

Prevalence of Toxoplasmosis, Cytomegalovirus and Rubella IgG Antibodies in Hatay Women and Children

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ABSTRACT

Objective: Toxoplasmosis, cytomegalovirus and rubella may cause congenital infections. The aim of this study is to investigate toxoplasmosis, cytomegalovirus and rubella IgG antibodies in women and children who were admitted to the Hatay Women and Children Hospital between January 1 and December 31, 2009.

Methods: Levels of IgG antibodies for toxoplasmosis, cytomegalovirus and rubella established with chemiluminescence immunoassay (Architect i2000, Abbott, USA) method were evaluated, retrospectively.

Results: The results were obtained from 1103 cases. Seropositivity of IgG antibodies for toxoplasmosis (n = 743), cytomegalovirus (n = 929) and rubella (n = 746) were 59.9%, 98.9% and 93.6%, respectively.

Conclusion: Routine serological screening should be recommended in women of childbearing age. Seronegative subjects should be vaccinated for rubella and educated for protection from toxoplasmosis.

Keywords: Cytomegalovirus, prevalence, rubella, toxoplasmosis

Prevalencia de los Anticuerpos IgG contra la Toxoplasmosis, el Citomegalovirus y la Rubéola en Mujeres y Niños de Hatay

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RESUMEN

Objetivo: La toxoplasmosis, el citomegalovirus y la rubéola pueden causar infecciones congénitas. El objetivo de este estudio es investigar los anticuerpos IgG contra la toxoplasmosis, el citomegalovirus y la rubéola en las mujeres y niños ingresados en el Hospital de Hatay para Mujeres y Niños, entre el 1^{er} de enero y el 31 de diciembre de 2009.

Métodos: Los niveles de anticuerpos IgG de la toxoplasmosis, el citomegalovirus, y la rubéola establecidos mediante el método de inmunoensayos por quimioluminiscencia (Architect i2000, Abbott, USA), fueron evaluados retrospectivamente.

Resultados: Los resultados se obtuvieron de 1103 casos. La seropositividad de anticuerpos de IgG para la toxoplasmosis (n = 743), el citomegalovirus (n = 929) y la rubéola (n = 746) fue de 59.9%, 98.9% y 93.6%, respectivamente.

Conclusión: Deben recomendarse tamizajes serológicos de rutina para las mujeres en edad de maternidad. Los sujetos seronegativos deben ser vacunados contra la rubéola y educados para protegerse contra la toxoplasmosis.

Palabras claves: Citomegalovirus, prevalencia, rubéola, toxoplasmosis

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INTRODUCTION

Toxoplasma gondii is one of the most common zoonosis in the world. The disease is mostly spread by consuming raw or undercooked meat having tissue cyst or by water and foods contaminated by such cysts. It is transmitted to fetus transplacentally during pregnancy (1). It is commonly asymptomatic in healthy subjects. However, miscarriages and stillbirths may be seen in patients with congenital toxoplasmosis.

Fatal infection risk is correlated with the age of pregnancy. The symptoms and signs regarding toxoplasmosis may not be seen after birth. Asymptomatic newborns and infants may have disorders including chorioretinitis, strabismus, blindness, epilepsy, anaemia, hepatitis, petechiae, encephalitis, pneumonia, microcephaly, intracranial calcifications, hydrocephaly, psychomotor and mental retardation (2–4).

Cytomegalovirus (CMV) infection is commonly seen in developing countries, and it is generally asymptomatic in adults. It causes congenital CMV infection, especially in early pregnancy, infectious mononucleosis in young subjects and severe infections in immunocompromised patients. Congenital CMV infection may result in hepatitis, hepatosplenomegaly, petechial skin eruption, multiple organ failure, microcephaly, mental retardation, chorioretinitis and cerebral calcification (5–7).

Rubella is an acute viral infection seen in children and adults. It is characterized by skin eruption, fever and lymphadenopathy. Besides, it can cause congenital rubella syndrome in the children of pregnant patients. It may lead to many anomalies regarding heart, eye, central nervous and haematopoietic systems in the infected newborn (3, 8, 9).

In Turkey, the seroprevalence of CMV and rubella are very high (3, 6, 7, 9). Rubella vaccine has been incorporated into the national childhood immunization programme for several years in Turkey. However, there is no vaccination programme for rubella after the age of 18 years. The seroprevalence of *Toxoplasma gondii* changes greatly between various regions ranging from 30.7% to 69.5% in Turkey (3, 4, 10, 11). Well-cooked meat is always preferable in Turkey. However, raw meat is consumed in traditional kitchens as raw meatball. People often use approved general network water. But uncontrolled water sources are used, especially in rural areas.

Hatay is a city located in southern Turkey, and has rich water sources. Asi River passes through the city and it is used in irrigated agriculture. Most of the people are involved with agriculture. Rural life is intertwined with the life of the city where the raw meatball is consumed such as in the southeast part of Turkey.

The seroprevalence of congenital infections in Turkey has not been well-documented. In a study conducted among pregnant women in Hatay, toxoplasma, CMV and rubella IgM antibodies have been found 0.54%, 0.4% and 0.54%, respectively (12).

The aim of the present study is to investigate the prevalence of IgG type antibodies against toxoplasmosis, CMV and rubella in women and children who were admitted to the Hatay Women and Children Hospital.

SUBJECTS AND METHODS

Hatay Women and Children Hospital has 150 beds, and all patients were admitted to this hospital. The majority of pregnant women in the city (approximately 160 000 female patients, 25% of them pregnant) and 60 000 children were treated and followed-up during 2009.

Toxoplasma, CMV and rubella IgG tests were retrospectively investigated in the women and children admitted to the Hatay Women and Children Hospital. The study was carried out between January 1 and December 31, 2009. Blood samples were taken from the children and women who had routine pregnancy follow-up or different complaints. The sera were studied on the same day without delay after blood samples were centrifuged. The women who were included in the study were divided into four groups according to their ages: 15–24, 25–34, 35–44 and over 45 years. The patients between 0–14 years of age were evaluated as a child group. Toxoplasma, CMV and rubella IgG levels were determined by chemiluminescence immunoassay method (Architect i2000, Abbott, USA). We followed the information in the kit when evaluating the results. Toxoplasma IgG values equal to or less than 1.60 IU/ml were considered as negative and values higher than 1.60 IU/ml were taken as positive. Cytomegalovirus IgG values equal to or less than 5.99 IU/ml were accepted as negative and values higher than 5.99 IU/ml were accepted as positive. Rubella IgG values equal to or less than 4.99 IU/ml were negative and values greater than 4.99 IU/ml were positive. In this study, a total of 1103 cases were evaluated.

RESULTS

The mean age of investigated cases was 26.63 ± 8.57 (0–57) years. Of 1103 cases, 1040 (94.3%) were women and 63 (5.7%) were children. Of the children, 33 (52.4%) were male and 30 (47.6%) were female. The age distribution among the cases is shown in Table 1.

Table 1: Age distribution among the cases

Age (years)	n
0–14	63
15–24	351
25–34	528
35–44	152
≥ 45	9
Total	1103

Seropositivity was detected in 433 (61.3%) out of 706 women investigated for antitoxoplasma IgG; 869 (99.1%) out of 877 women were investigated for anti-CMV IgG and 662

(94.6%) out of 700 women investigated for anti-rubella IgG. Toxoplasma, CMV and rubella seropositivity in women and children are shown in Table 2.

Table 2: Toxoplasma, cytomegalovirus (CMV) and rubella seropositivity in women and children

	Toxo IgG (+)	CMV IgG (+)	Rubella IgG (+)
Children	12 (32.4%)	50 (96.2%)	36 (78.3%)
Women	433 (61.3%)	869 (99.1%)	662 (94.6%)

Seropositivity rates for toxoplasma (n = 743), rubella (n = 746) and CMV (n = 929) based on the age groups are shown in Table 3. The seropositivity rates of IgG antibodies for toxoplasma, CMV and rubella in the samples studied were as follows: 59.9%, 98.9% and 93.6%.

Table 3: Distribution of toxoplasmosis, cytomegalovirus (CMV) and rubella seropositivity according to age groups

Age (years)	Toxo IgG (n = 743)		CMV IgG (n = 929)		Rubella IgG (n = 746)	
	Positive	Negative	Positive	Negative	Positive	Negative
0–14	12 (32.4%)	25 (67.6%)	50 (96.2%)	2 (3.8%)	36 (78.3%)	10 (21.7%)
15–24	142 (57%)	107 (43%)	293 (99.3%)	2 (0.7%)	207 (92.8%)	16 (7.2%)
25–34	220 (62.7%)	131 (37.3%)	447 (98.7%)	6 (1.3%)	336 (95.7%)	15 (4.3%)
35–44	68 (67.3%)	33 (32.7%)	122 (100%)	0	117 (95.1%)	6 (4.9%)
≥ 45	3 (60%)	2 (40%)	7 (100%)	0	2 (66.7%)	1 (33.3%)
Total	445 (59.9%)	298 (40.1%)	919 (98.9%)	10 (1.1%)	698 (93.6%)	48 (6.4%)

DISCUSSION

Toxoplasma, CMV and rubella infections are diseases which can be seen in childhood and adulthood and can lead to increased morbidity and mortality rates by giving rise to intrauterine infections, especially in pregnancy (13).

The seroprevalence of *Toxoplasma gondii* in the world is different depending on various factors such as: lifestyle, socio-economic conditions, nutritional habits and geography. The seropositivity was reported as 9.1% in England, 18.8% in Spain and 45% in India (14–16). Serological screening of pregnant women for toxoplasmosis is not a routine procedure in Turkey. When the studies which were carried out on women in their reproductive period were analysed, the seropositivity rate for toxoplasma IgG was reported as follows: Efe *et al* from Van 36%, Tekay and Özbek from Şanlıurfa 69.5%, Yılmaz *et al* from Afyon 30.7% and Bakıcı *et al* from Sivas 52.2% (3, 4, 10, 11). In our study, toxoplasma IgG antibodies were found to be 59.9%. This result is similar to the results of the studies carried out in the Southeastern Anatolia region where raw meatball is commonly eaten.

The prevalence of CMV infection is rather high in Turkey. There are similarities between the CMV IgG seropositivity detected in our study and the one detected in other studies investigating women who were in their reproductive period. In these studies, CMV IgG seropositivity was reported between 84.7% and 99.5% in Turkey (3, 6, 7, 11).

This rate was found to be 98.9% in our study. Although vaccine studies for CMV are proceeding at a great pace, we do not have any vaccine against this disease yet (17). Thus, antenatal screening for CMV should be provided to women.

Rubella, which can lead to serious fetal abnormalities during pregnancy, is of utmost importance for it can be prevented by vaccination. Serological screening for rubella among pregnant women, and follow-up examinations, are not routine procedures in Turkey. Rubella seropositivity in women during their reproductive years has been investigated by many researchers in Turkey. In these studies, the seropositivity rate was found to be between 86% and 99.5% (3, 6, 7, 9, 11, 18, 19). This rate was 93.6% in our study. Rubella infection has not been exactly eradicated in Turkey. Although there is endemic rubella infection in Turkey, the

rubella vaccine has been incorporated into the national childhood immunization programme for several years. Currently, there is no vaccination programme for rubella after 18 years of age and there are still unvaccinated women in the childbearing age. Because we did not collect information about rubella vaccination in our study, the effect of rubella vaccination on rubella seropositivity could not be determined.

As a result of the high seropositivity rates detected for CMV and rubella, the screening tests for rubella and the vaccination procedure against seronegative cases should be recommended for women, especially during their reproductive years. Otherwise, these diseases will lead to serious congenital infections. The screening tests for toxoplasma and education of people about transmission routes of this disease are important.

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