4.13 Varicella (Chickenpox)

Etiology

Varicella (chickenpox) is a generalized viral disease caused by varicella zoster virus (VZV), a deoxyribonucleic acid (DNA virus) of the *Herpesvirus* family.

Case Definitions

Only confirmed cases of disease should be reported.

Confirmed Case

Clinical evidence[10] of illness and laboratory confirmation of infection:

- isolation or direct antigen detection of varicella-zoster virus (VZV) from an appropriate clinical specimen **OR**
- detection of VZV DNA **OR**
- seroconversion or significant rise (e.g., fourfold or greater) by and standard serologic assay in varicella-zoster IgG titre between acute and convalescent sera **OR**
- positive serologic test for varicella-zoster IgM antibody **OR**
- Clinical evidence of illness in a person with an epidemiological link to a confirmed case of chickenpox or VZV infection

Probable Case

Clinical evidence of illness in the absence of laboratory confirmation or epidemiological link to a laboratory confirmed case of chickenpox.

Clinical Presentation

Primary varicella zoster virus infection causes varicella (chickenpox) and reactivated infection results in herpes zoster (shingles). Herpes zoster generally occurs decades after the initial infection. Varicella presents with fever, headache, and a rash that is maculopapular for a few hours, vesicular for 3-4 days and leaves a granular scab. The vesicles collapse when punctured. The vesicular rash typically consists of 250-500 lesions in varying stages of development and resolution (crusting).

They may be abundant or mild and not profuse enough to note that an infection is present. Complications are seen more frequently if the infections occur in adolescence, adulthood or in an immunocompromised host, with higher rates of encephalitis, pneumonia and death. Babies who develop varicella within the first 28 days of birth are at higher risk from developing severe generalized varicella.

[10] Clinical illness is characterized by a rash with rapid evolution of macules to papules, vesicles and crusts; all stages are simultaneously present; lesions are superficial and may appear in crops.

Complications from infection include secondary bacterial skin infections, otitis media, bacteremia, osteomyelitis, septic arthritis, endocarditis, necrotizing fasciitis, toxic shock like syndrome, mild hepatitis and thrombocytopenia.

Infections that occur early in pregnancy may result in congenital varicella syndrome in 0.7% of cases. After 13-20 weeks gestation the incidence is 2%.

Herpes zoster or shingles is a reactivation of latent varicella infection in the dorsal root ganglia in a localized area. The lesions are restricted to an area supplied by the sensory nerves along nerve pathways and are usually unilateral causing severe pain.

Diagnosis

The diagnosis is generally made based on symptoms. For confirmation on laboratory specimens go to the public health laboratory web site www.publichealthlab.ca or call 709-777-6583.

Epidemiology

Occurrence

Varicella occurs worldwide and, in countries without vaccination programs, it is mainly a disease of childhood, developing in 50% of children by the age of 5 years and 90% by the age of 12 years. In the pre-vaccine era, it is estimated that there were approximately 350,000 varicella cases and 1,500 to 2,000 varicella-related hospitalizations each year in Canada. However, assessing the effect of varicella immunization programs on the incidence of the disease is difficult as varicella infections are significantly under-reported, with less than 10% of the expected cases reported annually. Canadian studies have found decreases in the burden of varicella following the introduction of immunization programs.

The varicella immunization program was implemented in Newfoundland and Labrador (NL) in January 2005. The vaccine was administered at 12 months of age for children born January 2004 and onwards. A catch-up program was offered children at 4-6 years of age who were born between 2001 to 2003 who had not previously received a dose of varicella vaccine and who did not have a history of natural disease. Prior to 2005 varicella cases were reported by weekly aggregate cases and since varicella was considered a common childhood illness most cases were not reported to public health. From 2005 to 2009, varicella cases were reported in the age groups eligible for varicella immunization and from 2010 to present, all varicella cases are reported. In NL, the average number of cases hospitalized involving a varicella diagnosis for the years 2000 – 2005 was 21.8 cases, and from 2006 – 2010 the average number of cases involving a varicella diagnosis was 5.2 cases.

Reservoir

Humans.

Transmission

VZV is spread by the airborne route as well as by direct contact with the virus shed from skin lesions. The attack rate among susceptible contacts in household settings is estimated at 65% to 87%. In utero, infection also can occur as a result of transplacental passage of virus during maternal varicella infection.

Incubation period

The incubation period is from 10 to 21 days after exposure, usually 14 to 16 days. Infectiousness begins 1 to 2 days before onset of the rash and lasts until the last lesion has crusted. Varicella zoster immunoglobulin (VZIG) may extend the incubation period to 28 days. Varicella can develop between 2 and 16 days after birth in infants born to mothers with active varicella around the time of delivery; the usual interval from onset of rash in a mother to onset in her neonate is 9 to 15 days.

Communicability

The contagious period is from 1-2 days before the onset of the rash and lasts until all lesions are crusted usually five days. Those with zoster may be infectious for a week after the appearance of the vesiculopustular lesion. Infection usually confers immunity but a very mild case (few spots) may leave a person vulnerable for a second infection.

Control Measures

Management of Case

Investigation

- Assess for evidence of immunity and vaccine history
- Assess for vaccine-modified disease (breakthrough infection)
- Identify susceptible contacts with significant exposure during the period of communicability

Significant exposure is considered:

- Continuous household contact (living with the case),
- Sharing the same hospital room as a case,
- Prolonged face-to-face contact
- Health care workers with more than 15 minutes of face-to-face contact or one hour in patient's room

Treatment

- There is no specific treatment, treatment should be based on the symptoms of the patient
- In persons under the age of 18 years, avoid the use of acetylsalicylic acid (ASA, Aspirin) because of the association with Reye's syndrome

- The decision to use antiviral therapy and the route and duration of therapy should be determined by specific host factors, extent of infection, and initial response to therapy
- In immunocompetent hosts, most virus replication has stopped by 72 hours after onset of the rash
  - Oral antivirals are not recommended for routine use for healthy children with varicella
  - Oral antiviral should be considered for those at increased risk of moderate to severe varicella
- Intravenous antiviral therapy is recommended for immunocompromised patients and therapy initiated within 24 hours of rash onset, maximizes efficacy

Varicella Zoster Immune Globulin (VZIG) is not effective once symptoms have developed. To access VZIG call the DH&CS **729-3430** or the MOH after hours **1-866-270-7437.**

Immunization

The case does not need to be vaccinated.

Exclusion

- A child with mild illness should be allowed to return to school or daycare as soon as he or she is well enough to participate normally in all activities, regardless of the state of the rash. Parents, particularly parents of immunosuppressed children, should be notified that chickenpox is in the class as well as be provided with information on the VZV incubation period and how to detect early VZV
- Cases should avoid contact with:
  - Immunocompromised individuals
  - Susceptible pregnant women (particularly those in the third trimester)
  - Hospitalized premature infants, and
  - Infants born to susceptible mothers
- Airborne and Contact Precautions are recommended for hospitalized cases
- Air travel is not recommended until lesions have crusted due to the recirculation of cabin air
- Swimming in public pools is not recommended until lesions have healed and crusts are no longer present

Management of Contacts

Definition of Contact

A contact is someone who has significant exposure during the infectious period.

Immunoprophylaxis

- To determine the immunization requirement of contacts it is necessary to:
  - Assess for evidence of immunity and vaccine history

  - Assess disease history or serological evidence of disease
  - Assess shingles disease history

- A contact is considered immune and does not need to be vaccinated if one or more of the following is reported:
  - Self-reported history of varicella if born before 2004 (except for health care workers)
  - For those born in 2004 or later and for health care workers, a health care provider diagnosis of varicella or herpes zoster
  - Documented evidence of immunization with two doses of a varicella-containing vaccine
  - A history of laboratory confirmed varicella infection
  - Laboratory evidence of immunity
- If the contact is non-immune:
  - Univalent varicella vaccine given as soon as possible and within 3 and up to 5 days after exposure has been shown to be approximately 90% effective in preventing or reducing the severity of varicella and is the post-exposure management of choice for susceptible, healthy, non-pregnant persons

  - Varicella vaccination is not indicated for post-exposure management of infants less than 12 months of age, as the vaccine is not authorized for this age group and these infants are generally protected by maternal antibodies

- Varicella-zoster Immune Globulin (VZIG) may be given to high-risk non-immune individuals within 96 hours of significant exposure. It is used exclusively in prevention. VZIG should be considered for:
  - Immunocompromised individuals
  - Newborns whose mothers develop varicella within five days prior to delivery up to 48 hours after delivery
  - Hospitalized preterm infants (28 weeks or more of gestation) if mother lacks evidence of immunity against varicella
  - Hospitalized infants (less than 28 weeks of gestation or birth weight 1000 g or less) regardless of maternal antibody

Exclusion

No exclusion for contacts is required. However, susceptible household contacts should avoid contact for the incubation period with:

- Immunocompromised individuals
- Susceptible pregnant women (particularly those in the third trimester)
- Hospitalized premature infants, and
- Infants born to susceptible mothers

Management of Outbreaks

An outbreak management team should be established to address infection prevention and control measures.

Education and Prevention Measures

Immunize susceptible persons according to the Newfoundland and Labrador Immunization Manual available at web site
http://www.health.gov.nl.ca/health/publichealth/cdc/health_pro_info.html#immunization

- Offer vaccine to susceptible eligible individuals
- For students in the school setting susceptibility will be based on history of disease or appropriate past varicella immunization.
  - Serological testing will not be required
    Healthcare workers should demonstrate proof of immunity upon hire
  - Proof of immunity may include history of disease, serological evidence of disease or documented age-appropriate doses of varicella vaccine.

Reporting Requirements and Procedures

- The laboratory (hospital or public health laboratory) report case/s to the attending physician, the Chief Medical Officer of Health and the Medical Officers of Health (MOH)
- MOH office will notify, as required, local physicians, nurse practitioners, environmental health officers, community health nurses, communicable disease control nurses (CDCNs) and Infection control practitioners (ICP), in the particular region as required for follow-up and case investigation
- The CDCN in collaboration with the ICP (if necessary) will collect case details
- The CDCN will enter the case details into the electronic reporting system and utilize the Canadian Network for Public Health Intelligence (CNPHI tool) for alerts and/or outbreak summaries

Provincial Disease Control

- Reports the aggregate case data to Public Health Agency of Canada
- Provides an analysis of the case/s with reports in the Quarterly Communicable Disease Report (CDR), also posted on the Public Health web site
  http://www.health.gov.nl.ca/health/publichealth/cdc/informationandsurveillance.html
- Coordinates the response if an outbreak occurs across RHAs.

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