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SHORT COMMUNICATION

PREVALENCE OF RUBELLA ANTIBODIES IN A NON-IMMUNIZED URBAN POPULATION, SÃO PAULO, BRAZIL.

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SUMMARY

The prevalence of rubella antibodies was evaluated through a ramdom seroepidemiological survey in 1400 blood samples of 2-14 year old children and in 329 samples of umbilical cord serum. Rubella IgG antibodies were detected by ELISA, and the sera were collected in 1987, five years before the mass vaccination campaign with measles-mumps-rubella vaccine carried out in the city of São Paulo in 1992. A significant increase in prevalence of rubella infection was observed after 6 years of age, and 77% of the individuals aged from 15 to 19 years had detectable rubella antibodies. However, the seroprevalence rose to 90.5% (171/189) in cord serum samples from children whose mothers were 20 to 29 years old, and reached 95.6% in newborns of mothers who were 30 to 34 years old, indicating that a large number of women are infected during childbearing years. This study confirms that rubella infection represents an important Public Health problem in São Paulo city. The data on the seroprevalence of rubella antibodies before the mass vaccination campaign reflects the baseline immunological status of this population before any intervention and should be used to design an adequate vaccination strategy and to assess the seroepidemiological impact of this intervention.

KEYWORDS: Rubella; Seroprevalence.

INTRODUCTION

Rubella immunization programmes are designed to prevent intrauterine rubella infection. In developed countries, the widespread use of rubella vaccine in the last 20 years has significantly changed the incidence of rubella infection and consequently the incidence of congenital rubella syndrome (CRS). In the United States, the overall incidence of rubella has declined by more than

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98% since 1969[4]. In developing countries, however, the prevalence of CRS remains unknown since there are no effective surveillance systems for rubella and CRS[5]. Different strategies have been proposed for the prevention of CRS, consisting primarily of selective vaccination of prepubertal females, or universal immunization of preschool children of both sexes. However, before choosing a particular strategy, it is very important to assess the prevalence of rubella antibodies by age, in order to define the proportion of women of childbearing age still susceptible to rubella, as well the level of circulating rubella virus among children. The indiscriminate introduction of rubella vaccine without epidemiological data can be dangerous, since it can displace the circulation of rubella virus from childhood to early adult life, increasing the risk of CRS. In Brazil, a WHO collaborative study on the sero-epidemiology of rubella in Caribbean and Midle and South American populations in 1968[2] showed that in the urban area of São Paulo rubella antibodies detected by the haemagglutination-inhibition (HI) technique were present in 56% of children in the 5-9 year age group and in 91% of the 10-14 and 15-19-year age-groups. Two additional studies have shown a prevalence of rubella antibodies in pregnant women of approximately 80%[1,7]. The purpose of the present study was to evaluate the seroprevalence of rubella antibodies in the city of São Paulo before a 1992 program of mass vaccination against rubella among children aged 1-10 years.

MATERIAL AND METHODS

Samples: 1400 blood samples from 2-14 year old children were collected on filter paper, as previously described[8]. The samples were randomly selected from a measles survey conducted in 1987 that was based on probability sampling with 2-stage selection, applied independently in each municipality of Greater São Paulo as described previously[6]. The immune status of the adult population was assessed indirectly through the detection of rubella antibodies in 329 umbilical cord serum samples from newborns whose mothers were 15 to 34 years old.

Serology: Rubella IgG antibodies were detected by an in-house standardized ELISA using microtiter plates (Hemobag-São Paulo) sensitized with HPV77 rubella virus antigen prepared in Vero cells[9].

RESULTS AND DISCUSSION

The seroprevalence did not differ significantly between groups aged 2 to 5 years. A significant increase in prevalence of rubella infection was observed after 6 years of age, affecting 80% of the 14 year old group. A further increase was observed in the adult population, and 95.6% of mothers aged from 30 to 34 years had detectable rubella antibodies (Table 1).

This present study confirms the finding of a high antibody rate of rubella antibodies in the population of the urban area of São Paulo, as it was observed 20 years ago by the WHO collaborative study[2]. Our data also showed that in the city of São Paulo, before the large-scale introduction of the rubella vaccine, about 20% of individuals reached the childbearing age without immunity

TABLE 1

Prevalence of Rubella Antibodies in great São Paulo, Brazil, 1987.

Age (years)	Number	Positive (%)	Confidence Interval (95%)
2	262	73 (27.8)	22.4-33.2
3	233	78 (33.4)	27.4-39.4
5	184	72 (39.1)	32.1-46.1
6	186	104 (55.9)	48.8-63.0
8	191	110 (57.6)	50.6-64.6
10	164	125 (76.2)	69.7-82.7
14	180	144 (80.0)	74.2-85.8
15-19	49	38 (77.5)	65.8-89.2
20-24	93	84 (90.3)	84.3-96.3
25-29	96	87 (90.6)	84.8-96.4
30-34	91	87 (95.6)	91.4-99.8
Total	1729	1002 (57.9)	55.6-60.2

to rubella virus. The proportion of seropositivity increased with age, reaching ~ 90% in the 20-29 year old age group and ~ 95% in the 30-34 year old age group. The increase in the prevalence of rubella antibodies in the 20-34 year old age group indicates that a large number of women are infected during the childbearing years, giving rise to a still unknown number of CRS cases. The compulsory notification of CRS was introduced in São Paulo only in August 1992, and preliminary results from August to December, 1992 indicate that 15 cases of CRS were confirmed by the presence of rubella IgM antibodies. The completeness of the reporting of rubella still represents a problem even in developed countries[3] and we can expect that the real number of CRS in the city of São Paulo is much higher than that since many cases of CRS may have not been recognized or may have scaped notification.

This study confirms that rubella infection represents an important Public Health problem in São Paulo city. The data on the seroprevalence of rubella antibodies should be used to design an adequate vaccination strategy for the effective prevention of CRS and to assess the impact of this intervention on the seroepidemiological status of this population.

RESUMO

Prevalência de anticorpos anti-vírus da rubéola em população urbana não imunizada, São Paulo, Brasil.

A prevalência de anticorpos contra o vírus da rubéola foi avaliada através de inquérito soroepidemiológico, em 1400 amostras de sangue de crianças com idade entre 2 e 14 anos e 329 amostras de soro de cordão umbilical. Anticorpos para o vírus da rubéola foram detectados pela técnica de ELISA e as amostras foram colhidas em 1987, 5 anos antes da campanha de vacinação em massa com a vacina tríplice viral realizada na cidade de São Paulo em 1992. Um aumento significativo na prevalência foi observado após 6 anos de idade, e 77% dos indivíduos entre 15 e 19 anos apresentaram anticorpos anti-rubéola. Entretanto, a soroprevalência elevou-se para 90,5% (171/189) em soros de cordão de crianças cujas mães apresentavam idade entre 20 e 29 anos, alcançando 95,6% no grupo etário de 30 a 34 anos., indicando que um grande número de mulheres são infectadas durante a idade fértil. Este estudo confirma que a infecção pelo vírus da rubéola representa um importante problema de saúde pública na cidade de São Paulo. Os dados de prevalência de anticorpos contra o vírus da rubéola antes da campanha de vacinação em massa reflete o estado imunológico desta população antes de qualquer intervenção e pode ser usado para desenvolver estratégias adequadas de vacinação e avaliar o impacto soroepidemiológico dessa intervenção.

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REFERENCES

1. **BLACK, F.L.; BERMAN, L.L., BORGOÑO,** J.M. et al. - Geographic variation in infant loss of maternal measles antibody and in prevalence of rubella antibody. **Amer. J. Epidem., 124**:442-452, 1986.

2. **DOWDLE,** W.R.; **FERREIRA,** W.; **SALLES GOMES,** L.F. et al. - WHO collaborative study on the sero-epidemiology of rubella in Caribbean and Middle and South American populations in 1968. **Bull.Wld. Hlth. Org., 42**:419-422, 1970.

3. **GALAZKA,** A. - Rubella in Europe. **Epidem.Infect., 107**:43-54, 1991.

4. **HERRMANN,** K.L. - Rubella in the United States: toward a strategy for disease control and elimination. **Epidem. Infect., 107**: 55-61, 1991.

5. **MILLER,** C.L. - Rubella in developing world. **Epidem.Infect., 107**:63-68, 1991.

6. **PANNUTI,** C.S.; **MORAES,** J.C.; **SOUZA,** V.A.U.F. et al. - Measles antibody prevalence after mass immunization in São Paulo, Brazil. **Bull.Wld.Hlth.Org., 69**: 557-560, 1991.

7. **SCHATZMAYR,** H.G. - Aspects of rubella infection in Brazil. **Rev.infect. Dis., 7(suppl. 1)**:S53-S55, 1985.

8. **SOUZA, S.L. & CAMARGO, M.E.** - The use of filter-paper blood samples smears in a practical fluorescent test for American trypanosomiasis serodiagnosis. **Rev. Inst. Med. trop.S.Paulo, 8**: 255-258, 1966.

9. **SOUZA, V.A.U.F.; SUMITA, L.M.; FINK, M.C.D.S.** et al. - Enzyme-linked immunosorbent assay (ELISA) for rubella antibodies: a simple method for antigen production. (Abstract). **Rev. Inst. Med. trop. S. Paulo, 35 (suppl.10)**: S58, 1993.

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