# Duke Medicine
Division of Cellular Therapy

**ADULT AND PEDIATRIC BLOOD AND MARROW TRANSPLANT PROGRAM**

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<th>APBMT-COMM-016</th>
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<td>DOCUMENT TITLE:</td>
<td>Cytomegalovirus (CMV) Prevention and Treatment</td>
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<td>21 Jan 2019</td>
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<tr>
<td>Effective Date:</td>
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APBMT-COMM-016
CYTOMEGALOVIRUS (CMV) PREVENTION AND TREATMENT

1 PURPOSE
1.1 To provide a consistent approach to monitoring, prevention and treatment of cytomegalovirus (CMV) disease and infection in allogeneic and autologous hematopoietic stem cell transplant (HSCT) recipients

2 INTRODUCTION.
2.1 Level: Interdependent: Physicians, advance practice providers, nurses, and pharmacists *(requires an order from physician or physician designee to be placed into EPIC).

2.2 Supportive Data: HSCT recipients (particularly those receiving allografts) are at risk of developing opportunistic infections, including CMV; risk is dependent on the degree of immunosuppression experienced by the patient.

3 SCOPE AND RESPONSIBILITIES
3.1 This procedure provides a consistent approach to monitoring, prevention and treatment of CMV.

3.2 Attending physicians, advanced practice providers, pharmacists and registered nurses are responsible for ensuring that the blood and marrow transplant patients are monitored and treated, if necessary, for CMV.

4 DEFINITIONS/ACRONYMS
4.1 BMT - Bone Marrow Transplant
4.2 CMV - Cytomegalovirus
4.3 CrCL - Creatinine Clearance
4.4 GvHD - Graft versus Host Disease
4.5 HSCT - Hematopoietic stem cell transplant
4.6 IVIG - Intravenous Immune Globulin
4.7 IV - Intravenous
4.8 PCR - Polymerase Chain Reaction

5 MATERIALS
5.1 NA

6 EQUIPMENT
6.1 NA

7 SAFETY
7.1 NA
8 PROCEDURE

8.1 Monitoring

8.1.1 CMV immune screen will be performed prior to transplantation (IgG/IgM) for donor and recipient. If the recipient is <6 months of age or has had a dose of IVIG in the previous 3 months regardless of age, CMV DNA (PCR) panel will be obtained.

8.1.2 All allogeneic stem cell recipients will be monitored weekly for the presence of CMV infection (CMV-DNA by PCR) beginning during the first week post-transplant and continuing through a minimum of Day +100 or discharge home; intermittent monitoring will be done indefinitely for those receiving ongoing immunosuppression and for those with chronic GVHD.

8.2 Pediatrics Only: Indication for prophylaxis (prevention of CMV infection and disease in patients at risk)

8.2.1 Pediatric recipients of myeloablative and non-myeloablative allogeneic stem cell transplants who are immune screen-positive or whose donors are immune screen-positive will receive prophylaxis for CMV. Patients with neuroblastoma undergoing autologous BMT who also are CMV seropositive will receive, CMV prophylaxis because of the higher risk of CMV disease in patients treated with intensive chemotherapy prior to transplantation therapy.

8.2.2 Prophylactic therapy entails the administration of anti-CMV therapy to pediatric patients who do not have evidence of CMV infection or disease (e.g. the patient is CMV-DNA negative and does not have positive cultures or symptoms of CMV disease).

8.2.3 Prophylaxis is administered to pediatric patients with acyclovir (500mg/m2 per dose IV every 8 hours or adjusted for renal function) and beginning on day +1 and continuing until a minimum of day +100 or until CD4 immune function recovers.

8.3 Indication for preemptive treatment (prevention of CMV disease in patients with active CMV infection)

8.3.1 CMV Preemptive Therapy Protocol

8.3.1.1 CMV DNA results by real-time PCR

8.3.1.2 CMV DNA less than (<) 183 International Units/mL

8.3.1.2.1 No action

8.3.1.2.2 Repeat test within one week

8.3.1.3 CMV DNA 183-450 International Units/mL

8.3.1.3.1 Monitor viral load kinetics.

8.3.1.3.2 Repeat test within one week if no signs or symptoms of CMV disease are present.
8.3.1.3.3 Repeat test in 3 days if patient received alemtuzumab

8.3.1.4 CMV DNA greater than (> 450 International Units/mL
8.3.1.4.1 Initiate preemptive therapy for patients considered at-risk for CMV disease.

8.3.2 Induction Therapy (patients with normal renal function)
8.3.2.1 Ganciclovir 5 mg/kg IV twice daily
8.3.2.2 Foscarnet 90 mg/kg IV twice daily or 60 mg/kg IV three times a day

8.3.3 Induction Therapy Duration
8.3.3.1 Continue for at least 2 weeks and until CMV DNA is undetectable.
8.3.3.2 If CMV DNA is not undetectable after 3 weeks of induction, consider alternative therapy and send CMV genotype testing for drug resistance.

8.3.4 Maintenance Therapy (patients with normal renal function)
8.3.4.1 Ganciclovir 5 mg/kg IV daily
8.3.4.2 Foscarnet 90 mg/kg IV daily
8.3.4.3 Valganciclovir
   8.3.4.3.1 Adult dosing: 900 mg orally daily
   8.3.4.3.2 Pediatric dosing: 13 mg/kg orally daily (max 900 mg).

8.3.5 Maintenance Therapy Duration
8.3.5.1 Continue for a minimum of 2 weeks.
8.3.5.2 If the CMV DNA rises for two consecutive weeks on maintenance therapy, re-induce.
8.3.5.3 If the CMV viral load remains stable or increases 2 weeks after re-induction, consider alternative therapy and send CMV genotype testing for drug resistance.
8.3.5.4 CMV DNA testing is recommended weekly after therapy, at least until the viral load is undetectable.

8.3.6 Renal dosing:
8.3.6.1 For patients with renal impairment, dosing will be determined in consultation with the clinical pharmacist.

8.4 Treatment of CMV pneumonitis or persistent viremia
8.4.1 Consider one of the following to specific antiviral therapy (IVIG or Cytogam®):
8.4.1.1 Intravenous immune globulin (IVIG) 500 mg/kg (round dose to nearest 5 g) IV daily x 4 days, then every 48 hours x 12 additional doses, then weekly for 4 weeks (or other appropriate dose/schedule as prescribed)

8.4.1.2 Cytomegalovirus hyperimmune globulin (CMV-Ig; Cytogam®) 100 mg/kg IV 3x per week x 21 days, then weekly until no evidence for disease x 2 months or longer in severely immunocompromised patients with ongoing GvHD (or other appropriate dose/schedule as prescribed). Alternative dosing schedule 400 mg/kg IV Days 1, 2, 7, then 200 mg/kg Day 14 +/- Day 21

8.5 Reportable conditions:

8.5.1 Allergy or intolerance to anti-CMV therapy; renal dysfunction, neutropenia, or other adverse effects attributed to anti-CMV therapy

9 RELATED DOCUMENTS/FORMS

9.1 N/A

10 REFERENCES


10.4 Clinical Pharmacology (current edition) valganciclovir, ganciclovir, foscarnet, IVIG and CMV-IVIG.
### 11 REVISION HISTORY

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<th>Description of Change(s)</th>
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| 05           | S. McCollum    | - Acronyms defined  
- Section 8.1 - removed “urine and nasal sections are cultured for CMV” as this is no longer required in pediatric workup.  
- Section 8.1 - removed “if CMV is indeterminate, test will be repeated in 3-7 days” as this is no longer being performed.  
- Sections 8.3.1.2 and 8.3.1.3: “repeat testing in one week” was changed to “repeat testing within one week”.  
- Section 8.3.6 - added to indicate all renal dosing will be determined in consultation with the clinical pharmacist;  
- Section 8.4 - all renal dosing removed from the document.  
- Document footer updated to match title. |
# Cytomegalovirus (CMV) Prevention and Treatment

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## Management

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## Medical Director

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