Alberta Public Health Disease Management Guidelines

Congenital Cytomegalovirus (CMV)

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Health.CD@gov.ab.ca

Health and Wellness Promotion Branch

Public Health and Compliance Branch

Alberta Health

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Case Definition

Confirmed Case

Laboratory confirmation of cytomegalovirus (CMV) infection with or without clinical illness[(A)]:

- Isolation of CMV virus from urine in an infant within the first two weeks of life

OR

- Detection of CMV virus from an appropriate specimen (e.g., blood)[(B)] in an infant within the first two weeks of life by molecular diagnostic techniques, when available

OR

- Histopathological evidence of CMV inclusion disease from an appropriate clinical specimen

Probable Case

Clinical illness[(A)] in a child of any age, born to a CMV seropositive mother.

[(A)] Clinical illness includes:

- stillbirth,
- intrauterine growth retardation,
- fulminant cytomegalic inclusion disease (jaundice, hepatosplenomegaly, petechial rash, multiple organ involvement), and/or
- central nervous system findings (microcephaly, motor disability, chorioretinitis, cerebral calcifications).

There may be onset of lethargy, respiratory distress or seizures soon after birth.

[(B)] Refer to the Public Health Laboratory (ProvLab) Guide to Services for current specimen collection and submission information.

Reporting Requirements

Physicians, Health Practitioners and Others

Physicians, health practitioners and others shall notify the Medical Officer of Health (MOH) (or designate) of the zone, of all confirmed and probable cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two business days).

Laboratories

All laboratories shall report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two business days) to the:

- Chief Medical Officer of Health (CMOH) (or designate), and
- MOH (or designate) of the zone.

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- The MOH (or designate) of the zone where the case currently resides shall forward the Perinatally Acquired Notifiable Disease Enhanced Report form for all confirmed and probable cases to the CMOH (or designate) within four weeks of notification.
- For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two business days):
  - name,
  - date of birth,
  - out-of-province health care number,
  - out-of-province address and phone number,
  - positive laboratory report, and
  - other relevant clinical/epidemiological information.

Epidemiology

Etiology

Reference 1 applies to this section.

Cytomegalovirus (CMV) is a DNA virus. It is a member of the *Herpesvirus* group (herpesvirus 5). It is the largest virus to infect humans. The virus survives at room temperature for a few days.

Clinical Presentation

Approximately 1% of all newborns are perinatally infected with CMV, making CMV the most common congenital infection. Approximately 5% of newborns with congenital CMV demonstrate intrauterine growth retardation, neonatal jaundice, purpura, hepatosplenomegaly, microcephaly, brain damage, intracerebral calcifications, and retinitis. There may be intermittent shedding of virus for five to six years. Death may occur in utero.

Many infections are asymptomatic at birth but in about 10% of cases some degree of neurosensory disability can be identified. Deafness is one of the major complications resulting from CMV infection. Less specific findings include failure to thrive and recurrent respiratory infections. The infection may occur during either a primary or reactivated infection in the mother; however, primary infections carry a higher risk for severe symptomatic disease. Primary infections during pregnancy are much less common than reactivated infections.

A small number of infants are infected during delivery, through breast milk or following the transfusion of CMV-contaminated blood to a seronegative newborn; but they do not develop disease. Symptomatic disease or disease with sequelae typically occurs from these sources only in very low birth weight (less than 1200 grams) infants. (J Robinson, personal communication, January 21, 2004)

Diagnosis

The gold standard for diagnosis of congenital CMV is a urine sample for CMV culture. The diagnosis may be made by isolation of the virus or PCR testing. The virus may also be isolated from throat swabs, blood or other normally sterile sites. Urine specimens must be obtained within two weeks of birth. Serologic studies may be done to demonstrate the presence of CMV-specific IgM antibody or a significant rise in IgG antibody. Interpretation of the results requires knowledge of the clinical and epidemiologic background. (B Lee, personal communication, December 8, 2003)

Treatment

- Symptomatic treatment.
- There is no treatment or cure for congenital CMV although ganciclovir is now used as a treatment in some cases when central nervous system disease is diagnosed in the first month of life. (J Robinson, personal communication, January 21, 2004)

Reservoir

Humans.

Transmission

The fetus may be infected in utero from either a primary or reactivated maternal infection. The vertical transmission of CMV to an infant may occur:

- in utero by transplacental passage of maternal virus,
- at birth by passage through the infected genital tract of the mother, or
- postnatally by the ingestion of CMV-positive breast milk.

CMV is transmitted by intimate exposure with infectious tissues, excretions, and secretions. The virus is excreted in cervical secretions, semen, breast milk, urine, and saliva. This excretion occurs in both primary and reactivated infections.

Incubation Period

Infection acquired in utero is either evident in the first week of life (about 10% of cases) or not diagnosed until months to years later. Many cases are never recognized and are labelled idiopathic sensorineural hearing loss. (J Robinson, personal communication, January 21, 2004)

Period of Communicability

Virus is excreted in the urine and saliva of newborns for many months. The excretion may persist or be episodic for several years following a primary infection, possibly five or six years following a neonatal infection. Risk to the fetus is highest when the mother acquires disease or has a reactivation during the first half of gestation.

Host Susceptibility

The virus is ubiquitous, thus infection is common in all populations. Fetuses; patients with debilitating diseases, immunodeficiency or immunosuppression; organ recipients; and patients with AIDS are more susceptible to disease. Antibodies develop with infection.

Incidence

General

References 2 and 3 apply to this section.

CMV occurs worldwide. It was first isolated in the 1950s. The United States of America reports that intrauterine infections occur in 0.5–1% of pregnancies. In developing countries the majority of the population acquires infection early in life and almost 100% will develop antibodies. Lower socioeconomic status is presumed to be a contributing factor to higher CMV prevalence.

A large number of children attending daycare excrete CMV in their urine and saliva. Subsequently, there tends to be a higher incidence of CMV infection in daycare workers. (J Robinson, personal communication, January 21, 2004)

Canada

Reference 2 applies to this section.

No current information is available on congenital CMV as CMV is not nationally reportable. Epidemiologic investigations conducted in the 1960s and 1970s on the prevalence of CMV in populations in select areas across Canada showed Dené and Inuit women to have a higher prevalence of CMV antibodies, possibly due to the lower socioeconomic status of the population.

Alberta

Reference 4 applies to this section.

From 1998 to 2002, 18 cases of congenital CMV were reported in the province, ranging from three to five cases annually. The outcome of these cases is unknown.

Public Health Management

Key Investigation

- Contact the physician to:
  - assess the current status of the infant,
  - determine if the infant is displaying symptoms, and
  - obtain the diagnosis (i.e., acquired or congenital CMV).
- Only congenital CMV is reportable. If the physician is not able to differentiate between acquired and congenital infection at the initial contact, recall the record (file) until a diagnosis is determined.
- Identify disease or antibodies in mother.

Management of a Case

- Supportive.
- Routine practices in hospital.
- There are no restrictions for attendance at childcare facilities.

Management of Contacts

- Due to the high prevalence of asymptomatic shedders in the population there is no follow up of contacts.

Preventive Measures

Reference 3 applies to this section.

- Women of childbearing age who work in hospitals (particularly labour and delivery, and pediatric wards) should use routine practices.
- For women working in daycare centers, with preschoolers, and with persons unable to maintain personal hygiene, handwashing after contact is vital. Handwashing is particularly important after changing diapers or assisting with toileting.
  - Risk seems to be greatest for women caring for children less than two years of age.

Appendix 1: Revision History

Revision Date	Document Section	Description of Revision
October 2021	General	• Updated Template • Etiology, Clinical Presentation, Diagnosis Treatment sections moved to Epidemiology • Updated web links

References

(1) Public Health Agency of Canada. *Infectious substances: Cytomegalovirus.* Office of Laboratory Security. Material Safety Data Sheet. January 2001. https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/cytomegalovirus.html

(2) Hong Z, Zou S, Giulivi A. *Cytomegalovirus, herpesvirus 6, 7, and 8, and parvovirus B19 in Canada.* Public Health Agency of Canada. Ottawa: CCDR 2001; 27S3.

(3) Centers for Disease Control and Prevention, National Center for Infectious Diseases. *CMV: Diagnosis, prevention and treatment.* October 2002. https://www.cdc.gov/cmv/index.html

(4) Alberta Health and Wellness, Disease Control and Prevention. *Communicable Disease Reporting System.* May 2003.