CASE REPORT

MEASLES IN THAI ADULTS: THREE CASE REPORTS AND MANAGEMENT OF CONTACT CASES

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Abstract. We report on three adults (one nurse and two medical students) diagnosed as having measles. All the patients presented with fever, cough, conjunctival injection and rash. They contracted measles from pediatric patients who had been treated at Chulalongkorn Hospital in the previous two weeks. Physical examination revealed Koplik's spots on the oral mucosa and typical maculopapular rash. The diagnosis was confirmed by viral isolation. Measles IgG antibodies were measured in 36 medical students who were in close contact with patient 2 and measles vaccines were given. Thirty-three specimens had positive measles IgG, two had equivocal results and one had negative result. The student with negative measles IgG eventually developed measles (patient 3). Except for patient 2 and 3, no further cases of measles were seen among the contacts.

INTRODUCTION

Measles was once a major public health problem in Thailand. Since the measles vaccine was introduced to the national expanded immunization program, the number of patients has declined continuously (Division of Epidemiology, 1990-1998). Average patient age has changed from that of small children to that of older children (Pancharoen and Thisyakorn, 1997). The disease remains rare in adults. We report on three young Thai adults with measles.

CASE REPORT

Patient 1

A 23-year-old Thai nurse who was working in an Infectious Disease (ID) Pediatric Ward of Chulalongkorn Hospital presented with a seven-day history of fever and cough. She had been in contact with three hospitalized children who were diagnosed with measles in the previous few weeks. Her vaccination history was unreliable. She had not previously experienced any exanthematous febrile illnesses. She was seen by an ID specialist on February 4, 1998 when a maculopapular (MP) rash appeared on her face. Bilateral conjunctival injection and Koplik's spots in the oral cavity were noted.

Patient 2

A 21-year-old fifth year medical student who was working in the Department of Pediatrics, Chulalongkorn Hospital, presented with 2 days history of high-grade fever, cough and rash. He had been in contact with a pediatric outpatient with measles on January 12, 2001. The history of immunization was uncertain. He was seen by an ID specialist on January 26, 2001 when a generalized confluent MP rash developed on his face and trunk. Koplik's spots

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were seen on in the oral mucosa. Complete blood count (CBC) showed hematocrit (Hct) of 43.7%, white blood cell (wbc) count of 5,290 cells/mm^3, and a platelet count of 199,000/mm^3.

Patient 3

A 23-year-old fifth-year medical student who was in the same class as patient 2, and who was also working in the Department of Pediatrics, presented with a 2-day history of high-grade fever, cough, injected eyes and rash. She had been in contact with a child with measles two weeks previously. She had received a single dose of measles vaccine when she was very young. She was seen by an ID specialist on January 29, 2001 when a generalized MP pruritic rash had developed on her face, trunk and upper extremities. Bilateral purulent conjunctivitis and Koplik's spots in the oral cavity were noted. CBC showed Hct of 43.2%, wbc count of 4,370 cells/mm^3, and a platelet count of 143,000/mm^3.

A clinical diagnosis of measles was made in all three cases. Blood specimens were collected within 2 days of the appearance of rash and were sent to the National Institute of Health (NIH), Department of Medical Sciences, Ministry of Public Health, for further investigations. Measles IgM antibodies using an enzyme-linked immunosorbent assay (ELISA) technique (Dade Behring Marburg GmbH, Germany) were positive in the sera of two patients and equivocal in Patient 2 (performed twice). Lymphocytes of the patients were inoculated in the B95a cell line (a derivative of an Epstein-Barr virus-transformed marmoset B-lymphoblastoid cell line) (Pattamadilok *et al*, 1999). After a few days, syncytial formation was observed and identified by an indirect immunofluorescent antibody technique, using a monoclonal antibody against the measles virus (Light Diagnostics, Temecula, CA 92590) and fluorescein isothiocyanated-conjugated rabbit antimouse immunoblobulin G (DAKO A/S, Denmark). The details of the patients and the laboratory results are summarized in Table 1.

Treatment of these patients included one week of isolation and symptomatic treatment. The following week, the patients were clinically improved and eventually recovered without complications.

Thirty-six medical students were considered as close contacts of patient 2. Thirty-four of these were fifth-year medical students who shared the same lecture room with the patients. The other two were sixth-year medical students who were working in the pediatric ward. Sixteen were females and 20 were males. Their ages ranged from 19-23 years. Twenty-two students reported contact with at least one pediatric patient with measles in the previous four weeks. The history of previous measles vaccination included 12 cases of ≥ 1 injection, 4 cases with no previous measles vaccination and 20 with uncertain history. Two students had a past history of measles infection. All

Table 1
Details of the study patients and laboratory results.

No. of patient/ date of diagnosis	Position	Sex/ age	Rash	Koplik's spots	Viral isolation	IgM	IgG
Patient 1 04-02-98	Nurse	F 23 yrs	present	present	pos	pos	ND
Patient 2 26-01-01	Medical student	M 21 yrs	present	present	pos	equi	pos
Patient 3 29-01-01	Medical student	F 23 yrs	present	present	pos	pos	neg

Note: F = female, M = male, yrs = years, pos = positive, equi = equivocal, ND = not done

students were advised not to take care of pediatric patients during the two-week incubation period of the disease. On a voluntary basis, 2-5 ml of clotted blood was collected from all 36 students and sent to NIH for measurement of measles IgG antibody levels, using an ELISA technique (Dade Behring Marburg GmbH, Germany). The level of measles IgG antibody was considered positive (optical density or OD > 0.20) in 33 students (91.7%) with the antibody level ranging from 730-12,000 mIU/ml. Two specimens had equivocal results (OD = 0.10-0.20) with antibody levels of 630 and 650 mIU/ml. Measles IgG antibody testing of patient 3, performed a few days before the diagnosis of measles, was considered negative (OD < 0.10) and the antibody level was zero. Live hyperattenuated measles vaccines were given to all 36 students. Intramuscular immunoglobulin was not used. Two weeks later, one male student developed an exanthematous fever without demonstration of Koplik's spots or a typical measles rash. Measles and rubella IgM antibodies, and isolation for measles virus were negative. Measles IgG antibody testing performed in the previous two weeks had been positive. The cause of his illness was unlikely have been either measles or rubella viruses. Except for patient 3, no disease outbreak was observed among medical personnel or patients in the ward.

We have reported three young adults with a clinical diagnosis of measles. The typical clinical presentation, including characteristic enanthema and exanthema, was seen and was not different from those observed in children. The diagnosis was confirmed by viral isolation. These three patients probably had not received measles vaccination or had received only one dose. Several years after vaccination, antibody levels might have waned and fallen lower than the protective level, resulting in the possibility of infection with the measles virus ('secondary vaccine failure').

In the past decade, the majority of Thai patients with measles have been small children (Chotpitayasunondh *et al,* 1982). Measles vaccines were introduced to the national program of immunization in Thailand in 1984, with a vaccine coverage of 86.3% in 1993. The number of measles patients has since declined and patients nowadays tend to be older (Pancharoen *et al,* 1997; Pancharoen and Thisyakorn, 1998). The complications of measles in older children may be different from those in smaller children, *ie* a lower incidence of pneumonia and higher incidence of measles-associated appendicitis (Pancharoen *et al,* 2001).

Measles IgG antibody level was positive in almost all contact students; two others had a level of antibody believed to be sufficient to protect against the disease. We cannot determine whether the measurable measles antibody was due to natural infection or vaccination. Without protective antibody, one student (patient 3) eventually developed measles.

To prevent measles, two doses of the measles vaccine is essential: the first dose is given to 9- to 12-month-old children and the second at the age of 4 to 6 (Pediatric Infectious Diseases Society of Thailand, 2000). However, there is no recommendation for a catch-up schedule for children older than 4-6 years and young adults in Thailand. We suggest replacing rubella vaccine in young adults with the measles-mumps-rubella (MMR) vaccine, and giving a second dose of measles vaccine or MMR to all children and young adults who have no history of measles and who have not received (or have received only one dose) measles vaccine. Without this policy, we expect to see more cases of measles in older children and young adults in the near future.

All hospitals, especially university hospitals, should have policies to protect all medical personnel and undergraduate students against vaccine-preventable infectious diseases, including measles. If possible, the immune status for vaccine preventable diseases should be known.

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REFERENCES

Chotpitayasunondh T, Thisyakorn U, Ningsanon W, Mansuwan P. Measles in Children's Hospital, Bangkok. *J Pediatr Soc Thai* 1982; 21: 51-62.

Division of Epidemiology, Ministry of Public Health, Thailand. Annual Epidemiological Surveillance Report, 1990-1998.

Pancharoen C, Nananukool P, Thisyakorn U. Measles in Chulalongkorn Hospital during outbreak in Bangkok, 1994: supporting data for second dose of measles vaccination. *Chula Med J* 1997; 41: 51-9.

Pancharoen C, Thisyakorn U. Measles: Past, present and future. *RTAF Gaz* 1997; 43: 21-3.

Pancharoen C, Thisyakorn U. Measles in hospitalized children, Chulalongkorn Hospital. *Thai J Pediatr* 1998; 37: 283-7.

Pancharoen C, Ruttanamongkol P, Suwangool P, Likitnukul S, Thisyakorn U. Measles-associated appendicitis: Two case reports and literature review. *Scand J Infect Dis* 2001; 33: 632-3.

Pattamadilok S, Chittaganpitch M, Incomserb P, Rota JS. Genetic and antigenic analysis of Thai measles isolates during 1993-1994. *Thai J Pediatr* 1999; 38: 190-9.

Pediatric Infectious Diseases Society of Thailand. Measles, Mumps and Rubella Vaccine (MMR). In: Chokephaibulkit K, ed. Guidelines for vaccine use in Thai children. Bangkok: PKT Printing 2000: 28-37.