Measles

An acute viral infection caused by paromyxovirus, a single-stranded RNA virus

* Rapidly inactivated by heat, light or acidic condition
* Can last in the air or on objects and surfaces for up to 2 hours
* Described by Persian physician Rhazes in the 10th century
* 1846: Peter Panum described the incubation period of measles and lifelong immunity after recovery from the disease
* 1954: virus was isolated from human and monkey kidney tissue culture
  + only one antigenic type, which is why the vaccine is so effective
* 1963: first live attenuated vaccine was licensed
* Before 1963, infection with measles virus was nearly universal during childhood and 90% of people were immune by age 15

Epidemiology/risk factors

* Occurrence: common throughout the world, had been eradicated in the US in 2000 until this year
* Human disease, no known animal reservoir
* There has never been a documented asymptomatic carrier
* Transmission: person to person, airborne and highly contagious
* Usually occurs in late winter and spring
* Measles may be transmitted from 5 days before to 4 days after rash onset

Symptoms

* Incubation: 6 to 19 days
* Prodrome: stepwise increase in fever (103 or higher), cough, coryza and conjunctivitis + koplik spots in the mouth
* Rash develops 2-4 days after prodrome and up to 14 days after exposure
  + Begins on the face and head (hairline) and then moves down body
  + Maculopapular and becomes confluent
  + Lasts for 5-6 days
  + Fades in order of appearance
* Complications
  + The occurrence of fever beyond the third or fourth day of the rash suggests a measles-associated complication
  + Diarrhea: 8% reported
  + Otitis media: 7% reported, can cause deafness in severe cases
  + Pneumonia: 6% reported; most common cause of death in children and is usually a superimposed bacterial infection
  + Encephalitis: 0.1% reported, occurs 6 days after rash onset. CSF shows pleocytosis and elevated protein. Case-fatality rate is ~15%, some form of residual neurological damage occurs in ~25% of cases. Most common cause of death in adults
  + Seizures: 0.6-0.7% reported
  + Death: 0.2% reported, highest in young children (< 5) and adults
  + Acute disseminated encephalomyelitis (ADEM): demyelinating disease that develops during the recovery phase of measles infection, thought to be caused by a postinfectious autoimmune response
  + Subacute sclerosing panencephalitis (SSPE): rare degenerative CNS disease believed to be due to persistent measles virus infection of the brain. Onset occurs ~7 yrs after measles infection. Occurs in 5-10/million reported measles cases.
    - Insidious onset, progressive deterioration of behavior and intellect followed by ataxia, myoclonus, seizures and death
    - Very rare since the early 1980’s

Diagnosis

* IgM antibody testing: detectable 3 days after the appearance of the exanthema, becomes undetectable usually 30 days after the rash disappears.
* PCR: from the throat, nasal or nasopharyngeal swabs, also can be collected in the urine
* Viral culture: from peripheral blood mononuclear cells, respiratory secretions, conjunctival swabs or urine. Culture of the virus is difficult and not performed frequently
* WHO uses serum IgM as the standard test to confirm the diagnosis is countries with high prevalence

Treatment and follow-up

* supportive: antipyretics, fluids and treatment of bacterial superinfections
* Vitamin A: given to children in developing countries, associated with decreased morbidity and mortality. Unknown mechanism of action
* Post-exposure prophylaxis consists of vaccinating within 72 hours
* Administration of immune globin for exposed individuals with increased risk of measles complications
  + Infants < 12 months
  + Pregnant women w/o evidence of immunity
  + Immunocompromised patients
* Recommend prevention with vaccination
  + Nations with high measles prevalence administer MMR at age 9 months

CCRMC Recommendations:

* + If born on or before 1956, no need to vaccinate as likely already exposed
  + If born between 1956-1970 and do not remember being vaccinated or having infection, will need to be vaccinated
  + If not born in the US and no record of vaccination, will need vaccination
  + If born in US after 1970, already had 2 vaccines and no need to vaccinate

References/informational websites:

<http://www.cdc.gov/vaccines/pubs/pinkbook/meas.html#diagnosis>

UpToDate: clinical manifestations and diagnosis of measles, prevention and treatment of measles