



CLINICAL GUIDELINE

Cytomegalovirus CMV Neonatal Pathway

Scope (Staff):	Nursing and Medical Staff
Scope (Area):	NICU KEMH, NICU PCH, NETS WA

This document should be read in conjunction with this [DISCLAIMER](#)

Congenital CMV

Use [Congenital CMV Checklist MR037](#)

Testing

- Universal screening for congenital CMV is not offered, targeted testing should be performed on high risk infants.

Who to test

- Neonates:
 - with clinical suspicion of congenital CMV
 - including thrombocytopenia, petechiae, hepatomegaly, splenomegaly, hepatitis, microcephaly, unexplained IUGR, sensorineural hearing loss (SNHL), chorioretinitis, seizures or indicative CNS radiological abnormalities
 - with confirmed maternal CMV infection during (or just prior to) pregnancy
 - with a positive CMV PCR on amniocentesis. These neonates are considered to have congenital CMV and neonatal testing should be performed.

How and when to test

Ideally testing should be performed as early as practical in order to allow for timely decisions to be made around treatment and follow-up:

- For **infants <3/52** old testing can be performed using either urine or saliva. This testing is sensitive and specific for congenital CMV (and more sensitive than dried blood spot testing).
 - Urine for this purpose can be collected using a bag sample (minimum 1ml urine container)
 - Saliva should be taken at least one hour after the last feed using a sterile swab, the tip of which is then placed in a viral transport media.

- For **infants $\geq 3/52$** old CMV PCR can be performed using the initial newborn screening blood sample (dried blood spot 'Guthrie' card) by contacting the WA Newborn Screening Program (phone 6383 4153)
 - Urine / saliva CMV PCR at $\geq 3/52$ cannot differentiate congenital from postnatal infection.

Any infant with a positive CMV PCR on urine or saliva (<3/52 age) or newborn screening blood spot (any age) has congenital CMV and requires a thorough clinical assessment, baseline investigations and follow-up arranged as outlined (diagnosis and management of infants with post-natal CMV infection is discussed separately below)

Clinical assessment

- Growth parameters (length, weight, head circumference)
- Physical examination including: neurological examination, abdominal examination (jaundice, hepatosplenomegaly) skin examination (petechiae)
- Hearing assessment (usually through newborn hearing screening)

Investigations

- **Bloods:** FBC, LFT, conjugated bilirubin +/- CMV viral load (EDTA 2ml)
- **Imaging:** early MRI brain to assess for central nervous system (CNS) involvement (ideally prior to 4/52 age where possible). MRI is more sensitive for intracerebral calcification than head ultrasound scan (USS). Where MRI is not possible, consider USS or CT brain.
- **Ophthalmology:** early assessment for chorioretinitis

Treatment

Discuss all cases considered for treatment with the Infectious Diseases (ID) Registrar / Consultant or the clinical microbiologist on-call through KEMH/PCH switch:

Who to treat

- Consider treatment of neonates with confirmed congenital CMV infection and moderate to severe CMV disease defined as:
 - CNS involvement
 - microcephaly, radiographic changes indicative of CMV CNS disease, chorioretinitis +/- confirmed SNHL.
 - and / or
 - multiple manifestations attributable to congenital CMV
 - thrombocytopenia, petechiae, hepatomegaly, splenomegaly, IUGR, hepatitis.
- Treatment is not routinely recommended in mildly symptomatic CMV disease (one or two transient manifestations, e.g isolated thrombocytopenia), congenital CMV with isolated SNHL, or asymptomatic CMV infection.

- The potential benefits and side effects of treatment should be discussed with the patients family ideally by the neonatology and ID / Microbiology team.
- Treatment should not commence without informed parental consent; document consent in the patient medical record.

When and how

- Patients should be assessed urgently in the ID outpatient clinic at PCH prior to commencing therapy (or discussed with the ID / microbiology team for NICU patients).
- Commence treatment within the first month of life.
- Treat with oral valganciclovir 16mg/kg twice daily (or IV ganciclovir initially if extreme prematurity or unable to tolerate / absorb oral medications) for a total duration of 6 months, see [ChAMP monograph](#).
- All infants commenced on antivirals should have monthly follow-up with the Infectious Diseases team at PCH.

Follow-up

- **All** infants with congenital CMV regardless of treatment status should be referred for the following:
 - **Audiology:** Follow-up at least 6 monthly up to 3 years of age, then annually thereafter until 10 years old.
 - **Development:**
 - Initial paediatric developmental review at 9-12 months:
 - for >32/40 gestation - through the PCH developmental clinic (specify on referral form that “this child has complex medical needs with ongoing follow up at PCH”)
 - for <32/40 gestation born at KEMH - KEMH developmental follow up
 - Consider *Ages and Stages Questionnaire (ASQ)* at 6 months and 12 months. (refer to [Child and Adolescent Community Health Guideline](#))
 - Consider early referral to Child Development Services / Early Intervention Clinic if concerns identified.
 - **Ophthalmology:** *early* assessment for chorioretinitis and follow-up thereafter as determined by the ophthalmologist.

Infants with congenital CMV on valganciclovir require:

- **ID review:** Early review at 1-2 weeks, then 2-4 weekly thereafter to monitor compliance, side effects and complications, increase valganciclovir dose with growth and coordinate follow-up
- **Neutrophil count (FBC):** At least weekly for 2-3 weeks, then at 6 weeks and monthly thereafter.
- **Liver Function Test (LFT) and renal function (EUC):** At least monthly throughout therapy.

- **Other follow-up as above:** paediatrics, audiology and ophthalmology.

CMV viral load testing is not routinely required after commencing therapy, except if there are acute septic features or if there are specific concerns about absorption. CMV viral loads are expected to rebound after ceasing therapy, confirmation of this by viral load testing is not warranted.

Postnatally Acquired CMV Infection

- Infants can acquire CMV infection peri-natally via exposure to maternal genital secretions or postnatally via blood transfusion, contact with siblings or most commonly through breastfeeding.
- Postnatal CMV disease is rare in full-term infants however those born at <32 weeks gestation or with very low birth weight <1500g are at higher risk of symptomatic disease. Manifestations include hepatitis, thrombocytopenia, neutropenia, respiratory distress syndrome and sepsis-like syndrome.
- Where postnatal CMV disease is suspected, urine or saliva should be collected for PCR testing. A CMV viral load (EDTA tube 2ml minimum) should also be requested.
- Treatment (IV ganciclovir / oral valganciclovir) should be reserved for cases of severe disease in discussion with the infectious diseases team.
- A low risk of mild neurological and cognitive sequelae in premature infants infected postnatally has been reported although this finding has not been consistent across studies. In contrast to congenital CMV, postnatally acquired CMV infection has not been definitively associated with sensorineural hearing loss. Developmental follow-up can be considered on a case-by-case basis.
- Overall the risk of severe disease and/or subsequent sequelae in postnatal CMV infection is low and outweighed by the benefits of breastfeeding.
 - This is reflected in the American Academy of Paediatrics 2012 policy statement which recommends breast milk as the enteral feed of choice for preterm infants in CMV seropositive mothers.
- Infants with suspected T cell immunodeficiency are at high risk of severe manifestations of postnatal CMV disease and breastfeeding should be avoided.

Related CAHS internal policies, procedures and guidelines
CAHS Cytomegalovirus (CMV) Neonatal Pathway ChaMP monograph: Valganciclovir Neonatal Medication Protocols: Valganciclovir Congenital CMV Checklist MR037

References and related external legislation, policies, and guidelines
1. Congenital Cytomegalovirus Infection in Pregnancy and the Neonate: Consensus Recommendations for Diagnosis, Prevention and Therapy. The International Congenital CMV Consensus Recommendations Group 2016. 2. Australian Society for Infectious Diseases: Management of Perinatal Infections 2014 3. Kimberlin DW, Jester PM, Sánchez PJ, Ahmed A, Arav-Boger R, Michaels MG, Ashouri N,

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