

VARICELLA-ZOSTER INFECTIONS

(Chickenpox, Herpes Zoster, Shingles)

Revised 12/02

REPORTING INFORMATION (Varicella-related deaths and Chickenpox disease only)

- Class A(3) for varicella-related deaths only. Report by the end of the work week.
- Class B for chickenpox only. Report the number of cases only by the close of each working week.
- [Confidential Case Report Card](#) (3812.11, rev. 12/81) or Telephone
- Varicella-related deaths require the completion of the [Varicella Death Investigation Worksheet](#). The completed worksheet should be sent by the local health department to the ODH Immunization Unit, 35 E. Chestnut, PO Box 118, Columbus, OH 43266-0118.

AGENT

Varicella-zoster virus (VZV), a member of the herpesvirus group.

CASE DEFINITION (Chickenpox)

Clinical case definition

An illness with acute onset of diffuse (generalized) papulovesicular rash without other apparent cause

Laboratory criteria for diagnosis

- Isolation of varicella virus from a clinical specimen, OR
- Significant rise in serum varicella immunoglobulin G antibody level by any standard serologic assay

Case classification

Probable: a case that meets the clinical case definition, is not laboratory confirmed, and is not epidemiologically linked to another probable or confirmed case.

Confirmed: a case that is laboratory confirmed or that meets the clinical case definition and is epidemiologically linked to a confirmed or probable case

Comment

Two probable cases that are epidemiologically linked would be considered confirmed even in the absence of laboratory confirmation.

SIGNS AND SYMPTOMS

Primary infection with VZV results in chickenpox (varicella). Chickenpox infection can result in mild, atypical, or inapparent disease. In general, the disease causes a skin eruption which first appears maculopapular for a few hours and then becomes vesicular for three to four days and leaves a granular scar. Lesions are pruritic and tend to be more abundant on covered areas of the body. Lesions may also be seen on mucous membranes. A slight fever and malaise are also typical of chickenpox, and adults may also experience headache and anorexia. Complications include infection of the skin lesions, pneumonia, arthritis, aseptic meningitis, thrombocytopenia, encephalitis, and Reye syndrome.

VZV persists in a latent form in the dorsal root ganglia after the primary infection. Reactivation results in herpes zoster (shingles), which is a local manifestation of recurrent, recrudescent, or reactivated infection. Grouped vesicular lesions appear in the distribution of one to three sensory dermatomes, sometimes accompanied by pain localized to the area. Systemic symptoms are few. Zoster occasionally may become generalized in immunocompromised patients, with lesions appearing outside the dermatomes and with visceral complications.

DIAGNOSIS

The virus can be isolated from fresh nonpurulent vesicular lesions during the first 3-4 days of the exanthematous illness. Herpesvirus particles can generally be seen by direct electron microscopic examination.

Serology

The complement fixation test (CF) is best to determine diagnostic rises in titer. A fourfold or greater rise between acute and convalescent sera denotes a recent infection.

Enzyme-Linked Immunosorbent Assay (EIA) is best for assessing immune status. One serological specimen is adequate.

EPIDEMI OLOGY

Source

Humans are the only source of infection.

Occurrence

Worldwide, most cases of chickenpox occur in children 5-10 years of age. Chickenpox is seen most often during the late winter and early spring. The vast majority of people contract the disease during childhood. Adults may have more severe disease and have a higher incidence of complications.

Factors associated with the development of recurrent disease (herpes zoster) include aging, immunosuppression, intrauterine exposure to VZV, and varicella at a young age (less than 18 months of age). Zoster is not seasonal.

Mode of Transmission

Transmission may be either direct or indirect. Persons with chickenpox spread the disease to others via direct contact with the drainage from lesions, droplets, or airborne respiratory tract secretions. Vesicle fluid of patients with zoster is infectious. Indirect transmission occurs through articles freshly soiled with discharge from vesicles and mucous membranes of infected persons. Scabs of chickenpox lesions are not infective.

While chickenpox is highly infective, patients with zoster have a much lower rate of transmission. Susceptible contacts of either develop chickenpox. Introduction of a case of VZV into a household generally results in infection for almost all susceptible persons.

Period of Communicability (chickenpox)

One or 2 days (maximum of 5 days) prior to rash onset through a maximum of 6 days after the first appearance of vesicles. Immunocompromised patients with progressive chickenpox probably are contagious during the entire period that new lesions are appearing.

Incubation Period

Incubation is generally 14-16 days from exposure, with a range of 10-21 days. The

incubation period may be prolonged in Varicella-Zoster Immune Globulin (VZIG) recipients and in immunocompromised persons.

PUBLIC HEALTH MANAGEMENT

Case

Treatment

Symptomatic. Aspirin should not be used to treat infants, children or teenagers with chickenpox, because of the increased risk for developing Reye syndrome. Oral acyclovir given to children with varicella within 24 hours of rash onset results in decreased duration and severity of disease and should be considered for those at risk for severe complications of varicella, such as persons older than 12 years of age, persons with chronic cutaneous or pulmonary disorders, persons receiving long-term salicylate therapy, and persons receiving short, intermittent, or aerosolized courses of corticosteroids.

Isolation

The Ohio Administrative Code ([OAC 301-3-13 \[D\]](#)) states that "a person with chickenpox shall be isolated, including exclusion from school or child care center, until the sixth day after onset of rash, or until all lesions are dry, whichever comes first."

Immunocompromised and other children with a prolonged course should be excluded for the duration of the vesicular eruption.

Exclusion of children with zoster from school or childcare should be individualized. Lesions that are covered pose little risk to susceptible individuals. Children with zoster who are excluded from school or childcare may return after the lesions have crusted.

Health care workers (HCWs) with chickenpox should be excluded from work until all lesions are dry and crusted. HCWs with localized herpes zoster (shingles) should have the lesions covered and should be restricted from the care of high-risk patients until all lesions are dry and crusted. HCWs with generalized herpes zoster or with localized herpes zoster that cannot be covered should be restricted from patient contact until all lesions are dry and crusted.

Contact

Vaccine is recommended for use in susceptible persons following exposure to varicella, as long as there are no contraindications to vaccination. The vaccine is effective in preventing illness or modifying the severity of illness if used within 3 days, and possibly up to 5 days, after exposure. If the exposure results in infection with varicella, there is no evidence that administration of varicella vaccine during the incubation period or prodromal stage of illness increases the risk for vaccine-associated adverse reactions. Varicella Zoster Immune Globulin (VZIG) is a human blood product that contains high titers of varicella zoster virus antibody. If given within 96 hours after exposure, VZIG can modify or prevent clinical varicella and prevent complications or death. VZIG is indicated for use in susceptible individuals at high risk for complications who have had a significant exposure to a person with varicella. VZIG is available in Ohio via:

American Red Cross
Blood Services
Northern Ohio Region
3950 Chester Avenue
Cleveland, OH 44114
(216) 431-3010

or

American Red Cross
Central Ohio Region
995 E. Broad Street
Columbus, OH 43205
(614) 253-6714

Prevention and Control

A live attenuated varicella vaccine was licensed in the United States in 1995. After one dose of vaccine, 97% of children 12 months to 12 years of age develop detectable antibody titers. Among healthy adolescents and adults, an average of 78% develop antibody after one dose and 99% develop antibody after a second dose given 4 to 8 weeks later.

Present control measures are limited to isolation of cases from neonates, non-immune pregnant women, and immunocompromised individuals. Drainage from lesions is infectious and should be covered by a dressing or clothing. Hand-washing by those caring for patients or touching lesions should be emphasized.

Managing Hospital VZV Exposure Episodes

Patients with varicella or disseminated zoster and immunocompromised patients with localized zoster should be placed in a private room with negative air pressure. Staff should wear gowns, masks, and gloves to provide care. Localized zoster in immunocompetent patients should be managed with drainage and secretion precautions until all lesions are crusted. Staff should wear gloves when contacting lesions.

No person with a negative history for chickenpox should care for a patient with either chickenpox or zoster, unless VZV antibody titer shows evidence of immunity.

Patients exposed to VZV in a room, ward, or face-to-face setting within the 72 hours preceding rash onset of chickenpox or from the time of rash onset of zoster and those exposed to a case patient before all lesions are dry and crusted should be managed as follows: (a) verbal screening for history of VZV infection, consider immune if positive; (b) serologic testing if negative history, should not depend on complement fixation (CF) test, which is reliable only for recent infection - use fluorescent antibody to membrane antigen (FAMA), immune adherence assay (IAHA), enzyme immunoassay (EIA)/enzyme linked immunosorbent assay (ELISA), or neutralization test.

Susceptible patients (seronegative) should be discharged or placed on airborne precautions from day 10 through 21 following initial exposure. If given VZIG, precautions should extend from day 7 through 28 following initial exposure.

Staff exposed to VZV should be screened in the same manner as exposed patients. Susceptible staff should be excluded from patient contact from day 10 after their initial exposure until day 21 after the last exposure, as recommended by Centers for Disease Control and Prevention. If the staff member received VZIG, he/she should be excluded from day 10 after their initial exposure until day 28 after the last exposure.

From "Immunization of Health-Care Workers: Recommendations of the Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory Committee (HICPAC)", *MMWR* Dec 26, 1996, 46 (RR-18), p. 25
(www.cdc.gov/epo/mmwr/preview/mmwrhtml/00050577.htm):

All Health Care Workers (HCWs) should ensure that they are immune to varicella. Varicella immunization is particularly recommended for susceptible HCWs who have close contact with persons at high risk for serious complications, including (a) premature infants born to susceptible mothers, (b) infants who are born at less than 28 weeks of

gestation or who weigh less than or equal to 1,000 g at birth (regardless of maternal immune status), (c) pregnant women, and (d) immunocompromised persons. Serologic screening for varicella immunity need not be done before vaccinating unless the health-care institution considers it cost-effective. Routine post-vaccination testing of HCWs for antibodies to varicella is not recommended because greater than or equal to 90% of vaccinees are seropositive after the second dose of vaccine.

Serologic screening for varicella immunity need not be done before vaccinating unless the health-care institution considers it cost-effective. Routine post-vaccination testing of HCWs for antibodies to varicella is not recommended because greater than or equal to 90% of vaccinees are seropositive after the second dose of vaccine.

Hospitals should develop guidelines for management of vaccinated HCWs who are exposed to natural varicella. Seroconversion after varicella vaccination does not always result in full protection against disease. Therefore, the following measures should be considered for HCWs who are exposed to natural varicella: (a) serologic testing for varicella antibody immediately after VZV exposure; (b) re-testing 5-6 days later to determine if an anamnestic response is present; and (c) possible furlough or reassignment of personnel who do not have detectable varicella antibody. Whether post-exposure vaccination protects adults is not known.

Hospitals also should develop guidelines for managing HCWs after varicella vaccination because of the risk for transmission of vaccine virus. Institutions may wish to consider precautions for personnel in whom a rash develops after vaccination and for other vaccinated HCWs who will have contact with susceptible persons at high risk for serious complications.