Evaluation of the anti-Rubella herd Immunity in Children of Al-Muthanna Province

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Abstract

Fifty blood samples were collected from healthy children with age range from one to six years old. They were 25children from AL-Sammawa city and 25 children from AL-Khider. These samples were tested by ELISA to evaluate the immune status of children after immunization. The results showed that the percentage of children whom observed levels of anti-rubella specific antibodies ≥ 11 IU/ml were 96.7% and 95% for males and females respectively after vaccination .There was highly significant difference (P<0.01) in titer of IgG after vaccination between children of AL-Sammawa and AL-Khider. There was decrease in IgG levels between (2-4) years old but the IgG levels will rise between (1-2)and (4-6) year.

Introduction

The Expanded Programme on Immunization (EPI) began in Iraq in 1985, including Rubella vaccine, MMR vaccine represents one of combined vaccines of rubella, measles and mumps were given for children at age of 12- 15 months (1). Vaccination with rubella vaccine is the best way to eradicate Congenital Rubella Syndrome which has severe complications for women in their first trimester of pregnancy these complications includes severe <u>birth defects</u> or <u>death</u> of the fetus (2).

Rubella virus is classified as the only member of the genus Rubivirus within the family Togaviridae (3).

Rubella vaccine is given to both boys and girls even though boys do not themselves-need such vaccination, in the UK it has until recently been considered that boys do not need vaccinating against rubella and so should not be exposed to the slight risk of vaccine complication; in addition, circulation of wild rubella in the population as a whole is useful in boosting immunity in girls(4). Therefore, the live attenuated vaccine was given only to girls at adolescence to protect them against developing the disease while pregnant and transmitting it to the fetus resulting in the congenital rubella syndrome(5). However; because of its high reproduction rate; rubella will maintain its presence in the population indefinitely unless well over 50% of the populations are protected. In the USA, rubella vaccine has been given to boys as well and this approach (i.e. immunization with MMR vaccine at about 1 year) has recently been adopted in the UK and in Iraq (6,7).

Aims of the study:

Evaluation of the immune response in children immunized with anti-rubella vaccine according to sex, residency, and age groups.

Materials & Methods

The study was conducted from October 2009 to January 2010.Fifty children were selected randomly to study the immunity levels of Rubella virus after taken MMR vaccine. They were 25children from AL-Sammawa children Hospital and same number of children from Al-Khider health care center. They were 27 males and 23 females. The ages of them were between one to six years old. The serum samples were separated from blood and

stored at -10°C in the laboratory of college of Science. The ELISA test was caried out to quantitative determination of anti Rubella virus IgG (8,9,10).

Rubella virus diagnostic kit

ELISA rubella kit from (Bio-kit) INC company, USA were used to diagnose rubella virus in serum specimens, this include the following procedure:

1. The desired number of coated wells was placed in the holder.

2. Test samples, Negative Control, Positive Control, and Calibrator were prepared by adding 5µl of the sample to 200µl of sample diluent.

3. Diluted sera, calibrator, and controls100 μ l was dispense into the appropriate wells. For the reagent blank, 100 μ l absorbent solution was dispesed in 1A well position . The holder was tapped to remove air bubbles from liquid and mixed well.

4. The plates were covered with the enclosed foil and incubated at 37°C for 30 minutes.

5. At the end of incubation period, liquid was removed from all wells. Rinsed and flicked the microtiter wells 5 times with diluted wash buffer .

6. Enzyme Conjugate100µl was dispensed to each well and mixed gently for 10 seconds.

7. The plates were covered with enclosed foil and incubated for 30 minutes at 37°C.

8. The Enzyme Conjugate was removed from all well then the micro titer wells were rinsed and flicked 5 times with diluted wash buffer

9. TMB reagent 100 µl was added into each well. Mixed gently for 10 seconds.

10. The plates were covered with enclosed foil and incubated for 15 minute at 37°C.

11. The reaction was stopped by adding 100 μ l of TMB stop solution to each well. Mixed gently for 30 seconds.

12.O.D .at 450nm was read with in 15 minutes with amicrowell reader.

Calculation of results were the mean of duplicate cut-off calibrator (15 IU/ml) value xc, positive control, negative control and patient samples, the Rubella IgG index of each determination were calculated by (dividing the values of each sample by calibrator value) were calculated.

Statistical analysis

The student's T test of the difference between two values was used, and result considered statistical significant if P- value more than 0.01.

Results and Discussion

1-Anti RV antibody titers according to sex.

The sex distribution of study as shown in table (1) there were 26 males and 24 females, there were significant difference between male and female according to immune response, therefore, the Rubella vaccine should be given to both genders as mentioned by Mims and White (11).

Table (1) Comparison between ther of male and remain

Sex of children	Number of samples	Mean titer of	P value
		IgG	
Male	26	0.612	^{>} 0.05
female	24	0.582	

2-Anti RV antibody titers according residential distribution

The number of children who have mean IgG of RV according to their residential distribution shows highly significant difference titer in level of IgG of children who are living Al-Sammawa compared with samples of children that collected from Al-khider, and the difference in IgG may be caused by lowered levels in a healthy servings and dispensed different disease such as Influenza or diarrhea and contaminated water by different organisms in AL-Khider, or the vaccine is not active that lead to lack immunity system in the children of Al-khider, where as the healthy serving in Al-sammawa may be better than Al-khider (12,13,14) as shown in table (2).

Table (2) The Residential distribution RV samples

Residence	Mean titer	P value
	of IgG	
AL-	0.709	< 0.01
Sammawa		
Al-khider	0.484	

3- Anti RV antibody titers in samples according to age groups

In this study the anti RV antibody (IgG) in 50 children showed a high titer of IgG in specimens which are taken from children their age between 1-2 years and a lower titers in specimens of children of 2-4 years old, then, the titer is rising in children their age between 4-6 years as shown in table (3).

Table (3) shows the differences in mean values of IgG of different age groups

Age	Mean
	Titer of IgG
	110

1-2	0.620
2-4	0.500
4-6	0.637

The causes of high titers of IgG in age (1-2)years is result a newly vaccination of children when they are taking the first dose of MMR vaccine in age 12-15 month but the titer of IgG is decrease in children their age between 2-4 years, due to immunity decrease, but when they have taken the booster dose of MMR vaccine in age 4-6 years the titer of IgG increased, and remain in the constant level (15).

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تقييم مستويات الأجسام المناعية للحصبة الألمانية فى أطفال محافظة المثنى

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الخلاصة

شملت الدراسة (50) عينة دم مأخوذة من أطفال أصحاء بعد تلقيحهم بلقاح الحصبة الألمانية حسب الجدول التلقيحي المتبع في القطر ، وقد تراوحت أعمار هم مابين عدة شهور الى سنة سنوات. وقد كانوا 25 طفل من السماوة و 25 من قضاء الخضر هذه العينات أجريت لها الاختبارات المناعية لتقييم الاستجابة المناعية للطفال بعد تلقيحهم. تم اختبار هذه المعنوات المعينات أجريت لها الاختبارات المناعية لتقييم الاستجابة المناعية للطفال بعد تلقيحهم. تم اختبار هذه المعينات أجريت لها الاختبارات المناعية لتقييم الاستجابة المناعية للطفال بعد تلقيحهم. تم اختبار هذه المحموعة من العينات أجريت لها الاختبار ات المناعية لتقييم الاستجابة المناعية للطفال بعد تلقيحهم. تم اختبار هذه المجموعة من العينات باختبار الادمصاص المناعي المرتبط بالأنزيم ((ISA) وكانت النتائج كما يلي, اظهرت مصول الأطفال الذكور نسبة 7.60%، و مصول الإناث نسبة 95% احتوائها على تراكيز فعالة من الأجسام المضادة النوعية للحصبة الألمانية أعلى من 11وحدة دولية إمليلتر باختبار الادمصاص المناعي المرتبط بالأنزيم (المحاعي على تراكيز فعالة من الأجسام المضادة النوعية للحصبة الألمانية أعلى من 11وحدة دولية إمليلتر باختبار الادمصاص المناعي المرتبط ولالمانية على تراكيز فعالة من الأجسام المضادة النوعية للحصبة الألمانية أعلى من 11وحدة دولية إمليلتر باختبار الادمصاص المناعي المرتبط بالانزيم ELISA بعد عملية التقيح إهناك فرق معنوي كبير في عيارية IgG بعد التلقيح بين اطفال المركز واطفال مدينه الخصر وهناك النوعية الحصبة الألمانية أعلى من 11وحدة دولية إمليلتر باختبار الادمصاص المناعي المرتبط بالانزيم ELISA بعد وهناك فرق معنوي كبير في عيارية IgG بعد ولاحك و 4-6 سنة مقارنة مع الاعمار 1-2 و 4-6 سنة .