



## PEDIATRIC BLOOD AND MARROW TRANSPLANT PROGRAM

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Infection Prevention and Surveillance in Pediatric Transplant and Cellular Therapy Patients

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# **PBMT-GEN-073**

## **INFECTION PREVENTION AND SURVEILLANCE IN PEDIATRIC TRANSPLANT AND CELLULAR THERAPY PATIENTS**

### **1 PURPOSE**

- 1.1 To guide general infection prevention in Pediatric Transplant and Cellular Therapy (PTCT) patients, with standard surveillance recommendations and unique environmental considerations for protection during periods of highest susceptibility (i.e. inpatient admissions)

### **2 INTRODUCTION**

- 2.1 PTCT patients represent a unique population at significantly increased risk for infection and viral reactivation due to varying degrees of risk factors, often dependent upon: chemotherapy conditioning regimens (both myeloablative and reduced intensity), immunosuppressive therapies and duration of immune suppression, presence of graft-vs-host disease, and graft source or type of cellular therapy product.
- 2.2 In addition to standard precautions, transmission-based precautions are used to prevent the spread of suspected or established infections either through direct or indirect contact with the patient or the patient's environment.
- 2.3 This procedure will serve as a supplement to existing DUHS Infection Prevention policies, specifically indicated to outline the unique considerations of the Pediatric Transplant and Cellular Therapy patient population and inpatient unit.

### **3 SCOPE AND RESPONSIBILITIES**

- 3.1 Any staff member participating in the care of PTCT patients is responsible for the content within this procedure, including, but not limited to inpatient and outpatient nursing staff, inpatient and outpatient advanced practice providers, attending physicians, and all ancillary support staff.

### **4 DEFINITIONS/ACRONYMS**

- 4.1 ANC Absolute Neutrophil Count
- 4.2 BK Human polyomavirus 1
- 4.3 CMV Cytomegalovirus
- 4.4 CVL Central Venous Line
- 4.5 EBV Epstein-Barr Virus
- 4.6 eRVP Extended Respiratory Viral Panel
- 4.7 EVS Environmental Services
- 4.8 HHV6 Human Herpesvirus 6
- 4.9 Neutrophil engraftment: ANC > 500 on 3 consecutive days

- 4.10 PCR Polymerase Chain Reaction
- 4.11 PJP Pneumocystis jirovecii Pneumonia
- 4.12 PPE Personal Protective Equipment
- 4.13 PTCT Pediatric Transplant and Cellular text

## **5 MATERIALS**

- 5.1 N/A

## **6 EQUIPMENT**

- 6.1 Thermometer
  - 6.1.1 Tympanic thermometers will be available for use by PTCT patients and is the preferred method of temperature measurement, unless otherwise indicated.
- 6.2 Appropriate blood culture bottles and other sterile containers will be available for collection of any indicated specimen to evaluate potential source of infection.
- 6.3 Appropriate lab tubes will be available for collection of any indicated infection surveillance specimens.
- 6.4 Transmission-based Precautions supplies
  - 6.4.1 Inpatient and outpatient staff will ensure the availability and proper storage of the appropriate PPE based on the type of Transmission-based Precautions needed – a dedicated EVS supply cart will be stored on the inpatient unit.
  - 6.4.2 Gowns, gloves, simple masks, N95 respirators, eye protection.
  - 6.4.3 Availability of and proper display of designated signage to identify patients as indicated for the period of Transmission-based precautions.
  - 6.4.4 Single-patient, dedicated equipment will be available, as able, for patients on Transmission-based Precautions.

## **7 SAFETY**

- 7.1 N/A

## **8 PROCEDURE**

- 8.1 Bacterial Infection Prevention
  - 8.1.1 Bacterial surveillance
    - 8.1.1.1 Obtain blood cultures from each lumen of newly placed CVLs and subcutaneous implanted ports at time of admission to the inpatient unit post-operatively.
  - 8.1.2 Development of fever
    - 8.1.2.1 Refer to PBMT-GEN-025 Evaluation and Therapy of Neutropenic Fever

- 8.1.2.2 For patients with congenital athymia, refer to PBMT-GEN-072 Guidelines for the Management of Fever in Pediatric Patients with Athymia in the Peri-Implantation Period of RETHYMIC

## 8.2 Vital Infection Prevention

### 8.2.1 Viral surveillance

#### 8.2.1.1 CMV

- 8.2.1.1.1 Allogeneic stem cell recipients will receive weekly monitoring of CMV PCR through day 100 and then as clinically indicated.
- 8.2.1.1.2 Autologous stem cell recipients will receive weekly monitoring of CMV PCR at least through Day + 30 and then as clinically indicated.
- 8.2.1.1.3 Refer to APBMT-COMM-016 Cytomegalovirus (CMV) Prevention and Treatment
- 8.2.1.1.4 Refer to APBMT-COMM-016 JAI Cytomegalovirus (CMV) Monitoring, prophylaxis and management in Pediatric Hematopoietic Stem Cell Transplant recipients

#### 8.2.1.2 Adenovirus

- 8.2.1.2.1 Allogeneic stem cell recipients will receive monitoring of adenovirus PCR every 2 weeks through durable neutrophil engraftment
- 8.2.1.2.2 If patient presents with positive adenovirus on eRVP, screen plasma and stool with adenovirus PCR

#### 8.2.1.3 EBV

- 8.2.1.3.1 Allogeneic stem cell recipients will receive monitoring of EBV PCR every 2 weeks through Day +100 unless clinically indicated

#### 8.2.1.4 HHV6

- 8.2.1.4.1 Allogeneic stem cell recipients will receive weekly monitoring of HHV6 PCR through durable neutrophil engraftment

#### 8.2.1.5 BK

- 8.2.1.5.1 Screen urine with development of symptoms – dysuria, urinary frequency or urgency, frank or occult hematuria

- 8.2.2 Increased frequency of or addition of other viral surveillance as clinically indicated or at the discretion of the patient's provider
- 8.2.3 Viral prophylaxis
  - 8.2.3.1 Acyclovir for CMV/HSV prophylaxis: Allogeneic recipients- starting Day 0 until patient has evidence of satisfactory immune reconstitution and/or following cessation of immunosuppressive therapy for at least one month; Autologous recipients start at day 0 at least until Day + 30 and then only if clinically indicated.
  - 8.2.3.2 Letermovir for CMV prophylaxis in seropositive allogeneic stem cell recipients starting Day +1 and continue at least through Day + 100
- 8.3 Fungal Infection Prevention
  - 8.3.1 Fungal surveillance
    - 8.3.1.1 Screening with aspergillus (galactomannan) antigen as clinically indicated
    - 8.3.1.2 Screening with fungitell B-D glucan assay as clinically indicated
    - 8.3.1.3 Screening for fungal infection is particularly important in PTCT patients with prolonged fever (>96 hours) of unclear etiology, patients with fungal infection history, or patients with prolonged period of neutropenia
      - 8.3.1.3.1 Refer to PBMT-GEN-025 Evaluation and Therapy of Neutropenic Fever
  - 8.3.2 Fungal prophylaxis
    - 8.3.2.1 Allogeneic stem cell recipients
      - 8.3.2.1.1 Prophylaxis with voriconazole, posaconazole, or micafungin will be standardly administered starting Day +1 until patient has evidence of satisfactory immune reconstitution and/or following cessation of immunosuppressive therapy for at least one month
      - 8.3.2.1.2 Periodic monitoring of anti-fungal trough levels periodically are strongly recommended when available.
      - 8.3.2.1.3 Prophylaxis for PJP with sulfamethoxazole/trimethoprim will be standardly administered starting on day of transplant admission through Day -2 pre-cell infusion

- 8.3.2.1.4 Patients will then transition to prophylaxis for PJP with pentamidine (inhaled or intravenous) every 28 days beginning on Day +30 post-cell infusion
  - 8.3.2.2 Autologous stem cell recipients, including CAR-T and gene therapy recipients
    - 8.3.2.2.1 Prophylaxis with fluconazole will be standardly administered through Day +30
    - 8.3.2.2.2 Prophylaxis for PJP as per APBMT-COMM-017 Pneumocystis Jiroveci Pneumonia (PJP) Prophylaxis
- 8.4 Environmental Considerations
  - 8.4.1 Isolation precautions
    - 8.4.1.1 Refer to Duke Hospital Policy: DUHS Standard & Transmission-based Precautions (Isolation) Acute Care Hospitals and Ambulatory Care
    - 8.4.1.2 A dedicated EVS isolation cart will be stored and maintained on the PTCT inpatient unit
  - 8.4.2 Standard PPE
    - 8.4.2.1 Refer to Duke Hospital Policy: DUHS Standard & Transmission-based Precautions (Isolation) Acute Care Hospitals and Ambulatory Care
  - 8.4.3 Inpatient Unit Considerations
    - 8.4.3.1 Laundry Facilities
      - 8.4.3.1.1 One washer and one dryer are available on the inpatient PTCT unit in the Connection Room for the use of PTCT patients and their families during hospital admission
      - 8.4.3.1.2 The user will perform hand hygiene before use of either the washer or the dryer in accordance with DUHS Hand Hygiene Policy
      - 8.4.3.1.3 Alcohol-based hand sanitizer will be available near the laundry machines
      - 8.4.3.1.4 The user will thoroughly wipe down all surfaces of the machines, both inside and outside, with hospital-approved disinfectant wipes, prior to and after every use
    - 8.4.3.2 Connection Room
      - 8.4.3.2.1 Parents/caregivers and patients will be required to perform hand hygiene before

- entrance or use of any item in the Connection Room in accordance with DUHS Hand Hygiene Policy
- 8.4.3.2.2 A designated play space is available for patients and parent/caregiver use in the Connection Room
- 8.4.3.2.3 Parents/caregivers of patients ordered for Transmission-based Precautions are permitted to enter the Connection Room with the use of proper PPE
- 8.4.3.2.4 Patients ordered for Transmission-based Precautions will have private play sessions coordinated by PTCT staff with appropriate cleaning of the Connection Room before and after use
- 8.4.3.2.5 Patients and parents/caregivers will be prohibited from physical contact with other patients
- 8.4.3.2.6 Patients will be instructed to participate in “parallel play” with separate, individual materials and utensils that are not shared
- 8.4.3.2.7 A kitchenette with microwave, refrigerator and freezer storage space is available in the Connection Room for parent/caregiver use
- 8.4.3.2.8 Outside personal food or drink items are to be labeled with provided labels that include patient name, room number and first date of item storage. The refrigerator and freezer will be cleaned on a weekly basis at minimum and items are not to be shared between patients
- 8.4.3.2.9 Snacks and drinks provided by the Family Support Program will be individually wrapped and single-use items, available to inpatient parents and caregivers

## 9 RELATED DOCUMENTS/FORMS

- 9.1 APBMT-COMM-016 Cytomegalovirus (CMV) Prevention and Treatment
- 9.2 APBMT-COMM-016 JAI Cytomegalovirus (CMV) Monitoring, prophylaxis and management in Pediatric Hematopoietic Stem Cell Transplant recipients
- 9.3 DUHS Standard & Transmission-based Precautions (Isolation) Acute Care Hospitals and Ambulatory Care, Document ID: 5218
- 9.4 DUHS Hand Hygiene Policy, Document ID: 5199

- 9.5 PBMT-GEN-072 Guidelines for the Management of Fever in Pediatric Patients with Athymia in the Peri-Implantation Period of RETHYMIC
- 9.6 PBMT-GEN-074 Evaluation and Management of Fever in Immunocompromised Patients

## 10 REFERENCES

- 10.1 [https://www.astctjournal.org/article/S2666-6367\(21\)00892-7/fulltext](https://www.astctjournal.org/article/S2666-6367(21)00892-7/fulltext)
- 10.2 [https://www.astctjournal.org/article/S2666-6367\(21\)00633-3/fulltext](https://www.astctjournal.org/article/S2666-6367(21)00633-3/fulltext)
- 10.3 <https://academic.oup.com/cid/article/78/2/423/7274728>
- 10.4 <https://pmc.ncbi.nlm.nih.gov/articles/PMC5016011/>
- 10.5 Abdel-Azim H, Balian C, Tewari P, Santizo R, Kapoor N, Mahadeo KM. A survey of infectious disease clinical practices among pediatric blood and marrow transplant programs in the United States. *Pediatr Blood Cancer*. 2015 Apr;62(4):731-5. doi: 10.1002/pbc.25355. Epub 2015 Jan 3. Erratum in: *Pediatr Blood Cancer*. 2015 May;62(5):926. PMID: 25557155.
- 10.6 Tomblyn M, Chiller T, Einsele H, Gress R, Sepkowitz K, Storek J, Wingard JR, Young JA, Boeckh MJ; Center for International Blood and Marrow Research; National Marrow Donor program; European Blood and Marrow Transplant Group; American Society of Blood and Marrow Transplantation; Canadian Blood and Marrow Transplant Group; Infectious Diseases Society of America; Society for Healthcare Epidemiology of America; Association of Medical Microbiology and Infectious Disease Canada; Centers for Disease Control and Prevention. Guidelines for preventing infectious complications among hematopoietic cell transplantation recipients: a global perspective. *Biol Blood Marrow Transplant*. 2009 Oct;15(10):1143-238. doi: 10.1016/j.bbmt.2009.06.019. Erratum in: *Biol Blood Marrow Transplant*. 2010 Feb;16(2):294. Boeckh, Michael A [corrected to Boeckh, Michael J]. PMID: 19747629; PMCID: PMC3103296.

## 11 REVISION HISTORY

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