

have colds and cough, but older patients may have severe disease.

Clinical Features. The average incubation time for RSV infections is 2 to 8 days. The most common manifestations are bronchiolitis and pneumonia in infants; tracheobronchitis, croup, and otitis media in young children; and upper respiratory infections in older children and adults. Bronchiolitis in infancy may lead to an increased risk of asthma and the development of chronic obstructive airway disease in later life. Fatal disease can occur in immunocompromised infants.

The diagnosis of RSV infection can be made definitively by culturing the virus or detecting RSV antigens from respiratory secretions, nasal wash specimens, or nasopharyngeal or throat swabs.

Differential Considerations. The syndromes associated with RSV infections overlap those due to other upper and lower respiratory tract pathogens, including rhinovirus, parainfluenza and influenza viruses, echoviruses, coxsackieviruses, and coronaviruses. RSV infection can be presumptively diagnosed in an infant with pneumonia or bronchiolitis when no bacterial pathogens are noted. Noninfectious causes for hypoxemia in infants, such as foreign-body aspiration and asthma, also must be considered.

Management. Therapy of RSV infection is largely supportive. For infants sick enough to be hospitalized, aerosolized ribavirin has been shown to shorten the duration of illness and ameliorate hypoxemia in normal infants.⁹⁹ Corticosteroids have not been shown to be beneficial. During the winter, high-risk infants can be protected against RSV infection with monthly infusions of human RSV immunoglobulin or with monthly intramuscular injections of a monoclonal anti-RSV antibody preparation.⁹⁹ Severe disease may occur in immunocompromised infants, and respiratory precautions are required to prevent transmission from patient to patient and staff to patient.

Mumps Virus

Principles of Disease. Mumps, or infectious parotitis, is an acute viral illness characterized by fever, swelling, and tenderness of the salivary glands, with the parotid gland most commonly involved. Mumps occurs most commonly in the winter and spring and, since the advent of widespread pediatric immunization, mostly in older children. The virus is spread by way of the respiratory tract and through direct contact with the saliva of infected people. The incubation period is 2 to 4 weeks, and the disease is communicable from 1 week before to 9 days after the onset of parotitis, with a period of maximal infectiousness approximately 2 days before the onset of illness. One third of cases are asymptomatic.

Clinical Features. Nonsuppurative parotid swelling is the hallmark of mumps; the swelling may be unilateral. Trismus sometimes is a feature. In the first 3 days, the patient's temperature may range between normal and 40°C. The most important but less common manifestations are epididymo-orchitis and meningitis. Orchitis occurs in 15 to 25% of postpubertal male patients and usually is unilateral. Although some degree of testicular atrophy is usual, the incidence of sterility is very low, especially when the orchitis is unilateral.¹⁰⁰ More than 50% of patients with mumps have a lymphocytic pleocytosis in the CSF, and hypoglycorrhachia is common; symptomatic meningitis occurs in less than 10% of cases. Encephalitis is uncommon, occurring in 1 in 6000 cases, and is the major determinant of mortality. Congenital infection is rare but may result in fetal loss if it occurs in the first trimester.¹⁰¹ Rare complications of mumps include hydrocephalus, deafness, transverse myelitis, Guillain-Barré syndrome, pancreatitis, mastitis, oophoritis, myocarditis, and arthritis.

Differential Considerations. In children, the diagnosis of mumps is made by a history of infectious exposure and the presence of parotid swelling and tenderness in association with constitutional symptoms. Laboratory confirmation generally is not required. Considerations in the differential diagnosis include other viral infections and other causes of parotid swelling and tenderness, such as bacterial parotitis or sarcoidosis.

A multistate outbreak of mumps was reported in the United States in 2006, with almost 6000 reported cases.¹⁰² Because the likelihood of infection was five times higher in persons who had received only one dose of mumps vaccine as opposed to those who had received two doses of the vaccine, updated recommendations that all persons receive two doses of mumps vaccine were introduced by the CDC's Advisory Committee on Immunization Practices.¹⁰³

Management. Treatment is supportive and should include an analgesic and an antipyretic agent. No data support the use of steroids to prevent complications of or ameliorate the symptoms of orchitis in postpubertal men.

Contacts who have had no history of mumps or of previous vaccination should be immunized. Because there is no risk in vaccinating those who are already immune, serologic screening to identify susceptible people is unnecessary. Long-lasting immunity develops in more than 95% of recipients of the vaccine. Among previously infected people, including those who had asymptomatic disease, long-lasting and possibly life-long immunity is possible.

Measles Virus (Rubeola)

Principles of Disease. Measles is a highly communicable viral illness acquired as an infection of the respiratory tract. Generally, all susceptible people exposed to an active case will acquire infection. After multiplication in the respiratory mucosa, the virus spreads to regional lymphoid cells and then travels in the bloodstream to leukocytes in the reticuloendothelial system. The clinical manifestations appear after a second viremic phase.

Before the availability of an effective vaccine in 1963, measles was a ubiquitous disease. In 2006, measles accounted for approximately 240,000 deaths globally; in view of higher death rates in previous years, it is clear that great strides have been made to decrease measles deaths in many areas of the world. Measles continues to be a leading cause of death in young children, especially those living in developing countries.¹⁰⁴ Endemic measles in the United States has been eradicated, although the disease continues to occur among inadequately vaccinated persons who, in most instances, have been exposed to the disease by someone who has been infected abroad.¹⁰⁵ Measles is a reportable disease, and the local health authority should be contacted. Children should be kept out of school for at least 4 days after the appearance of the rash.

Clinical Features. The incubation period of measles is 10 to 14 days. Cough, coryza, conjunctivitis, and fever precede development of the characteristic rash by 2 to 4 days (Fig. 128-6A). Pinpoint grayish spots surrounded by bright red inflammation (Koplik's spots) typically are found on the lateral buccal mucosa before the appearance of the rash and are considered pathognomonic for measles (see Fig. 128-6B). Discrete red macular and papular lesions begin on the head and progress downward over a period of 3 days to cover the entire body. Laryngitis, tracheobronchitis, bronchiolitis, and pneumonitis may accompany the disease. Bacterial superinfections occasionally delay recovery. A rare acute encephalomyelitis, associated with a mortality rate of 25%, can complicate recovery. Unlike rubella, measles acquired during pregnancy is not teratogenic but may result in stillbirth or premature delivery.



Figure 128-6. A, Measles. B, Koplik's spots due to measles.

Among infants and malnourished children, more severe illness is usual. Deaths from pneumonia and diarrhea occur in up to 10% of cases. Measles can exacerbate vitamin A deficiency and lead to blindness.

Measles may manifest with atypical findings in people who were vaccinated with the inactivated vaccine before its removal from the market in the United States in 1968. An atypical rash, predominantly on the extremities, can accompany pneumonitis, pleural effusion, and peripheral edema. The current vaccine is a live, attenuated strain available as a single antigen or in combination with rubella vaccine or with mumps and rubella vaccines.

Differential Considerations. The diagnosis is made primarily on the basis of clinical characteristics. Other viral exanthems may at times manifest with a similar rash.

Management. Treatment of the primary disease is supportive. Immunocompromised children and infants younger than 1 year who are susceptible and have been exposed to measles can be given passive immunization within 6 days of exposure. Healthy infants should receive 0.25 mL/kg of immunoglobulin intramuscularly, and immunocompromised children should be given 0.5 mL/kg intramuscularly, up to 15 mL.

Subacute Sclerosing Panencephalitis

Principles of Disease. Subacute sclerosing panencephalitis (SSPE) is a degenerative disease of the brain caused by measles virus or a defective variant that persists in the CNS after primary measles. SSP has virtually disappeared in the United States since the 1970s, approximately 10 years after measles vaccination began.

Clinical Features. SSP is a subacute encephalitis involving both the white and the gray matter of the cerebral hemispheres and brainstem and follows 1 in 100,000 cases of measles. It generally occurs in patients with a history of an uncomplicated case of primary measles that occurred at a younger-than-average age. Five to 10 years later, subacute SSP manifests with myoclonus and variable focal neurologic deficits. Progressive neurologic degeneration ensues, and death usually occurs within months to years of diagnosis.

Differential Considerations. The disease can resemble other degenerative neurologic disorders, but characteristic electroencephalographic changes and the detection of measles antibodies in the CSF and markedly elevated serum antibodies to measles will confirm the diagnosis.

Management. Treatment is supportive only.

Rhabdoviridae

Within the Rhabdoviridae family of viruses are two genera, *Lyssavirus*, containing the rabies and rabies-like viruses, and *Vesiculovirus*, containing the vesicular stomatitis and related viruses. Six lyssaviruses are known, but only the rabies, Duvenhage, and Mokola viruses are known to cause disease in humans. Rabies is discussed further in Chapter 129.

Vesicular Stomatitis Virus and Related Viruses

Vesicular stomatitis virus commonly infects wild and domestic animals and occasionally infects humans. Transmission is believed to be through insect bites. Vesicular stomatitis virus New Jersey type and vesicular stomatitis virus Indiana type produce an influenza-like febrile illness 1 to 2 days after exposure that lasts 4 to 7 days. Oral vesicular lesions occasionally have been noted.¹⁰⁶ Accompanying disease manifestation can be nonspecific. Diagnosis can be made serologically. Treatment is supportive.

Filoviridae

Marburg and Ebola Viruses

Principles of Disease. Marburg and Ebola viruses cause a systemic febrile illnesses associated with multiorgan failure. Although the viruses have infected African green monkeys and cynomolgus monkeys, respectively, the infection is fatal to the monkeys, and the natural reservoir is unknown. Recent reports indicate a possible reservoir in certain bat species, but definitive proof is pending.¹⁰⁷ Monkey-to-human and human-to-human transmission through contact with contaminated tissues or materials has been documented. Aerosol transmission has not been reported.

Clinical Features. The illness is of sudden onset 2 to 10 days after exposure to infected tissue or contact with contaminated materials. Headache, fever, myalgias, arthralgias, and lethargy are early signs. The cardinal sign is diffuse coagulopathy. With both Marburg and Ebola infections, documented mortality rates are greater than 90%. Human infection with Marburg virus was documented in Germany and the former Yugoslavia as a result of contact with imported green monkeys. Human outbreaks also have been documented in the Democratic