The investigation of rubella seroprevalence in pregnant women in Kars

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Rubella seroprevalence in pregnant women

Levent Sahin[1], Rulin Deniz[1], Yakup Baykuş[1], Yasemin Yavuz[2], Zuhal Tazegün[3], Atakan Tazegün[4], Osman Acar[5]

[1] Department of Obstetrics and Gynecology, Faculty of Medicine, Kafkas University, Kars, Türkiye.
[2] Obstetrics and Gynecology Clinic, İstanbul Yeni Ufuk Hospital, İstanbul, Türkiye.
[3] Microbiology Clinic, Kars Harakani Government Hospital, Kars, Türkiye.
[4] Family Medicine Clinic, Kars Harakani Government Hospital, Kars, Türkiye.
[5] Department of Microbiology, Faculty of Medicine, Kafkas University, Kars, Türkiye.

Abstract

Aim: Although Rubella (German measles) is a mild viral infection often seen in children and can be prevented by a vaccine, it can cause serious anomalies in the fetus when infection occurs during pregnancy. In this study, we aimed to investigate the seroprevalence of antibodies against the rubella virus in pregnant women in the risk group who were admitted to Kafkas University Department of Obstetrics and Gynecology and Kars Government Hospital between 01.01.2012 and 31.05.2015.

Methods: In this study, serum Rubella IgG results were investigated retrospectively in 2917 pregnant women aged 15 to 45 years who were admitted to Kafkas University Department of Obstetrics and Gynecology and Kars Government Hospital between 01.01.2012 and 31.05.2015. Rubella IgG antibodies were measured by the Enzyme Linked Immunosorbent Assay (ELISA) method in the patients' serum. Rubella IgG antibody values over 10 IU/mL were considered positive.

Results: The mean age of the study participants was 27.1 ± 6.1 years. 178 (6.1%) patients were considered seronegative in terms of serum Rubella IgG levels, whereas 2739 (93.9%) patients were seropositive.

Conclusion: It was detected that Rubell IgG seronegativity rate was 6,1% in pregnant women. Childbearing age women who had not a history of infection and no vaccination are at risk. It is important to vaccinate women prior to pregnancy and after pregnancy if seronegative women diagnosed during pregnancy, in terms of providing protection against congenital rubella syndrome. Mortality and morbidity due to congenital rubella syndrome can be reduced by vaccinating women who apply to make laboratory tests before marriage.The data obtained in this study is going to be important for the evaluation of effectiveness of Measles Mumps Rubella vaccine which was included in the routine childhood immunization schedule in 2006.

Keywords

rubella, ELISA, congenital rubella syndrome

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Corresponding Author: Levent Sahin, Department of Obstetrics and Gynecology, Kafkas University Medical School, Kars, Türkiye.
P.: +90 505 489 73 33 · **E-Mail:** leventsahinmd@yahoo.com

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Introduction

Rubella, also known as German measles or three-day measles, is an infection caused by the rubella virus.[1] Rubella virus is the only member of the genus Rubivirus and belongs to the family Togaviridae, whose members commonly have a single-stranded RNA genome of positive polarity enclosed by an icosahedral capsid. The virus is transmitted via the respiratory route and replicates in the nasopharynx and lymph nodes. It appears in the blood 5 to 7 days after infection and spreads throughout the body. Rubella has teratogenic properties and can cross the placenta, infecting the fetus, where it halts cellular development or destroys cells.[2]

Rubella can cause congenital rubella syndrome (CRS) in the newborn. CRS results from intrauterine infection and includes cardiac, cerebral, ophthalmic, and auditory defects.[3] It may also lead to prematurity, low birth weight, and neonatal thrombocytopenia, anemia, or hepatitis. The risk of major defects is highest for infections in the first trimester. CRS is the main reason a vaccine for rubella was developed.[4] Many mothers who contract rubella during the critical first trimester either experience miscarriage or give birth to a stillborn baby. If the baby survives, it may present with severe heart disorders (patent ductus arteriosus is most common), blindness, deafness, or other life-threatening organ disorders. Skin manifestations, known as "blueberry muffin lesions," may also occur.[4] For these reasons, rubella is included in the TORCH complex of perinatal infections, with approximately 10,000 cases occurring annually.[5]

Rubella virus-specific IgM antibodies indicate recent infection but can persist for over a year, so positive results should be interpreted with caution. The presence of IgM along with, or shortly after, the characteristic rash confirms the diagnosis.[6]

Rubella infections are prevented through active immunization using live, attenuated virus vaccines, usually as part of the MMR vaccine. The WHO recommends the first dose at 12–18 months and a second dose at 36 months. Pregnant women are typically screened for immunity; those found susceptible are vaccinated postpartum because the vaccine contains live virus.[7,8] Screening for rubella susceptibility via vaccination history or serology is recommended for all women of childbearing age at their first preconception counseling visit in the U.S. to reduce CRS incidence.[8]

There is no specific treatment for rubella; management focuses on symptom relief. Treatment for newborns addresses complications: congenital heart defects and cataracts can be corrected surgically.[9] Management of ocular CRS is similar to age-related macular degeneration, including counseling, monitoring, and provision of low-vision devices if needed.[10]

The purpose of this study was to determine the seroprevalence of rubella infection, which is usually mild but can have serious consequences during pregnancy, among pregnant women in Kars.

Materials and Methods

Rubella IgG results were retrospectively investigated in 2,917 pregnant women aged 15–45 who were admitted to Kafkas University School of Medicine, Department of Obstetrics and Gynecology, and Kars State Hospital between January 2012 and May 2015. Rubella IgG antibodies in blood samples were analyzed using the Enzyme-Linked Immunosorbent Assay (ELISA) method.

Results

A mean age of 2917 pregnant women who enrolled to our study was found 27.1± 6.1 years old (age range was 15-45). In our study, the Rubella IgG result was negative in 178 out of 2917 (6.1%) serum example and was positive in 2739 out of 2917 (93.9%) serum samples.

Discussion

Rubella was first described in the mid-eighteenth century. Friedrich Hoffmann[11] made the first clinical description of rubella in 1740, which was confirmed by de Bergen[12] in 1752 and Orlow in 1758. In 1814, George de Maton[13] first suggested that it be considered a disease distinct from both measles and scarlet fever. All these physicians were German, and the disease was known as Rötheln (contemporary German Röteln), hence the common name of "German measles". Henry Veale, an English Royal Artillery surgeon, described an outbreak in India. He coined the name "rubella" (from the Latin word, meaning "little red") in 1866.[11,14-16]

Rubella is a disease that occurs worldwide. The virus tends to peak during the spring in countries with temperate climates. Before the vaccine to rubella was introduced in 1969, widespread outbreaks usually occurred every 6–9 years in the United States and 3–5 years in Europe, mostly affecting children in the 5–9 year old age group.[17] Since the introduction of the vaccine, occurrences have become rare in those countries with high uptake rates.

Vaccination has interrupted the transmission of rubella in the Americas: no endemic case has been observed since February 2009. Since the virus can always be reintroduced from other continents, the population still needs to remain vaccinated to keep the western hemisphere free of rubella. During the epidemic in the U.S. between 1962–1965, rubella virus infections during pregnancy were estimated to have caused 30,000 stillbirths and 20,000 children to be born impaired or disabled as a result of CRS.[18,19] Universal immunisation producing a high level of herd immunity is important in the control of epidemics of rubella.[20]

The elimination of rubella and prevention of CRS program has been carried out in Turkey since 2006. Children were included in routine vaccination in our country since 2006. With the help of both vaccination as well as surveillance and social mobilization activities, the elimination period had started, but our country has become a target for importations increasingly.[21] Importations cannot be prevented in recent years because of the emigration from Syria.

Different studies done in pregnant women in Turkey demonstrate that the rate of protective antibodies against rubella ranged from 95.5% to 82%.[22-26] In our study, this rate was found to be 93.9%, which was similar to the other studies. This seropositivity is thought to be the result of natural infection in childhood.

In this study, 178 patients (6.1%) were found to be seronegative for rubella. These women are at risk for rubella infection and CRS during pregnancy. It is known that immunity against rubella varies in terms of age, socioeconomic status, and geographic region. Results of various studies in our country showed that 10-15% of women of childbearing age were seronegative for rubella.[27-29]

Even though there is no clear information about Rubella seronegativity in our region, our study result seems to be low according to the available literature. This may indicate the effectiveness of using routine vaccination schedules. We think that data obtained with this study would be important in the coming years for the evaluation of the effectiveness of the mumps, measles, and rubella vaccine, which was included in the childhood routine immunization schedule.

In conclusion, the advantages of widespread and effective implementation of children vaccination programs, vaccination of seronegative young girls and mothers before pregnancy, and vaccination of seronegative pregnant women after pregnancy are very clear in terms of providing protection against rubella virus.

Declarations

Animal and Human Rights Statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments.

Informed Consent
Informed consent was obtained from all participants.

Conflict of Interest
The authors declare no conflicts of interest.

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Scientific Responsibility Statement
The authors declare that they are responsible for the scientific content of the article, including the study design, data collection, analysis and interpretation, manuscript preparation, and approval of the final version of the manuscript.

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