Rubella immune status among healthcare workers in the Department of Obstetrics and Gynaecology of a regional hospital in Hong Kong: the need for a vaccination policy

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Summary: Rubella infection in early pregnancy is associated with severe consequences in the developing fetus. In Hong Kong, 8–11% of women of child-bearing age are still susceptible to rubella infection. Therefore, rubella immune status of healthcare workers who may have contact with pregnant women is of particular concern. Rubella immunity of healthcare workers in a Department of Obstetrics and Gynaecology was analysed. In the one and a half years of study, 134 healthcare workers voluntarily submitted blood samples for immunity determination and 16·4% of them were susceptible to rubella infection. A substantial proportion of healthcare workers of child-bearing age (14%) was negative for rubella antibody. Susceptible healthcare workers have a risk of acquiring and subsequently transmitting the potentially teratogenic rubella infection to their patients. There is a need to review the rubella immunization policy for healthcare workers in Hong Kong.

Keywords: Rubella; susceptibility; immunization; healthcare workers; pregnancy.

Introduction

Before the use of rubella vaccine, rubella was a common childhood disease. The clinical manifestations range from completely inapparent infection to a characteristic postauricular and suboccipital lymphadenopathy, transient erythematous and sometimes pruritic rash, mild malaise, coryza and low grade fever. Transient polyarthritis and polyarthralgia occur in up to 70% of infected adult women, but are less common in men and uncommon in children.1,2 Postinfectious encephalopathy and symptomatic thrombocytopenia have been reported at rates of one per 6000 cases and one per 1500 cases respectively.3,4

By far the most important consequences of rubella are the miscarriages, stillbirths and fetal
anomalies that result from infection in pregnancy, especially in the first trimester. Prevention of fetal infection and consequent congenital rubella syndrome is a prime objective of rubella immunization.

The rubella immune status of healthcare workers deserves special attention. If they are not immune, they are at risk of contracting rubella, especially from their patients. This poses a risk to the developing fetus if they are in early pregnancy. Infected healthcare workers can also transmit the infection to susceptible patients. This was a concern during the 1997 outbreak of rubella infection in Hong Kong (3812 cases during the second quarter of 1997 versus 225 cases during the same period of 1996). Transmission is difficult to prevent since around half the infections are asymptomatic. In addition, even if the infections are symptomatic, transmission is known to occur during the period that occurs a few days before the onset of rash. Healthcare workers serving in obstetrics and gynaecology units are a particular cause of concern since around 8–11% of the pregnant women in Hong Kong and 7·4% of pregnant women delivered in 1997 at the Prince of Wales Hospital (PWH), the teaching hospital of The Chinese University of Hong Kong, were rubella susceptible.

We sought to analyse the rubella immunity of healthcare workers in the Department of Obstetrics and Gynaecology, PWH, in order to assess the need to change the vaccination policy in Hong Kong.

Methods

This retrospective study was conducted at PWH, a 1400-bed acute regional hospital. Healthcare workers of the Department of Obstetrics and Gynaecology who had submitted blood samples for rubella immunity determination during the previous year and a half were identified through laboratory records. Their demographic data and rubella immune status were analysed. Statistical significance was assessed by two-tailed Student’s t-test.

Results

Altogether, 129 female and five male healthcare workers from the Department of Obstetrics and Gynaecology, PWH submitted blood samples. The age was recorded for 125 of them and ranged from 19–58 years (mean 34; median 33 years). Overall, 16·4% (22/134) of healthcare workers were negative (<10 IU/mL) for anti-rubella IgG antibody, 21 being female and one male. Thus 16·3% of female staff (21/129) were seronegative. Fourteen percent (14/100) of the female healthcare workers of child-bearing age (15–45 years) were seronegative (Table I), though none of the 49 of age ≤30 years were susceptible.

Discussion

Rubella immunization was first introduced in Hong Kong, in September 1978 following a

Anti-rubella IgG antibody was detected by an enzyme immunoassay (AxSYM Rubella IgG, Abbott, USA). Antibody levels of ≥15 IU/mL were reported as ‘positive’; antibody levels between 10 and <15 IU/mL were reported as ‘equivocal’; and antibody levels of <10 IU/mL were reported as ‘negative’.

### Table I  Rubella immune status according to the age groups of 129 female healthcare workers in the Department of Obstetrics and Gynaecology, Prince of Wales Hospital.

<table>
<thead>
<tr>
<th>Age group (yr)</th>
<th>No. tested</th>
<th>No. with negative anti-rubella IgG antibody (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15–20</td>
<td>2</td>
<td>0 (0)</td>
</tr>
<tr>
<td>21–25</td>
<td>22</td>
<td>0 (0)</td>
</tr>
<tr>
<td>26–30</td>
<td>25</td>
<td>0 (0)</td>
</tr>
<tr>
<td>31–35</td>
<td>24</td>
<td>2 (8.3)</td>
</tr>
<tr>
<td>36–40</td>
<td>16</td>
<td>6 (37.5)</td>
</tr>
<tr>
<td>41–45</td>
<td>11</td>
<td>6 (54.5)</td>
</tr>
<tr>
<td>46–50</td>
<td>10</td>
<td>3 (30)</td>
</tr>
<tr>
<td>≥51</td>
<td>10</td>
<td>2 (20)</td>
</tr>
<tr>
<td>Unknown</td>
<td>9</td>
<td>2 (22.2)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>129</strong></td>
<td><strong>21 (16.3)</strong></td>
</tr>
</tbody>
</table>

None of the healthcare workers had an equivocal result.
rubella outbreak in 1977. The immunization programme was targeted at Primary 6 schoolgirls, and later expanded to cover susceptible women of child-bearing age. In 1990, the Department of Health expanded the immunization programme from a ‘selective’ to a ‘universal’ approach. Since then, a triple live-attenuated vaccine against measles, mumps and rubella (MMR) has been offered to all males and females at the age of one year.

In our study, none of the 49 female health-care workers of age \( \leq 30 \) years were rubella seronegative. This group was aged \( \leq 12 \) years in 1978 and attended school at level of Primary 6 or lower. They thus received rubella immunization. This may explain our observation of a statistically significant increase in the percentage of rubella susceptibility in female healthcare workers aged >30 years as compared to those aged \( \leq 30 \) years (Table II). Increased susceptibility to rubella infection with age was also observed in nulliparous women attending antenatal sessions in Maternal and Child Health Centres.\(^9\)

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Although this retrospective study could not assess the true sero-prevalence of healthcare workers since those who had already tested positive for rubella antibody were less likely to resubmit samples, the finding of a high percentage of rubella seronegativity (16-4%) among healthcare workers deserves attention. Even if we assume that those untested healthcare workers (about 60% of all staff in the unit) were seropositive, still around 7% of the total were susceptible to rubella; a figure which is close to that for the women of child-bearing age in Hong Kong. This is rather unexpected, since healthcare workers should be more knowledgeable about rubella infection in pregnancy and should have better access to vaccination.

In Hong Kong, rubella immunity testing is easily accessible to healthcare workers. However, the rubella immunization policy varies between hospitals. In most hospitals, immunity testing and subsequent vaccination for staff is encouraged, but only on a voluntary basis. Our findings indicate that such a policy does not provide satisfactory coverage. Although the clinical manifestations of rubella infection are usually mild, the risk of staff transmitting infection to patients, in particular pregnant women, or of acquiring it if they themselves became pregnant, cannot be neglected. Such medical risks and the potential legal consequences, outweigh the cost of vaccination. There is need to review the policy of rubella immunization for healthcare workers in Hong Kong and in all countries where vaccination of susceptible healthcare workers is still not mandatory.

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### References


