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RISK OF RUBELLA IN PREGNANCY*

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Like other viral infections, rubella is characterized by a rash of short duration and generalized lymphadenopathy. Most frequently, it is a childhood disease and usually involves no further complications. However, if women who have not previously had rubella are infected with it during pregnancy, the virus will be transferred to the embryo or fetus, causing viremia. Since such viremia occurring during organogenesis can cause malformations in 7-70% of the babies[1], it is very important to know whether a pregnant woman has had rubella, especially when there is a possibility of her contracting it.

Ideally, women should be checked before pregnancy to determine if they have ever had rubella, and those who have not should be immunized properly.

Rubella cannot be diagnosed solely on the basis of clinical findings (microlymphadenopathy, maculopapular rash, arthralgia, thrombocytopenia)[2] since other viruses, especially enteroviruses, can cause the same clinical picture[3]. Positive diagnosis of rubella is made by performing hemagglutination-inhibition (HAI) and sucrose density gradient (SDG) studies, which likewise are the methods for determining past incidence of the disease.

In this study, serologic and virologic examinations were performed on 74 pregnant women with possible exposure to rubella. At the same time, the 74 children suspected as the sources of infection were studied. The results of such examination are vital for any decision concerning therapeutic abortion.

Material and Methods

Between April 1976 and July 1979, 74 women in their first trimester of pregnancy were referred to the Department of Virology at the Hacettepe University Institute of Child Health because of exposure to children with suspected rubella. Five mls of blood were drawn from the pregnant women during their first visit and another 5 mls two weeks later for serologic studies. Blood was likewise drawn from the 74 children, whose throat cultures were also obtained for viral isolation on the first visit

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and kept in Hank's balanced salt solution (HBSS) at −70°C. Fetal explant tissue culture was obtained from the offspring of one of the exposed women and used for viral isolation.

Rubella HAI tests were performed according to the procedural guide of the U.S. Center for Disease Control[4]. Fractionation of immunoglobulins was performed from sera samples by ultracentrifugation in a discontinuous sucrose gradient[5]. Rubella virus was isolated using the interference technique with Echovirus type 11[6]. The isolates were confirmed as rubella virus by neutralization with antirubella-specific rabbit serum. Serologic tests were performed on two specimens from each person on the same run.

Results

On the basis of the HAI and SDG studies, 68 of the 74 children suspected as possible sources of rubella were found not to have been infected recently, and 18 were already immune to the disease. Of the remaining six, one child tested positive on HAI but revealed IgM antirubella antibodies in his SDG results (Table I), while the other five children showed negative HAI results on their first visit but positive results two weeks later, at which time IgM type antibodies were noted.

Although six of the 74 children were found to be recently infected by serologic tests, the rubella virus could be isolated from the throat cultures of only two of these children.

TABLE I

HEMAGGLUTINATION-INHIBITION AND SUCROSE DENSITY GRADIENT RESULTS OF 74 CHILDREN SUSPECTED AS SOURCES OF RUBELLA INFECTION FOR PREGNANT WOMEN

	First blood sample		Second blood sample (2 weeks later)	
	Positive	Negative	Positive	Negative
HAI	19	55	24 (19 + 5)	50
	IgG	IgM	IgG	IgM
SDG	18	1	19	5

Of the 74 pregnant women, 30 were shown by HAI and SDG studies to be already immune at their first visit. Forty-four (59.36%) were found susceptible to rubella

TABLE II

THE EVALUATION OF IMMUNITY TO RUBELLA OF 74 WOMEN BELIEVED TO BE EXPOSED DURING THE FIRST TRIMESTER OF PREGNANCY

	First blood sample		Second blood sample (2 weeks later)	
	Positive	Negative	Positive	Negative
HAI	30	44	36	38
	IgG	IgM	IgG	IgM
SDG	30	—	30	6

(Table II), but only six of them actually became infected. The HAI test titrations of these women were altered but, more importantly, IgM antirubella antibodies were shown in all cases (Table III). With two exceptions (Table III, Cases 1 and 3), the probable source of infection was shown to be the suspected child. Abortion was advised to all six women, but it could be performed on only one woman at this hospital. In that particular case, rubella virus was isolated in the fetal lung.

TABLE III

SEROLOGIC AND VIROLOGIC TEST RESULTS OF PREGNANT WOMEN FOUND TO BE INFECTED AND OF PROBABLE SOURCES OF INFECTION

	Rubella hemagglutination-inhibition test (HAI)		Sucrose density gradient (SDG) virus isolation	
Cases	First blood sample	Second blood sample		
1	<8	64	IgM	1/2
	SI* <8	<8		
2	<8	128	IgM	1/2
	SI 256	128	IgG	
3	<8	32	IgM	1/4
	SI <8	<8		
4	64	32	IgM	1/4
	SI 64	64	IgG	
5	<8	16	IgM	1/4
	SI 64	64	IgG	
6	<8	64	IgM	1/2
	SI <8	128	Virus was isolated	

SI* : Source of infection.

Discussion

Rubella during childhood is known to be rather harmless, but if a pregnant woman contracts the infection during the first trimester, the teratogenic effects can be observed in anywhere from 7 to 70% of the offspring in the form of congenital abnormalities[1]. Studies have shown that 85% of the women of childbearing age in some countries are immune to rubella infections, with only 15% in the susceptible group[7]. In countries where routine immunization against rubella is practiced, this percentage is rapidly decreasing, reducing the risk of infection during pregnancy by the same rate[8]. The present study is the first in Turkey to indicate susceptibility to rubella in a specific group. The susceptibility rate was found to be very high: 59.46%. With the application of rubella vaccination, the ratio would decrease.

Two things should be kept in mind while defining the risk of rubella: the CAUSE of the infection and the EFFECT of the infection, which is malformation in the offspring. The problems involved in simultaneously evaluating these two important points give rise to considerable variations in the literature[9-11]. It is necessary to know whether pregnant women have had rubella prior to or during pregnancy. If they have had rubella without knowing it, then the primary or secondary infections should be evaluated separately. If the serologic tests indicate primary rubella infection in pregnant women, especially during the first trimester, the risk of fetal infection and consequently of malformation is high and therapeutic abortion is recommended[12]. In this study, 40.5% of the pregnant women were shown to have had rubella infection prior to pregnancy, so obviously there was no reason for discontinuing the pregnancy even if they had been exposed to the disease.

The rubella virus could be isolated in only one woman (Case number 6 in Table III); her aborted fetus was the only subject for study. Despite good cooperation on the part of the families, the aborted fetuses of the other five women could not be obtained for virus studies, so infection in their offspring could not be proved. Although virus was isolated from the throats of two children, the exposed women did not show clinical signs of infection, and their laboratory findings were negative.

Summary

Rubella should not be diagnosed solely on the basis of clinical findings. The diagnosis must be confirmed by serological and virological studies in all pregnant women who come into contact with the infection. Therapeutic abortion should be recommended only if acute primary infection has been confirmed by these tests.

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