Surveillance of Rubella in female students in Medical Colleges

Bahram Mazhari, Humaira Zafar, Wajiha Raza, Sumaira Zareef, Muhammed Umer Awan, Abbas Hayat

Department of Pathology, Benazir Bhutto Hospital, and Rawalpindi Medical College Rawalpindi

Abstract

Background: Rubella virus infection is normally not a serious infection in childhood, but if it occurs during pregnancy it can be a very serious threat to the developing fetus. It may lead to Congenital Rubella Syndrome resulting in infant mortality.

Methods: This cross sectional study was conducted in Microbiology Department, Benazir Bhutto Hospital (BBH), Rawalpindi. One hundred females with their age range from 17-25 years were included in the study. Twenty female medical students studying in each year of different Medical Colleges were tested. Blood samples were taken and tested for Anti Rubella Antibodies (IgG) by ELISA method.

Results: Out of 100 females from Medical Colleges who were studied 54 females were found positive (54%) for IgG Anti Rubella Ab whereas 46 females (46%) were found negative. 4 students (20%) from 1st year, 7 students (35%) from 2nd year, 12 students (60%) from 3rd year, 14 students (70%) from 4th year and 18 students (90%) from final year were found Seropositive for IgG Anti Rubella Antibodies.

Conclusion: Female students exposed to hospital environment develop antibodies during exposure to patients. Rubella immunization should be considered for the age group that is not exposed to the hospital environment.

Introduction

Rubella or German measles is a world wide infectious illness caused by Rubella virus. The incubation period is 12-14 days and is characterized by rash on face, chest, extremities, and lymphadenopathy in the posterior auricular and sub occipital region. It usually infects children and young adults. The disease spread is via droplet infection and via mucous membrane of the respiratory passages.

If infection occurs in the first 12 weeks of pregnancy it will result in severe malformation of the fetus i.e. Congenital Rubella Syndrome. It comprises of congenital heart diseases especially patent ductus arteriosus, congenital cataract, microphthalmia and sensorineural deafness. Other manifestations may include mental retardation, microcephaly, low birth weight, spleen, liver and bone marrow problems. It is the one of the most important causes of increased infant mortality rate. Clinically diagnosed cases of Congenital Rubella Syndrome are observed by the physicians in Pakistan. The infected infants shed the virus up to eighteen months of age in their saliva and transmit Rubella to susceptible contacts such as their care takers, nurses and doctors.

Thus the present study was designed to evaluate the immune status of Pakistani women studying in medical colleges against rubella.

Subjects and Methods

Five Groups of 20 unmarried female medical students studying in 5 different years of medical colleges were selected for the study during October 2008 to February 2009.

3ml of blood was drawn with consent using a disposable syringe from a suitable superficial vein of upper limb and was transferred to clean, sterilized and labeled test tubes. The sample was then centrifuged at 3000 rpm for 5 min and serum was separated. This serum was ultimately used for ELISA. The sample was run in batches of 15 along with positive and negative control samples. The guidelines of procedure was strictly followed during this procedure. Only healthy female medical students were included Exclusion criteria comprised females who were unhealthy having some illness and were Less than 17 years or greater than 25 years of age.

Results

100 females with mean age of 20.3 years (S.D 2.5) from 5 different years of Medical colleges were studied. 54 females were found positive (54%) for
IgG Anti Rubella Ab whereas 46 females (46%) were found negative. (Fig 1)

Table I Rubella immune status in different years of medical college in relation to exposure to hospital environment:

<table>
<thead>
<tr>
<th>Year in med. college</th>
<th>Total time of hospital exposure</th>
<th>Total tested</th>
<th>Seropositive ‘n’</th>
<th>% age</th>
<th>Seronegative ‘n’</th>
<th>% age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year</td>
<td>None</td>
<td>20</td>
<td>4</td>
<td>20%</td>
<td>16</td>
<td>80%</td>
</tr>
<tr>
<td>2nd year</td>
<td>None</td>
<td>20</td>
<td>7</td>
<td>35%</td>
<td>13</td>
<td>65%</td>
</tr>
<tr>
<td>3rd year</td>
<td>0 to 1 year</td>
<td>20</td>
<td>12</td>
<td>60%</td>
<td>8</td>
<td>40%</td>
</tr>
<tr>
<td>4th year</td>
<td>1 to 2 years</td>
<td>20</td>
<td>14</td>
<td>70%</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>5th year</td>
<td>2 to 3 years</td>
<td>20</td>
<td>18</td>
<td>90%</td>
<td>2</td>
<td>10%</td>
</tr>
</tbody>
</table>

Medical students were evaluated against their exposure to hospital environment. It was observed that most of the patients were non-immune during 1st and 2nd year of their medical college with minimal to no hospital exposure (20% in first year and 35% in 2nd year). With advancing years and exposure to hospital patient’s immune status was seen to considerably increase from 60% in 3rd year to 70% in 4th year with 1 and 2 years of hospital exposure respectively. Maximum immunity 90% was seen in Final year students with 3 years of hospital exposure. (Table 1)

There was significant relationship between Rubella infection and increased exposure to hospital environment (p< 0.05). Only 11% females were found immune with no exposure to hospital environment programs among premarital women of child bearing age have been done in different regions of the world. Outbreaks of rubella occurred in the past and are a constant threat to pregnant females since it carries a very high risk of malformations in the baby. Our findings are also in favor of the reports of many researches that claim Rubella outbreak among susceptible hospital employees 4.

This study evaluated the immune status of most affected group of population (women of child bearing age) in relation to their exposure in the hospital to patients. This study evaluated students studying in 5 different years of medical college and they were assessed for their immune status regarding Anti Rubella IgG Ab against their exposure to the hospital.

Students studying in first 2 years of medical college have almost nil exposure to patients as they are pre-clinical years, they can be considered equivalent to the population of this age in general with no exposure to hospital environment but are exposed to cases in the family. A comparatively small percentage was found seropositive which emphasizes the dire need of vaccination in this group. In 3rd year students with one year of hospital exposure, immunity was found to be considerably increased from 30% in 2nd year to 60% in 3rd year. This highlights the effects of patient exposure. With each advancing year and increasing exposure to hospital, the immunization status was changed. It was found to be increased from 60% in 3rd year to 70% in 4th year to 90% in 5th year. There is a drastic difference from 20% Seropositive in 1st year to 90% positive in 5th year. This difference can be due to increasing age but most likely factor is exposure to patients in the hospital. There are many clinical and sub-clinical patients who are a source of passing the infection to others which include doctors, nurses, medical students other than their family members.

It is known that babies suffering from

Fig I Seropositive Vs Seronegative

Discussion

Rubella viral infection in childhood is a mild viral disease but if it occurs during pregnancy it is a serious threat to the developing fetus 5. It is one of the great health concerns all over the world. Studies regarding rubella surveillance and immunization
Congenital Rubella Syndrome act as reservoir of infection for their caretakers, nurses and doctors. A study of Rubella antibodies on medical students working in hospitals, showed a high positivity of 99.3%7. A small percentage of students with no hospital exposure were also found seropositive, which may also indicate community exposure of the population to rubella. Studies have shown that women of childbearing age are found seropositive to Rubella Ab, which indicates that infection is present in population in general. Studies that were done locally in the past showed that prevalence of Rubella IgG Ab increases with age9.

Immunization is an effective and simple way to prevent subsequent development of Congenital Rubella Syndrome. Female students who were not exposed to hospital environment were found to be seropositive in a small percentage. Low positivity in the females with non-exposure to hospital environment reflects the need to immunize this group. Studies show that ideally women of childbearing age should be immunized before becoming pregnant10. In one of the studies it was found that if a female is vaccinated 1-4wks before and after conception, risk of getting congenital rubella syndrome is not increased and there is no need of termination of pregnancy11.

**Conclusion**

Immune status was seen considerably strong against Rubella with increasing exposure to hospital. In view of this we can claim that clinical or sub clinical infection of Rubella prevails in medical students during their exposure to patients during hospital rotations. Rubella immunization should strongly be considered for the age group who are not exposed to the hospital environment.

**References**

10. Gall SA. Maternal Immunization Obstetrics and Gynecology clinics in North America, 2003; 30(4); 632 – 36