

Two Outbreaks of Rubella in International Students: Policy Implications

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From Chinese version, pp,916-924

Abstract

Because of the implementation of routine vaccination, the number of vaccine preventable diseases such as rubella had markedly declined for years in Taiwan. Eliminating rubella and congenital rubella is one of the targets in “Eradication Program for Measles, Congenital Rubella Syndrome, Poliomyelitis and Neonatal Tetanus”. Following the two outbreaks of rubella in foreign laborers last year, there were two more outbreaks in international students in Taipei County and Changhua County, respectively. This article will briefly describe these two events and discuss the issues of management and control. Finally, we will give some recommendations for vaccination policy for foreigners.

Keywords: rubella, eradication program for measles, congenital rubella syndrome, poliomyelitis and neonatal tetanus, vaccination policy for foreigners

Received: Sep 5, 2008 ; Accepted: Sep 24,2008.

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Introduction

In 1986, our country implemented free rubella vaccination. Routine immunization services of the measles-mumps-rubella (MMR) vaccine had been offered at no cost to children aged ≥ 15 months since 1992. Because of the efforts of the public health staff, the immunization coverage rate of MMR has been higher than 95% in recent years. The number of confirmed rubella cases was less than 10 per year from 2002 to 2006 [1]. Of these, 39.1% were locally-acquired, and 60.9% were imported. Two outbreaks of rubella in foreign laborers occurred in 2007, which increased the number of locally-acquired cases to 51, consisting of 94.4% of total cases. It was the highest numbers of rubella cases in the past ten years. In these two rubella outbreaks, there were 46 foreign laborers [2]. Taiwan started to import laborers from other countries in 1989, and we estimated the number of foreign laborers in Taiwan at about 357,937. Approximately 99.9% of these laborers were from Southeast Asian countries, which had either not included rubella vaccine as routine childhood immunization, or had just included the vaccine recently. Therefore, the foreign laborers which lack immunity to rubella may pose a problem for Taiwan's goal of eradicating rubella and congenital rubella. These outbreaks made us review the vaccination policy for foreign laborers. While the vaccination policy was under review, two rubella outbreaks among international students occurred in Taipei and Changhua County this year. This article will briefly describe these two outbreaks and explore the issue of the vaccine policy for international students.

Description of the outbreak

1. Rubella outbreak in international college students in Taipei County

The First Branch received reports of probable cases of measles and rubella

on March 17 and 18, respectively. After investigation, it was found that both patients were confirmed cases of rubella and were Malaysian students studying in the same college. There were eight reported cases between Marc 13 and April 28, and seven of which were confirmed (Figure 1). All of the confirmed cases were men from Malaysia, aged between 17 and 20 years (median: 18 years). One student arrived in Taiwan in June 2007; the others arrived during February 18-19, 2008. No students had recent travel histories or received rubella vaccine.

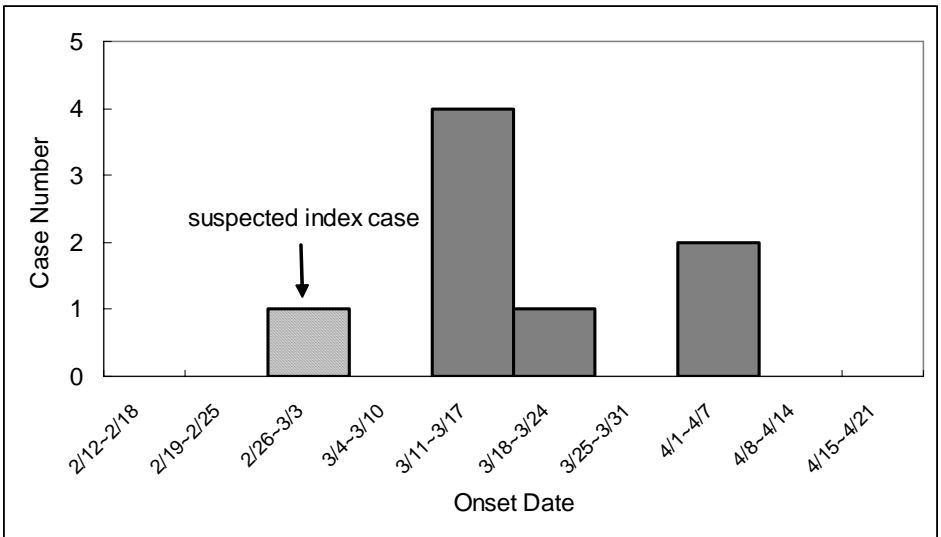


Fig 1. Confirmed cases of rubella in a college, Taipei County, 2008

In this school, there were a total of 1268 students and no difference in numbers by sex. All were international students, and about 2/3 of the students came from Hong Kong, Macau, Malaysia, Myanmar, or Indonesia. The control measures of the outbreak included (1) investigating the illness history and contacts of confirmed cases to find the possible source of infection (2) excluding the confirmed and probable cases from school for seven days after onset of the rash (3) surveillance of those with history of exposure to rubella virus. Because most of the male students had not received rubella vaccine, all male students in this school were given MMR vaccine (a total of 621 students) on March 24. (By regulation, foreign women must have proof of MMR vaccination or immunity when they apply for residency.) The immunization coverage rate was 97%.

After immunization with the MMR vaccine, two probable cases were reported on April 15 and were confirmed by serology. Sequence analysis by the virology laboratory proved that both were natural infections.

Investigation showed that at the end of February, a student had mild fever and generalized rash. This student was diagnosed as having a common cold; the person also left Malaysia and arrived in Taiwan on February 18. In addition, he had close contact with the first reported case, indicating that this student might be the index case.

In conclusion, the suspected index case might have been infected in Malaysia and began the chain of infection in Taiwan among students with no immunity. There was no spread of rubella to school staff or the community.

2. Rubella outbreak in a college in Changhua County

In Changhua County, two Malaysian students in a college went to an Ear-Nose-and-Throat (ENT) doctor because of cough, rhinorrhea and rash on April 3 and April 5, respectively. The serological findings showed that both had

rubella. They were freshman and sophomore in the Department of Hotel and Restaurant Management and living on the second and fifth floors in the same dormitory. After investigation, we found 10 confirmed cases of rubella between March 13 and April 5. (Figure 2).

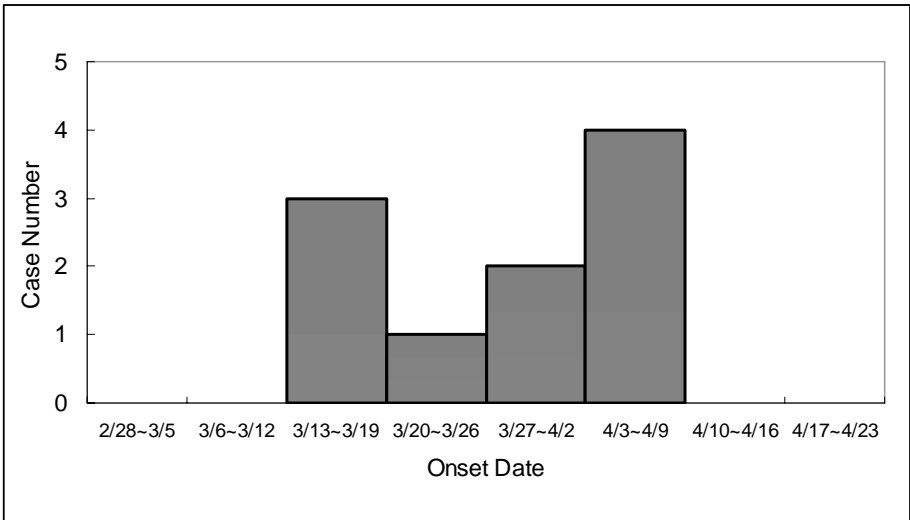


Fig 2. Epidemic curve of rubella outbreak in a college, Changhua County, 2008

These 10 cases were studying in the same college and the age were between 20 and 22 years (median: 21 years). Nine students were male (all were from Malaysia) and the other one was female (Taiwanese). Only one of the nine Malaysian students reported having received MMR vaccine. The Taiwanese student also declared that she had MMR vaccine. However, neither of them was able to provide documentation of MMR vaccine history. The female student rented a single room outside the school. All of the Malaysian students lived in the same dormitory (seven students on the second floor and two on the fifth floor).

Investigation revealed that a student who had symptom onset on March 13 might be the index case of the outbreak. He visited his relatives in Malaysia in January and came back to Taiwan on February 24.

There were 4293 students and 364 staff in this college; 1108 students lived in the dormitory; 69 were international students (68 from Malaysia and one from Argentina). All international students lived in the school dormitory. To control the outbreak, students who were reported cases or contacts with similar symptoms were isolated in designated rooms. In addition, we implemented a health monitoring system for students in the dormitory and the classmates of cases. Because the international students were at high risk of rubella infection due to lack of immunity, the bureau of public health gave one dose of MMR vaccine to all the international students with no symptoms and no history of MMR vaccination (a total of 59 students). We also investigated if any students or employees had contact with pregnant women. There were three employees who were pregnant in the school, but they had little opportunities to contact the students. Besides, all of them had rubella IgG, which meant the risk of congenital rubella syndrome was very low.

In summary, the index case might have been infected in Malaysia and

brought about the chain of infection in Taiwan among students with no immunity. Despite having a large number of persons in this school, only one Taiwanese student was infected. There was no spread of rubella in households or to the community.

Discussion

Rubella is a highly contagious viral infection. Most patients only have mild symptoms and the disease is self-limited. However, if pregnant women were infected in the first trimester, it can result in multiple birth defects [4-8]. According to the World Health Organization (WHO), by the end of 2006, 123 countries had incorporated rubella into general recommendation of childhood immunization, which was greatly increased compared to only 65 countries in 1996. Nevertheless, the number consists of only 27% of the population [3]. In Taiwan, immunization coverage rate of the first dose of MMR vaccine was more than 95%. In addition, there had been several mop up immunization campaigns for children in their first grade of elementary school, junior high school, and voluntary vaccination for child-bearing women. In recent years, the number of rubella cases in Taiwan had decreased steadily [9]. Most cases of rubella were sporadic not in clusters. The case number of congenital rubella syndrome were only 3 (one case imported from Vietnam) in 2001, one in 2007 (imported from Indonesia), and one (imported from China) in 2008. While the total number of rubella cases is decreasing, the proportion of imported cases had increased. From 2002 to 2006, 35% of the confirmed cases occurred in foreigners. After the two outbreaks of international laborers last year, another two outbreaks among international students were reported.

This report showed that these outbreaks might have originated from other

countries, and all the infected college students in Taipei were foreigners with unknown vaccination history. Only one of the confirmed cases in Changhua was Taiwanese. According to the patient's mother, the patient received one dose of rubella vaccine in childhood. The reason that the outbreak was limited to international students might be because the international students were clustered in the same classes, who did not live with Taiwanese students, the chance of spreading the disease to Taiwanese was decreased. Another explanation was that the susceptible population among Taiwanese was low, so there was no obvious transmission to Taiwanese students and staff. Furthermore, there was no further spread of rubella to households or the community during these outbreaks.

The index cases of these two outbreaks were found through retrospective case finding. Because the symptoms of rubella were mild and atypical, these two index cases were diagnosed as having common colds initially and missed the opportunity for early implementation of control measures. Moreover, with decreased case numbers in Taiwan, most of the young doctors did not have enough clinical experience to diagnose rubella [10].

In controlling the outbreak, other than detailed investigation of cases and contacts and active case finding among childbearing women, we provided these international students MMR vaccine. Because the vaccines also provide protection against measles and mumps, the students were given the MMR vaccine without first checking for the presence of rubella antibody. In Taiwan, foreign women, aged 15 to 50 years, must have tested positive for rubella antibody or provide rubella vaccination certificate when they apply for residency. If they do not have rubella antibody or have no proof of vaccination they need to receive MMR vaccine in Taiwan. This regulation was implemented well in the college in Taipei. On the other hand, female students in the college in Changhua did not

have the relevant records or certificates. After investigation, we found that the Taiwan's foreign office did not follow the new regulation and even used health certificates which were not provided by Taiwan Centers for Disease Control.

After mass immunization in Taipei, two suspected cases were reported and proven to be natural infections by sequence analysis. Immunization of high risk group is one of the control measures for rubella epidemic [12-14]. Because the incubation of rubella is up to three weeks, immunization of contacts might not prevent the disease. More importantly, surveillance of rubella and congenital rubella syndrome, outbreak investigation, and proper isolation should be implemented to control the outbreak.

The data from the Ministry of Education indicated that there were approximately 26,000 international students attending schools in Taiwan during the 2007-08 academic year [15]. There was no rubella regulation for male students. The United States and European countries usually ask new students to complete two doses of MMR vaccine or provide serologic test results [16-17]. Compared to the rules of other countries, ours were very lax.

The Eradication Program for Measles, Congenital Rubella Syndrome, Poliomyelitis and Neonatal Tetanus initiated in 1991 had a great effect on decreasing case numbers. This program had stepped into the fourth stage last year, and we hope to eradicate rubella and congenital rubella syndrome as soon as possible. Therefore, we need to adopt a more stringent strategy to prevent disease outbreaks. The outbreaks which happened last year gave us an opportunity to review and revise our policies.

In May 2008, Taiwan Centers for Disease Control convened a meeting with related departments to discuss the issue. The meeting passed a resolution requiring all foreigners to have tested positive for rubella and measles antibody or

provide vaccination certificate of rubella and measles when they apply for residency. The policy will be revised and announced this year and carried out on January 1, 2009.

Conclusion

By carrying out the vaccine policy successfully, the number of locally-acquired cases of rubella decreased steadily each year. In contrast, the proportion of imported cases or infected foreigners increased. The rubella outbreak in foreign laborers last year and international students this year reinforced the evidence that foreigners are at high risk of contracting vaccine-preventable diseases. Although our country has high immunization coverage rate and herd immunity, some people still have not received vaccine or have no immunity and are at risk of being infection. To avoid having foreigners living in Taiwan became a source of vaccine-preventable diseases, other than keeping high immunization coverage rate of the routinely recommended immunizations, we should have regulations for the foreigners. To protect people's health and prevent outbreaks, all foreigners should be tested positive for rubella and measles antibody or provide vaccination certificate of rubella and measles when they apply for residency.

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