

Seroprevalence of Rubella Antibodies among Women of Reproductive Age Group

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Abstract

Introduction: Rubella is a febrile rash illness affecting children and adults: however, in women affected early during pregnancy, it can severely impact the fetus resulting in miscarriage, fetal death, or an infant born with a group of disabling conditions collectively called Congenital Rubella Syndrome (CRS). Immunity to rubella in the form of rubella specific antibodies in pregnant women can indirectly indicate the risk of acquiring CRS. The susceptibility of women in reproductive age group should be the first requirement in order to set plan for the prevention of rubella infection and its transmission.

Aim: To determine the seroprevalence of rubella specific immunoglobulin G antibodies in women of 18–40 years age group.

Settings and Designs: It is a cross sectional observational study conducted at a tertiary care hospital.

Materials and Methods: Blood sample collected from 150 women of reproductive age group was subjected to architect system, with the chemiluminiscent microparticle immunoassay for detection of Rubella IgG.

Statistical Analysis: The results obtained were tabulated and chi-square test applied.

Results and Conclusions: 91.33% women were seropositive for rubella IgG antibodies. Since the seroprevalence is high, the susceptibility to rubella infection during pregnancy is low and hence the risk of CRS in the population is also low.

Keywords: congenital rubella syndrome, rubella immunoglobulin, rubella susceptible, rubella IgG, rubella in pregnancy

Introduction

Rubella infection has not been a major worry for most of the practitioners worldwide due to its mild presentation of an exanthematous disease.¹ But for doctors in the field of Obstetrics and Neonatology, it has been a nightmare as it has directly been responsible for the inestimable wastage and severe congenital malformations.²

The virus can get transmitted through the placenta leading to congenital defects in the fetus like total/partial blindness (62%), sensorineural deafness (66%), psychomotor delay (62%), mental retardation (42%), and heart disease (58%) and is known as Congenital Rubella Syndrome (CRS). Also, there is a 2% mortality rate among the congenitally infected infants who were symptomatic at birth.³

The evaluation of immunity to rubella virus relies on presence of specific antibodies and its titers in the blood. A recent study from Maharashtra estimates rubella seropositivity was 76.4% in 1,329 adolescent girls and that the immune status was better in urban population.⁴ In Lucknow, 500 samples were collected from females of different age groups and 400 (80%) of these were tested positive for rubella

IgG.⁵ Low seroprevalence was observed in the studies conducted in other regions such as Kolkata, Chandigarh and Amritsar.⁶

Even though many of the developed nations have achieved elimination of rubella transmission, developing and under developed countries are still facing the grave complications of this disease. The susceptibility of women in reproductive age group should be the first pre requisite in order to set strategies/plan for the prevention of CRS related morbidity and mortality.⁷

India as a country has not established any definitive system to combat rubella. There is dearth of information on the immune system of Indian women against rubella infection. This study is conducted to evaluate the percentage of women susceptible to rubella infection and in the hope to contribute to evaluation of rubella seroprevalence.

Materials and Methods

Study Setting: The study was performed at a tertiary care hospital for a duration of two years from October 2017.

Study Design: A cross sectional observational study

Sample size: After the approval from the institutional ethics committee, 150 participants were included in the study by convenient sampling technique.

Methodology

Women in the reproductive age group of 18–40 years were included in the study and subjected to blood investigation. Rubella specific immunoglobulin G (IgG) levels were detected by running the sample through architect system using chemiluminiscent microparticle assay technique and the subjects were classified as seropositive or seronegative. The percentage of women of reproductive age group susceptible to rubella infection was estimated.

Results

Out of the 150 participants evaluated, seropositivity of rubella IgG antibodies among women of 18–40 years was 137 which accounts for 91.33% of screened population. And only 10 participants, or 6.67% were found to be seronegative for rubella IgG antibodies among women of reproductive age

group.

The remaining 3 participants were found to be in the grayzone and a repeat testing would be required for evaluation.

Discussion

Immunity to rubella in the form of rubella specific antibodies in pregnant women can indirectly hint at the risk of acquiring CRS and hence large-scale surveys are now being conducted in various parts of the world⁴ to assess the number of females who may be susceptible to rubella infection during pregnancy.

The rubella seroprevalence in Italy was 82%. In France, the rate of seroprevalence among women of 19–31 years was 93.3% and in Argentina, the seroprevalence was 92.2% in age group 20–24 years and 91.2% in age group 25–29 years. Similar studies conducted in the eastern countries like Taiwan revealed 94.3% seroprevalence and Japan showed 92.2% seroprevalence of immunity to rubella.⁸

In Gulf area, studies from Saudi Arabia showed high prevalence rate of 92.2% in females of age group 20–25 years. However, studies from Morocco and Algeria indicate low seroprevalence rates accounting to 17.8% and 31.4% respectively.⁸

Although in India, multiple small-scale studies have been conducted but there is absence of a comprehensive data about true burden of rubella and CRS and also regarding the number of pregnant females susceptible to the infection.⁹

A study from Vellore, among women above 18 years was conducted and it reported that 12.5% women were susceptible to rubella infection.² Another study performed in Tamil Nadu, found 15% seronegativity for rubella among healthcare workers.¹⁰

A survey of 207 girls in the age group 12–25 years was done in Kolkata. The seropositivity among various age groups ranged between 35–55% only.¹¹ In contrast, a study from Hyderabad states that almost 95% of pregnant women were seropositive for rubella.⁶ Various studies from Delhi and have also estimated seroprevalence of 85–90%.¹²

Our study, although a small scale study, shows that seropositivity is 91.33%. And although only a small percentage of women – 6.67% are susceptible to infection with rubella, this is still enough for transmission of the virus to occur in the society and lead to CRS.

In the absence of rubella surveillance data, understanding regional epidemic-endemic cycles of rubella virus is difficult and it is not possible to devise a national strategy to curtail the morbidity due to rubella infection. This calls for a systemic review or a nation-wide cohort study to address the disease burden of CRS and to account for the number of females susceptible to rubella infection.

Conclusion

From the present study we can conclude that there is high seropositivity for rubella IgG antibodies amongst the participants of the reproductive age group. However, a small fraction of population still remains susceptible to rubella infection and hence the incidence of rubella infection, transmission of the virus and CRS cannot be completely ruled out. This observation triggers the mind to evaluate these findings on a larger population to understand the trends in seroprevalence and to spread awareness regarding the disease.

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