

SEROPREVALENCE OF TOXOPLASMA GONDII, RUBELLA VIRUS AND CYTOMEGALOVIRUS IN SOUTHEAST OF THE TURKEY AND CURRENT APPROACH*

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Introduction

Exposure to teratogens in the first weeks of embryo formation and infections that may affect the fetus; It is responsible for half of neonatal deaths [1]. The most common infectious agents that can affect the fetus during pregnancy are *Toxoplasma gondii* (T.gondii), Rubella virus (RV), Cytomegalovirus (CMV), Herpes Simplex Virus (HSV) Type I and II [2]. In 2016, the World Health Organization (WHO) announced the Zika virus infection and the agent "Zika Virus" from the arbovirus family [3]. Zika virus was first detected in French Polynesia in 2013 as a combination of pictures similar to Guillain-Barre Syndrome and microcephaly [4,5]. Later, if pregnant women were infected, some craniofacial anomalies, loss of brain tissue, corpus callosum agenesis, low pressure cerebrospinal fluid, and various neurological disorders were observed in later periods [3,4]. After this date, a new definition as "TORZiCH" was made to the definition of "TORCH infection" [3].

The prevalence of TORCH infections varies from one geographic location to another; In other words, its prevalence varies between regions and countries [6]. It is affected by the living standards of the societies, the vaccination schedules, the regions and conditions where they live, such as rural and urban life. In fact, since infections caused by TORCH are

mostly asymptomatic and clinical diagnoses on this subject are inconsistent, it is very important to identify and diagnose susceptible women, especially those with acute maternal infection [7].

In this study, it was aimed to retrospectively determine the data and evaluate the findings in order to determine the seroprevalence of T. gondii, RV and CMV infections in pregnant women in the southeast of the Turkey. In addition, in this study, we aimed to examine current approaches in terms of TORCH infections.

Materials and Methods

This study was carried out in the Gynecology and Obstetrics outpatient clinics in Mardin State Hospital, Mardin, Southeast of the Turkey. Approval was obtained from the Mardin Provincial Health Directorate of Health's Ethics Committee with the document numbered 37201737-806.02.02-E1570 on 23.11.2020. All procedures in this study were carried out in accordance with the 1964 Declaration of Helsinki and its subsequent amendments. Serum sample results of 5663 cases admitted in the first trimester of pregnancy between January 2017 - June 2020 were analyzed retrospectively. The age of the patients and whether they were refugees were evaluated.

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Serum samples taken from pregnant women were studied using the chemiluminescence method using an immunoassay device (Cobas 6000 V2, Roche Diagnostics, Mannheim, Germany). According to the content of the kit, for *T. gondii* IgM; cut-off index 1.0 IU / mL and above positive, 0.8-1.0 gray zone and values below 0.8 IU / mL negative, for *T. gondii* IgG; 3 IU / ml and above were considered positive, the gray zone between 1 - 3.0 IU / mL and values below 1 IU / mL were considered negative. For CMV IgM; cutoff index 1.0 IU / mL and above positive, 0.7 - 1.0 gray zone and values below 0.7 IU / mL negative, for CMV IgG; 1 IU / ml and above were accepted as positive, 0.5 - 1.0 IU / ml gray zone and values below 0.5 IU / ml were considered negative. For Rubella IgM; cutoff index 1.0 IU / mL and above is positive, 0.8 - 1.0 gray zone and values below 0.8 IU / mL are negative; For Rubella IgG; Values of 10 IU / ml and above were considered positive and values below 10 IU / mL were considered negative.

Statistical Methods

IgG and IgM distributions and nationality percentages were described with frequency analysis, and age was described with mean and standard deviation. Normality of age parameter was analyzed with Kolmogorov Smirnov Test. Since age was not distributed normally, Mann Whitney U test was used for difference analysis. For IgG and IgM differences, Chi-square Likelihood Ratio was used. All analysis was performed at SPSS 17.0 for windows at 95% confidence interval.

Results

Mean age of Turkish patients was 27.92 ± 5.95 and mean age of Syrian patients was 27.47 ± 6.63 with statistically insignificant difference ($p > 0.05$) (Figure 1).

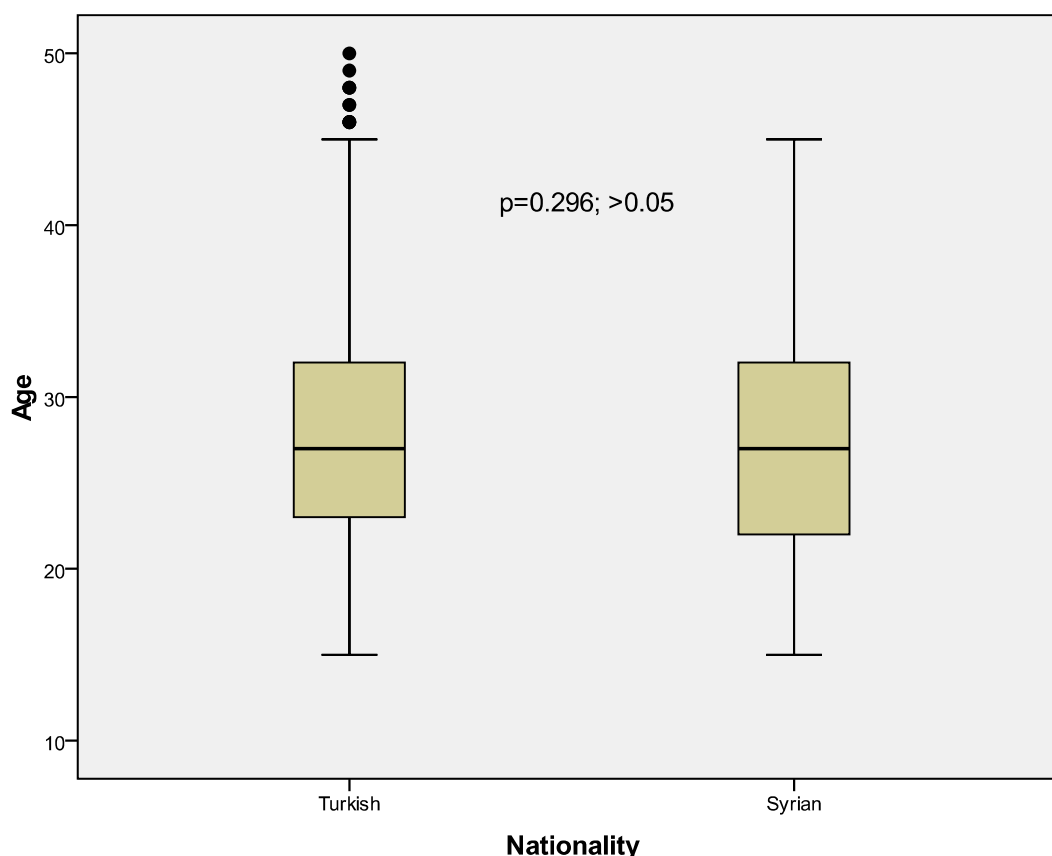


Fig. 1. Age means of patients based on nationality groups

CMV IgG was 99.9% positive in Turkish and 100.0% rate in Syrian patients with statistically insignificant difference ($p > 0.05$). CMV IgM was 98.6%

negative in Turkish and 97.6% in Syrian patients with statistically insignificant difference ($p > 0.05$).

Rubella differences between patient groups were also insignificant for both IgG and IgM ($p>0.05$). IgM negative rate for Turkish population was 98.8% and 98.0% for Syrian population, whereas IgG was 91.6% positive for Turkish population and 91.5% for Syrian population.

Toxoplasmosis IgG difference between nationality groups was statistically significant ($p<0.05$). Positive rate was 44.8% for Turkish and 38.9% for Syrian population for IgG. Toxoplasmosis IgM difference was insignificant with 96.9% negative rate for Turkish population and 96.2% for Syrian population ($p>0.05$) (Table 1).

Table 1.
CMV, Rubella and Toxoplasmosis IgG and IgM distributions and difference analysis results

	Turkish (n=5370; 94.8%)	Syrian (n=293; 5.2%)	P
CMV IgG, n (%)			
Negative	7 (0.1)	-	>0.05
Positive	5363 (99.9)	293 (100.0)	
Gray zone			
CMV IgM, n (%)			
Negative	5297 (98.6)	286 (97.6)	0.233
Positive	37 (0.7)	5 (1.7)	
Gray zone	36 (0.7)	2 (0.7)	
Rubella IgG, n (%)			
Negative	449 (8.4)	25 (8.5)	0.943
Positive	4920 (91.6)	268 (91.5)	
Gray zone	1 (0.0)	-	
Rubella IgM, n (%)			
Negative	5306 (98.8)	287 (98.0)	0.320
Positive	42 (0.8)	5 (1.7)	
Gray zone	22 (0.4)	1 (0.3)	
Toxoplasmosis IgG, n (%)			
Negative	2960 (55.1)	178 (60.8)	0.046
Positive	2408 (44.8)	114 (38.9)	
Gray zone	2 (0.1)	1 (0.3)	
Toxoplasmosis IgM, n (%)			
Negative	5203 (96.9)	282 (96.2)	0.659
Positive	121 (2.3)	9 (3.1)	
Gray zone	45 (0.8)	2 (0.7)	

Discussion

In order to be able to perform TORCH screening in pregnant women, it is necessary to know the rate of exposure to these infectious agents in the general population or the rate of seronegativity if the possibility of encountering them is low. In other words, the vaccination schedule of the society and the infection prevalence rates should be known. In order to perform these tests, which have a certain cost, in most countries, the necessary medical indication or the presence of suspected ultrasonographic findings are required [8]. In our study, Toxoplasma Ig G was found to be significantly lower in refugee pregnant women than local people. This shows that screening in terms of Toxoplasma infection may be more necessary than the general population in the approach of refugee pregnant women. When the test results of all cases who applied to a hospital in

Istanbul were examined retrospectively, the rate of *T. gondii* IgG seropositivity was found to be 32.5%, whereas in our practice, only the tests performed on first trimester pregnant women revealed *T. gondii* IgG seropositivity rate as 44.8% [9]. Rural life is widespread throughout the province of Mardin, small cattle breeding is carried out, well water is used, even city water is supplied from dug wells and vegetables and fruits are washed using this well water. For this reason, *T. gondii* IgG positivity rates were found to be high due to these and similar reasons. In addition, this information shows the necessity to be informed about the protection against *T. gondii* infection in terms of public health.

However, it should not be forgotten that the clinical signs and symptoms of "Congenital Toxoplasmosis", if present, are generally not recognized at birth, because the sequelae usually develop later in

life. The most common findings of congenital toxoplasmosis are chorioretinitis, retinal scar, cerebral calcifications and hydrocephalus [10-11]. Therefore, it increases the value of fetal anomaly scanning performed in pregnant women with devices with high resolution and image quality. In addition, a study conducted in England; does not recommend tests for *T. gondii* and Rubella for tertiary centers with high clinical experience [2].

Rubella is mostly passed on in childhood and leaves a lifetime of immunity. In Turkey since 2006, "the National Immunization Calendar" added rubella vaccine; It is administered in 2 doses, one and four years old. For people who cannot get rubella vaccine, rubella-measles-mumps triple vaccine is administered in two doses at four-week intervals, in line with their request. If it is calculated since the first vaccination year, considering the female population that will become adults in the decades, it seems that the

necessity of screening Rubella in pregnant women as a screening test will disappear [12].

CMV Ig G was found to be highly positive in our study. The social prevalence of CMV, which can be transmitted with body fluids, infected secretions, close contact and even breast milk, is as expected [2]. In our study, parallel to this, high CMV Ig G positivity was observed, and parallel to this, high seropositivity was observed in refugee pregnant women.

Conclusion

The use of TORCH test in the follow-up of pregnant women and its use in the evaluation of fetal well-being has value and importance. However, although the usage preferences of this test panel vary, it comes to the fore that it should be used together with the fetal anomaly screening performed with the help of ultrasound in the second trimester and it should be looked after in selected pregnant women.

XÜLASƏ

Türkiyənin cənub-şərqində Toksoplazma gondii, Məxmərək və Sitomeqalovirusun seroprevalentliyi və cari yanaşma

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Açar sözlər: *Hamilalilik, Sitomeqalovirus, Toksoplazma gondii, Məxmərək*

Məqsəd: Klinikamızda hamilə qadınlarda Sitomeqalovirus (CMV), Toksoplazma gondii (*T.gondii*) və məxmərək (Rubella) serologiyasının retrospektiv qiymətləndirilməsi və hazırda bu testlərin aparılmasının zəruriliyini araşdırmaq məqsədi daşıyır.

РЕЗЮМЕ

Серопревалентность Тохопlasma gondii, Краснухи и Цитомегаловируса на юго-востоке Турции и текущий подход

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Ключевые слова: *беременность, цитомегаловирус, токсоплазма гонди, краснуха.*

Цель: ретроспективно оценить серологию цитомегаловируса (CMV), Тохопlasma gondii (*T.gondii*) и краснухи (Rubella) у беременных женщин в нашей клинике и изучить необходимость выполнения этих тестов в настоящее время.

Metod: 2017-ci ilin yanvar-2020-ci ilin iyun ayları arasında mərkəzimizdə Mamalıq və Ginekologiya poliklinikasına gələn birinci trimestrdə hamilə qadınlardan alınmış serologiyanın qiymətləndirilməsi. Bundan əlavə, bu müddət ərzində müraciət edən qaçqın hamilə qadınların seroloji nəticələri də daxil edilib. Tapıntılar CMV, T. gondi və Rubella üçün müəyyən edilmiş normativ dəyərlərinə uyğun olaraq qiymətləndirilmişdir.

Nəticələr: Türkiyə vətəndaşı olan hamilə qadınlarla qaçqın hamilə qadınlar arasında T. gondii Ig G pozitivliyinin seroloji olaraq qiymətləndirildiyi zaman statistik əhəmiyyətli olduğu müəyyən edilmişdir. CMV və məxmərək serologiyasının qiymətləndirilməsində statistik əhəmiyyətli dəyərlər tapılmadı.

Nəticə: Hamilə qadınların təqibində TORCH testinin istifadəsi və dölün rifahının qiymətləndirilməsində istifadəsi dəyər və əhəmiyyət kəsb edir. Ancaq bu test panelinin istifadə seçimləri fərqli olsa da, ikinci trimestrdə ultrasəs köməyi ilə edilən fetal anomaliya skriningi ilə birlikdə istifadə edilməli və seçilmiş hamilə qadınlarda baxılmalıdır.

Метод: Оценка серологии, полученной от беременных женщин в первом триместре, которые обратились в поликлинику акушерства и гинекологии нашего центра в период с января 2017 года по июнь 2020 года. Кроме того, были также включены результаты серологических исследований беременных женщин-беженцев, подавших заявления в течение этого времени. Результаты были оценены в соответствии с нормативными значениями, определенными для CMV, T. gondi и Rubella.

Результаты. При серологической оценке выявлено, что положительный результат на T. gondii Ig G между беременными женщинами, гражданками Турции и беременными женщинами-беженками, является статистически значимым. Статистически значимых значений при оценке серологии ЦМВ и краснухи обнаружено не было.

Вывод: Использование теста TORCH при динамическом наблюдении за беременными женщинами и его использование для оценки состояния плода имеет ценность и важность. Тем не менее, хотя предпочтения в использовании этой тест-панели различаются, на первый план выходит, что ее следует использовать вместе со скринингом аномалий плода, проводимым с помощью ультразвука во втором триместре, и за ней следует следить у выбранных беременных женщин.

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