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Prevalence of Rubella Virus in Suspected Cases of Congenital Infections

Mamatha Ballal and P.G. Shivananda

Department of Microbiology, Kasturba Medical College, Manipal

Abstract. This study includes a total of 342 infants suspected of having congenital infections from January 1991-December 1993. Serum samples of these infants were tested for rubella specific IgM antibodies by μ ELISA. Of the total 342 infants, 52 (15.2%) were found to be positive for IgM antibodies to rubella virus. The commonest clinical presentation in infants with IgM antibodies to rubella virus was bilateral congenital cataract and hepatosplenomegaly.

Key words: *Rubella virus; ELISA; Congenital infections; IgM antibodies; Bilateral congenital cataract.*

Rubella virus accounts for majority of intrauterine infections; there are only a few serological studies from India on congenital rubella infections.[1, 2, 3] Rubella is a mild exanthematous disease of the children and occasionally of young adults. Primary virus infection during pregnancy may lead to the teratogenic effect on the fetus. It is highest in cases of infection during the first 2 months of pregnancy (40-60%) and progressively decreases during the fourth and fifth months (10-20%).[1]

Intrauterine infection with rubella is assoicated with chronic persistence of the virus in the newborn. Viral excretion may last for 12-18 months after birth, but the level of shedding gradually decreases with age.

The present paper describes our experience over three years, in the serological diagnosis of congenital rubella in Manipal.

Reprint requests: Prof. P.G. Shivananda, Associate Dean and Head, Department of Microbiology, Kasturba Medical College, Manipal-576 119.

Materials and Methods

The study was done on babies, suspected of intrauterine infections, attending the pediatric outpatient department of Kasturba Medical College Hospital, Manipal from January 1991-December 1993.

A total of 342 babies one year old or younger were studied. These included 74 newborn babies (0-15 days), 182 babies between 16 days and three months of age and the remaining 86 babies between four months and one year.

The clinical manifestations in the babies included bilateral congenital cataract, neonatal hepatitis, intrauterine growth retardation (IUGR), developmental delay with or without microcephaly, hepatosplenomegaly, cerebral palsy, pneumonitis and hydrocephalus.

Blood samples were collected from

these babies, serum separated and stored at -70°C unitl used.

Rubella Specific IgM Antibodies

The serum samples were examined by μ capture ELISA. The sera were tested for the presence of rubella specific antibodies at the dilution of 1: 100. Sera yielding corrected absorbance values, of more than 70% of that obtained with the +ve control serum were considered positive. The manufacturer's instructions (Sorin Biomedica) were strictly adhered to, in the performance and interpretation of the test.

Results

A total of 342 infants with suspected congenital infections were included in the study. According to the clinical presentations the infants were divided into 6 groups, group 1 (n=50), bilateral congenital cataract; group 2 (n = 68), neonatal jaundice; group 3 (n=61) intrauterine growth retardation; group 4 (n=83), developmental delay with or without microcephaly; group 5 (n=40), hepatosplenomegaly; group 6 (n=40), miscellaneous group with varied features like seizures, pneumonia, cerebral palsy, meningitis etc. Of the total-342 infants, 52 (15.2%) were positive for IgM antibodies by ELISA test.

Figure 1 shows the total number of sera tested in each group and postivity to rubella IgM antibodies in each group. Highest incidence was seen in group 1 (bilateral congenital cataract, 28%) and lowest in group 6 (miscellaneous group, 10%). Table 2 shows the age-wise incidence of rubella infection in infants.

Table 1

Clinical features	No. of cases positive for Rubella virus infection
Bilateral congenital cataract	**14**
Neonatal jaundice	10
Intrauterine growth retardation	7
Development delay with or without microcephaly	11
Hepatosplenomegaly	6
Miscellaneous group like Seizures, pneumonia, cerebral palsy, meningitis etc.	4
Total52	

Discussion

Rubella is a mild exanthematous disease of viral aetiology, affecting all ages and accounting for majority of intrauterine infections.[4] Infection from rubella virus is particularly serious if contracted during the first 3 months of pregnancy. In these cases, embryopathies may be present in a high precentage. Rubella infection, if acquired early in pregnancy, may result in spontaneous abortions or congenital anomalies in the infant.[5, 6]

Table 2: Age wise analysis of infants with seropositivity to Rubella virus by ELISA

Age group	Total no. tested	Total positive IgM Abs to rubella virus	Precentage positivity
0 - 15 days	74	6	8.11
16 days - 3 months	182	34	18.68
3 months - 1 year	86	12	13.95
Total	342	52	15.20

The clinical features of congenital rubella syndrome may be grouped into three broad categories.

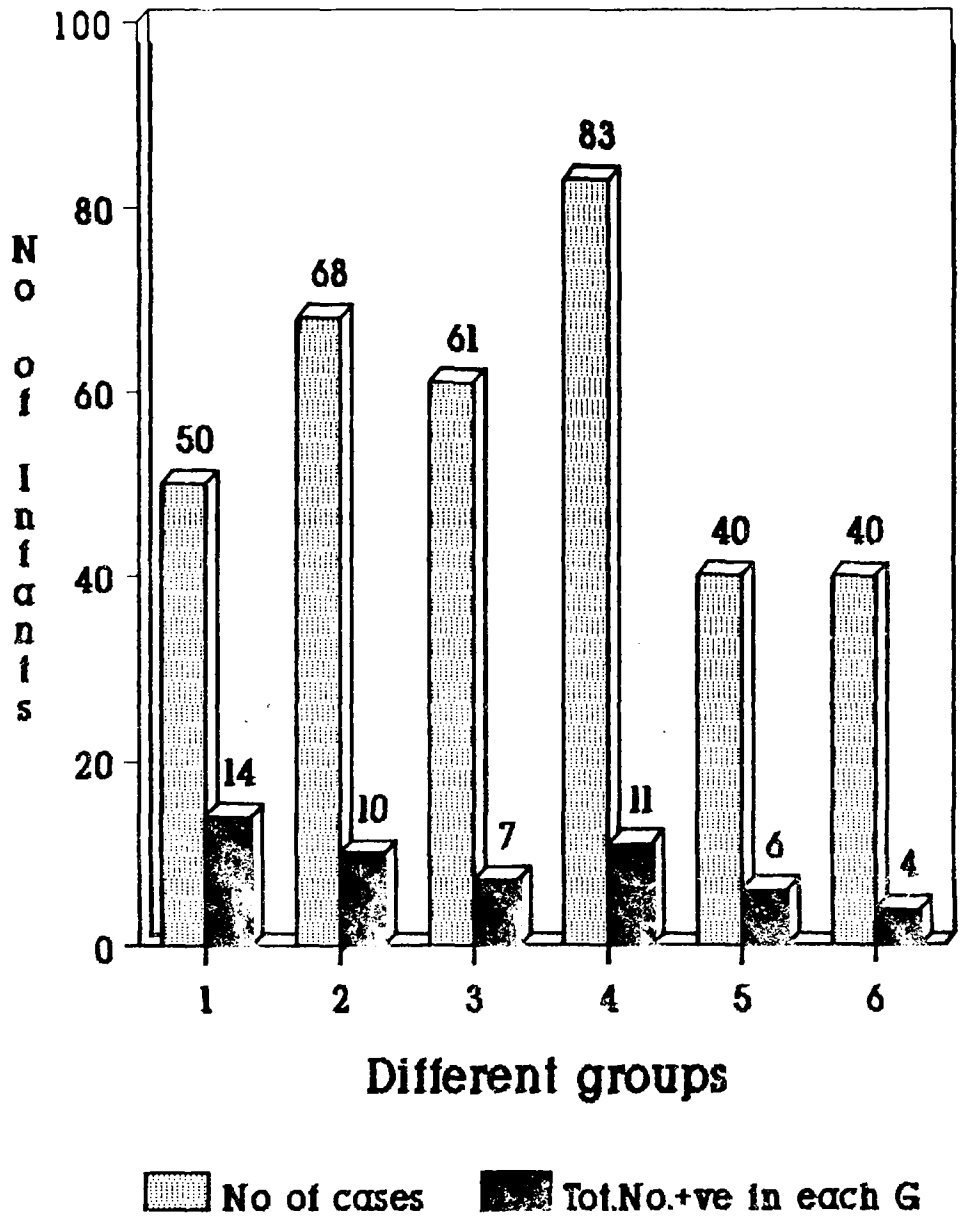

Fig. 1: Distribution of rubella virus specific IgM antibodies in infants with different clinical presentation

Group: 1- Bilateral congenital cataract. 2- Neonatal jaundice. 3- Intrauterine growth retardation. 4- Developmental delay with or without microcephaly. 5- Hepatosplenomegaly. 6- Miscellaneous group like seizures, pneumonia, cerebral palsy, meningitis etc.

1. Transient effects in infants.
2. Permanent manifestations that may be apparent at birth or become recognised during the first year[3]
3. Developmental abnormalities that appear and progress during childhood and adolescence.[7]

Foetal abnormalities may be hepatosplenomegaly, psychomotor retardation, bone alterations, cardiopathies and neuropathies. Congenital rubella infection usually causes permanent developmental defects resulting in cataract, sensory and neural deafness, cardiac defects and bony lesions.[8]

The various serological surveys point to a high prevalence of rubella virus in Indian population[9, 10] and 10-30% seronegativity in women of child-bearing age.

Demonstration of virus specific IgM antibodies in infancy is considered as a definitive evidence of intrauterine viral infection.[3]

In a study from Delhi, 5.6%, of 272 infants with congenital malformations were shown to have higher rubella haemagglutination inhibition antibody titres as compared to their mothers. In addition, rubella IgM antibodies were detected in 7 (43.75%) out of 16 children, by immunofluorescence. In our case, 15.2% were positive for IgM antibodies by μ capture ELISA test. In a similar type of study by Broor *et al*,[3] 12% of infants were positive for IgM antibodies by μ capture ELISA test.

There is a 20% mortality rate among congenitally virus infected infants who are symptomatic at birth. Surprisingly, some virus infected infants appear normal at birth but manifest abnormalities later. Severely affected infants may require institutionalization.

It is a well known fact that in rubella infection, all babies are not born with congenital malformations and therefore only symptomatic infants were included in our study.

To examine the full extent of the problem of congenital infections with rubella, a long term prospective study should be implemented.

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FDA Licenses Combination Vaccines

The U.S. Food and Drug Administration (FDA) licensed 2 new combination vaccines in September 1996 that promise fewer inoculations for children and easier administration for physicians.

The first combination includes mixing of acellular pertussis and haemophilus influenza type b(Hib) vaccines in one injection for fourth-dose use in the diphtheria-tetanus-pertussis immunization schedule. The second is a combined Hib/hepatitis B vaccine (Comvax) for infants, at ages of 2 months, 4 months, and 12-15 months. Intended for intramuscular injection, Comvax is to be used in a three-dose series, with a two month interval between the first two doses.

The American Academy of Pediatrics (AAP) greeted these twin federal approvals of combination vaccines with open arms.

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