Measles infections confirmed in Tokyo following outbreak in Okinawa

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A Tokyo woman has been diagnosed with a measles infection, indicating the contagious disease has spread from Okinawa Prefecture to the
History

• 10 month old boy
• Birth history unremarkable
• Good past health
• Immunization history:
  – According to MCHC schedule up to 6 months old
  – Not yet vaccinated with MMR-V vaccine
• Referred from Tsuen Wan Adventis Hospital to Princess Margaret Hospital for fever and rash
High fever for 6 days, max 40°C

Diffuse Maculopapular rash
Developed in cranio-caudal direction

Watery Diarrhea
8 – 10x/day

Mild productive cough, no conjunctival injections
Contact History

- Travelled to *Jiang-Men, China* 19/3/2018 – 2/4/2018
- Visited wet market in China with live poultry at the vicinity
- Grandmother developed herpes zoster recently
- Mother developed fever on day of admission
Physical Examination

• Temperature 37.5°C
• Stable vitals
• No conjunctival injection
• Generalized macuopapular rash on face, neck, trunk, back and four limbs
• **Koplik Spots** present over bilateral buccal mucosa

• Working diagnosis: **Measles!**
Investigations

• Complete blood count
  – WCC 7.8, ANC 2.2, ALC 3.9, Monocyte 1.5
• Liver and renal function tests – normal
• NPA for respiratory viruses – negative
• **Measles IgM – positive!**
• Rubella IgM – negative
• Urine and Throat swab **Measles RNA Detected by RT-PCR**
Progress

- Supportive therapy was given
- Rash and fever gradually subsided
- Improvement in oral intake
- Discharged on 5th day of admission (Day 11 illness)
Measles (*Rubeola, 1st Disease*)

- One of the *earliest viral exantheme* to be recognized,
- Globally, caused significant morbidity and occasional mortality through its complications,
- Measles elimination is a public health priority,
  - In 2016, estimated 7 million people were affected
- In September 2016, Hong Kong was certified by the WHO as having eliminated measles,
  - *Defined as absence of endemic measles transmission* (existence of continuous measles transmission of indigenous or imported measles virus that persists for at least 12 months)
Measles Virus

- Genus Morbillivirus
- Member of the Paramyxovirus family
- Single stranded RNA and lipid envelop
- Human is the only host
- 1 Serotype
Measles Pathogenesis

• Respiratory transmission of virus
  – Aerosolized droplets of respiratory secretions

• Replication in nasopharynx and regional lymph nodes
  – Primary viremia 2-3 days after exposure
  – Secondary viremia 5-7 days after exposure with spread to tissues

• Establishment of infection in the skin and other viremic sites (respiratory tract)
Measles

Schematic Distribution of Measles Rubeola Rash

1st Day of Rash
- Koplik’s spots on buccal mucosa
- Rash Discrete

3rd Day of Rash
- Confluent maculopapules
- Discrete maculopapules

Really Sick Children Must Take No Exercise

Number of days after fever onset that a rash will appear:
1 Day: Rubella
2 Days: Scarlet fever/ Smallpox
3 Days: Chickenpox
4 Days: Measles (Koplik spots one day prior to rash)
5 Days: Typhus + Rickettsia (variable)
6 Days: Nothing
7 Days: Enteric fever (Salmonella)
Clinical Manifestation

- Highly contagious
- 90% of susceptible exposed individuals becoming infected
- Subclinical disease infrequent
- Incubation period: 8-12 days
- Average interval between appearance of rash in the index case and subsequent cases is 14 days (7-21 days)
Clinical Manifestation

• Acute viral disease, symptoms of common cold
• Fever, Cough, Conjunctivitis (photophobia) and Coryza
• Faint maculopapular rash beginning on the face then spread Cephalocaudally and Centrifugally → **Confluence**, especially on the trunk
• Within 2-3 days, the rash fade and take on a coppery darker color, then brownish discolouration (measles staining)
• Desquamation may occur
• Associated symptoms e.g. Diarrhea
• **Koplik spots (Enanthema)**
  
  – appears at the initial stage of the illness
  
  – *Pathognomonic*
  
  – First arise on the buccal mucosa opposite the lower molars, then spread quickly to involve most of the buccal and lower labial mucosa
  
  – Background mucosa appears bright red and granular
Diagnosis

• Clinical: 3”C”s
  • Cough
  • Coryza + Diarrhea
  • Conjunctivitis

• Beware of “Atypical Measles”
From 1999-2008, study population (n=165) was divided into 2 groups:
- 29 infants were aged <7 mths and 136 infants were 7-12 mths of age.

The mean duration of fever in infants:
- 4.6 vs 6.8 days in <7 mths and 7-12 mths respectively (p<0.001, 95% CI 1.24-3.04).

The onset of skin rash:
- 2.3 vs 3.7 days after the onset of fever in <7 mths and 7-12 mths respectively (p=0.001, 95% CI 0.58-2.12)

Conjunctivitis (p=0.001) and staining of skin rash during convalescence (p=0.026) were significantly less common in the younger group.

There were no significant differences between the 2 groups regarding presence of coryza (p=0.07), cough (p=0.28), Koplik's spots (p=0.18), diarrhoea (p=0.72), pneumonia (p=0.74) and the use of antibiotics (p=0.74).
Anti-measles IgM Antibody

• 20% false negative if taken < 72 hours after rash onset (AAP Red Book)

• May need to repeat if taken too early
  – Detectable for at least 1 month after rash onset in unimmunized people
  – May be absent or present only transiently in immunized people

• Should also test for rubella
Complications

• More common in young or malnourished (Vitamin A deficiency) children, immunocompromised hosts
  – Otitis media
  – bronchopneumonia
  – Laryngotracheobronchitis (croup)
  – Diarrhea - dehydration
  – Acute encephalitis (1/1000)
  – Death
Measles eye disease
Treatment

- **Supportive** (Fever, hydration, cough, nutrition)

- **Appropriate antibiotics** targeted at bacterial complications

- **Vitamin A treatment**
Vitamin A treatment

• Low serum concentrations of vitamin A was associated with severe measles
• Developing countries
  – Decrease morbidities and mortalities
• WHO recommends vitamin A for all children with measles regardless of their country of residence
• Administered once daily for 2 days, at dosage:
  – 200,000 IU for children 12 months or older
  – 100,000 IU for children 6 through 11 months of age
  – 50,000 IU for infants younger than 6 months
  – An additional age-specific dose should be given 2 through 4 weeks later to children with clinical signs and symptoms of vitamin A deficiency
Mortality

- Young (< 5 years of age)
- Immunocompromised
- Malnutrition (Vitamin A deficiency)
Diagnostic challenge

• Solely reliance on symptoms (fever + cough + coryza + rash) may not be adequate
• Recognize diarrhea as one of the common symptoms of measles
• Beware of “atypical measles”

• Remember to enquire a detail contact and travel history
• Immunization history
  – At risk of measles?
  – Beware of post-MMR rash

• Timely blood taking for anti-measles IgM
• Obtain appropriate specimens for viral study