France and Italy[11,12]. Lack of treatment, low prevalence of congenital toxoplasmosis disease, and the cost were the main causes against screening[13].

Amniocentesis is performed prenatally for the diagnosis of toxoplasma infection. Amniosentesis is conducted later than the 18th week of pregnancy and at least 4 weeks after the presumed time of maternal toxoplasma infection[14]. This study aimed to discuss whether routine antenatal toxoplasmosis screening is necessary or if it leads to unnecessary interventions during pregnancy.

Materials and Methods

This is a retrospective study investigating pregnant women who had toxoplasma screening at a tertiary hospital between 2019 and 2023. The study approval was obtained from the Ankara Bilkent City Hospital Institutional Review Board (no: 1-24-234, date: 05/2024). The patient data were obtained from the hospital records.

Toxoplasma screening is performed routinely and free of charge in our hospital. There is a pregnancy counseling school in the hospital. Routinely, all pregnant women are counseled about hygienic measures and the possibility of fetal infections. For the current study, antenatal toxoplasma screening results were obtained from pregnant women. The pregnant women were accepted as seropositive if both toxoplasma immunoglobulin G (IgG) and immunoglobulin M (IgM) were positive, and, in these cases, an acute infection was suspected.

Pregnant women with positive toxoplasma IgG and IgM test results accompanied by low IgG avidity were included in the study group. LIAISON diagnostic system kits were used to test for quantitative detection of IgM and IgG antibodies to toxoplasma gondii. The VIDAS automated analyzer system was used to perform an IgG avidity test. Pregnant women with missing data for either toxoplasma IgM, IgG, or avidity testing were excluded.

All pregnant women with positive toxoplasma IgM test results and low avidity were referred to Perinatology Outpatient Clinics. Detailed ultrasound examination was performed. Amniocentesis was offered. The amniotic fluid was sent to the molecular laboratory for toxoplasma polymerase chain reaction (PCR). Ultrasound examinations were carried out every 4 weeks by the Perinatology Clinic.

In addition, fetal outcomes and follow-up information of the newborns born to the pregnant women who gave birth in our hospital were recorded.

Statistical Analysis

The data were analyzed by SPSS 20.0 statistical software (SPSS, Inc., Chicago, IL, USA). While mean ± standard deviation was used to present normally distributed data, median (minimum-maximum) was used to present non-normally distributed data. Number (%) was used to present the categorical data.

Results

Between the years 2019 and 2023, 49,292 toxoplasma IgM screenings were performed antenatally. A total of 50 pregnant women whose toxoplasma IgM and IgG were positive, accompanied by a low anti-toxoplasma IgG avidity index, were eligible to be enrolled in the study. All the pregnant women were counseled from both the Infectious Diseases Department and the Perinatology Department. The pregnant women received oral spiramycin three times a day until delivery.

Of the 50 pregnant women, 30 refused to have amniocentesis. Twenty pregnant women agreed to have amniocentesis. Among the patients who consented to amniocentesis, there was one termination of pregnancy due to toxoplasmosis infection (Figure 1). In one of the pregnant women, trisomy 18 was detected, and the fetus was shown to be deceased during pregnancy. Toxoplasma PCR was negative in the remaining patients (Figure 2).

There were 23 women who gave birth in our hospital. Unfortunately, data regarding the neonatal period and early childhood outcomes of all fetuses were not available. The postnatal follow-up results of the fetuses who were born in our hospital showed that the Sabin Feldman test was performed. The Sabin Feldman test was positive in 65.2 percent (15/23) of the newborns. These newborns were monitored by the pediatric infection department.

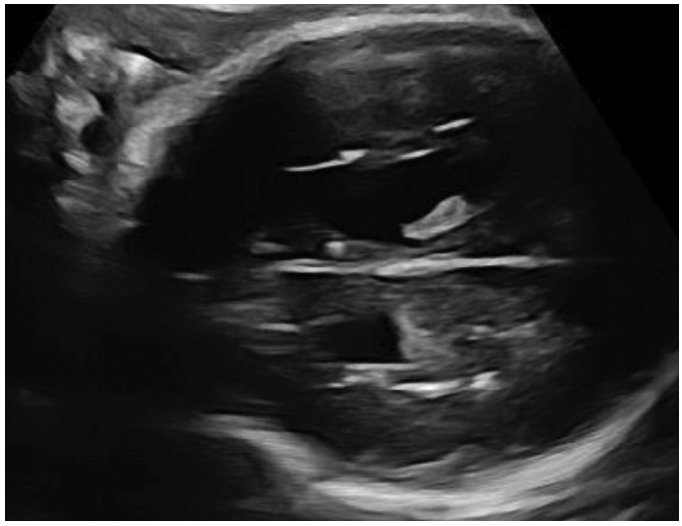

Figure 1. Fetal toxoplasmosis - intracranial ultrasonographic findings

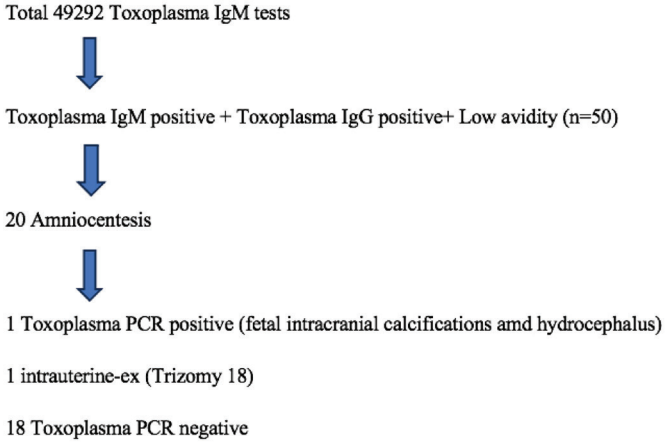

Figure 2. Toxoplasma screening flowchart

IgM: Immunoglobulin M, IgG: Immunoglobulin G, PCR: Polymerase chain reaction

Discussion

Toxoplasma gondii is an intracellular parasite with protean clinical manifestations. In pregnant women, the important issue is to determine whether the acute infection occurred during pregnancy and therefore was transmitted to the fetus[15,16]. This study aimed to discuss antenatal toxoplasma screening, which is conducted routinely in one of the biggest tertiary hospitals in Turkey. In the current study, fewer than half of the pregnant women whose toxoplasma IgM and IgG were positive, accompanied by low anti-toxoplasma IgG avidity, agreed to have amniocentesis, and only 1 fetus was terminated due to toxoplasmosis infection[17].

Antenatal toxoplasma screening is not recommended by the societies, and has been questioned due to decreased incidence of infection as a result of increased hygiene measures and prenatal classes for pregnant women[18]. The debate about toxoplasma screening involves not only the cost and decreased incidence but also other factors. The increased number of invasive procedures held during pregnancy, such as amniocentesis, is another issue[19].

In the patient whose toxoplasma diagnosis was confirmed by amniocentesis and whose pregnancy was terminated, intrauterine ultrasonographic findings such as fetal intracranial calcification and hydrocephalus were observed in the fetus[20]. This result suggests that toxoplasma screening should be reserved for pregnant women with intrauterine ultrasonographic findings[20]. However, we believe that the high number of amniocenteses in our study (n=20) was because the amniocentesis procedure was free of charge. The right to have amniocentesis was granted to every patient who was enrolled in this study with toxoplasma IgM positivity accompanied by low anti-toxoplasma IgG avidity.

Prevention of toxoplasmosis infection is based on hygiene measures[9]. Pregnant women are counseled in antenatal classes about hygiene. They were given education on avoiding the use of contaminated water, cooking food well, avoiding eating raw meat, and washing hands.

In a study conducted between the years 2008 and 2017, the frequency of toxoplasma IgM seropositivity was found to be 0.64% in Türkiye[21]. Congenital toxoplasmosis was not documented in that study. In our study, a total of 49,292 toxoplasma IgM tests were performed. Fifty out of 49,292 pregnant women were shown to be toxoplasma IgM seropositive. Syrian refugees may not have been able to receive health services, and hygiene conditions were not suitable during the period when that study was conducted. Indeed, in the study by Halici-Ozturk et al.[22], seropositivity rates were found to be higher for Syrian refugees compared to natives. Over the years, it has been observed that toxoplasma positivity has decreased with the developments in health services. Additionally, we think that toxoplasma positivity has decreased in our hospital thanks to antenatal classes.

Study Limitations

The main limitation of the current study was that the number of patients who were examined in the outpatient clinics but did not give birth in our hospital was high. The study had a retrospective design. Therefore, the outcomes during the neonatal period and early childhood for all fetuses were not available. This study was not a cost-effectiveness study. Therefore, we cannot conclude that antenatal routine toxoplasma screening is not cost-effective.

Conclusion

Antenatal toxoplasma screening should be recommended for pregnant women with ultrasonographic findings and/or in the case of suspicion for primary infection during pregnancy to prevent unnecessary intervention during the fetal period.

Ethics

Ethics Committee Approval: The study approval was obtained from the Ankara Bilkent City Hospital Institutional Review Board (no: 1-24-234, date: 05/2024).
Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: G.T.E., D.Ş., Concept: G.T.E., D.Ş., Design: G.T.E., D.Ş., Data Collection or Processing: G.T.E., D.Ş., Analysis or Interpretation: G.T.E., D.Ş., Literature Search: G.T.E., D.Ş., Writing: G.T.E., D.Ş.
Conflict of Interest: No conflict of interest was declared by the authors.
Financial Disclosure: The authors declared that this study received no financial support.

References

1. Parigi M. Toxoplasma gondii in animals and the environment. 2014.
2. Parlak M, Çim N, Nalça Erdin B, Güven A, Bayram Y, Yıldızhan R. Seroprevalence of toxoplasma, rubella, and cytomegalovirus among pregnant women in Van. Turk J Obstet Gynecol. 2015;12:79-82.
3. de Noya BA, Ruiz-Guevara R. Pregnancy as a risk factor to disease and the vertical transmission to the fetus, of a host of parasitic ailments. CientMed. 2020;1:01-16.
4. Silasi M, Cardenas I, Kwon JY, Racicot K, Aldo P, Mor G. Viral infections during pregnancy. Am J Reprod Immunol. 2015;73:199-213.
5. Cheong JN, Wlodek ME, Moritz KM, Cuffe JS. Programming of maternal and offspring disease: impact of growth restriction, fetal sex and transmission across generations. J Physiol. 2016;594:4727-40.
6. Feldman DM, Keller R, Borgida AF. Toxoplasmosis, parvovirus, and cytomegalovirus in pregnancy. Clin Lab Med. 2016;36:407-19.
7. Zinjani S. Common medical conditions in the neonates, in Clinical anesthesia for the newborn and the neonate. 2023, Springer. p. 49-70.
8. Ducrocq J, Simon A, Lemire M, De Serres G, Lévesque B. Exposure to toxoplasma gondii through consumption of raw or undercooked meat: a systematic review and meta-analysis. Vector Borne Zoonotic Dis. 2021;21:40-9.
9. Wehbe K, Pencole L, Lhuaire M, Sibiude J, Mandelbrot L, Villena I, et al. Hygiene measures as primary prevention of toxoplasmosis during pregnancy: a systematic review. J Gynecol Obstet Hum Reprod. 2022;51:102300.
10. Peyron F, L'ollivier C, Mandelbrot L, Wallon M, Piarroux R, Kieffer F, et al. Maternal and congenital toxoplasmosis: diagnosis and treatment recommendations of a french multidisciplinary working group. Pathogens. 2019;8:24.
11. Bobić B, Villena I, Stillwaggon E. Prevention and mitigation of congenital toxoplasmosis. Economic costs and benefits in diverse settings. Food Waterborne Parasitol. 2019;16:e00058.
12. Tomasoni LR, Messina G, Genco F, Scudeller L, Prestia M, Spinoni V, et al. Risk of congenital toxoplasmosis in women with low or indeterminate anti-toxoplasma IgG avidity index in the first trimester of pregnancy: an observational retrospective study. Clin Microbiol Infect. 2019;25:761.e9-761.e13.
13. Binquet C, Lejeune C, Seror V, Peyron F, Bertaux AC, Scemama O, et al. The cost-effectiveness of neonatal versus prenatal screening for congenital toxoplasmosis. PLoS One. 2019;14:e0221709.
14. Antsaklis A, Theodora M. Amniocentesis, in Clinical Maternal-Fetal Medicine. 2021, CRC Press. p. 63.1-63.10.
15. Racicot K, Mor G. Risks associated with viral infections during pregnancy. J Clin Invest. 2017;127:1591-9.
16. Dasa TT, Geta TG, Yalew AZ, Abebe RM, Kele HU. Toxoplasmosis infection among pregnant women in Africa: a systematic review and meta-analysis. PLoS One. 2021;16:e0254209.
17. Teimouri A, Mohtasebi S, Kazemirad E, Keshavarz H. Role of toxoplasma gondii IgG avidity testing in discriminating between acute and chronic toxoplasmosis in pregnancy. J Clin Microbiol. 2020;58:e00505-20.
18. Elsheikha HM. Congenital toxoplasmosis: priorities for further health promotion action. Public Health. 2008;122:335-53.
19. Robert-Gangneux F, Dardé ML. Epidemiology of and diagnostic strategies for toxoplasmosis. Clin Microbiol Rev. 2012;25:264-96.
20. Khalil A, Sotiriadis A, Chaoui R, da Silva Costa F, D'Antonio F, Heath PT, Jet al. ISUOG practice guidelines: role of ultrasound in congenital infection. Ultrasound Obstet Gynecol. 2020;56:128-51.
21. Sert UY, Ozgu-Erdinc AS, Gokay S, Engin-Ustun Y. Toxoplasma screening results of 84587 pregnant women in a tertiary referral center in Turkey. Fetal Pediatr Pathol. 2019;38:307-16.
22. Halici-Ozturk F, Yakut K, Öcal FD, Erol A, Gökay S, Çağlar AT, et al. Seroprevalence of toxoplasma gondii infections in Syrian pregnant refugee women in Turkey. Eur J Obstet Gynecol Reprod Biol. 2021;256:91-4.