



## ADULT AND PEDIATRIC BLOOD AND MARROW TRANSPLANT PROGRAM

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Management of Bleeding in the Adult and Pediatric Blood and Marrow Transplant Patient

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**Author:** MOORE171

**Owner:** JLF29

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## **APBMT-COMM-014**

# **MANAGEMENT OF BLEEDING IN THE ADULT AND PEDIATRIC BLOOD AND MARROW TRANSPLANT PATIENT**

### **1 PURPOSE**

- 1.1 To outline the care of the adult and pediatric hematopoietic stem cell transplant (HSCT) patient who is at risk for bleeding secondary to thrombocytopenia, graft versus host diseases (GVHD), and/or fragile tissues following administration of chemotherapy and/or irradiation therapy and transplantation.

### **2 INTRODUCTION**

- 2.1 Thrombocytopenia is a common complication of the stem cell transplant process.
- 2.2 Multiple factors can lead to thrombocytopenia including but not limited to: chemotherapy, total body irradiation (TBI), medications, GVHD, autoimmune destruction, disseminated intravascular coagulopathy (DIC), and thrombotic thrombocytopenic purpura (TTP), inadequate platelet production, improperly functioning platelets, or excessive loss of platelets.
- 2.3 Prolonged periods of thrombocytopenia places the patient at increased risk for active bleeding which may require significant treatment interventions such as platelet infusions.

### **3 SCOPE AND RESPONSIBILITIES**

- 3.1 Interdisciplinary
  - 3.1.1 The physician will provide supportive medical management of the patient.
  - 3.1.2 The nurse will provide supportive care and administer any treatment ordered by the physician or designee.
  - 3.1.3 If blood product treatment is required:
    - 3.1.3.1 Requires an order placed by a physician or designee in the electronic medical record.
    - 3.1.3.2 Registered Nurses (RNs) may administer blood products after completing a training course, a blood administration test and demonstration of clinical competency with their preceptor.
    - 3.1.3.3 RNs must re-validate their clinical competency to administer blood products on an annual basis.
    - 3.1.3.4 Other licensed personnel (advanced practice providers and physicians) may administer blood products after demonstration and validation of clinical competency.

- 3.1.4 The Medical Director and Nurse Manager are responsible for ensuring that the requirements of the procedure are successfully met.

#### **4 DEFINITIONS/ACRONYMS**

- 4.1 ABC Automated Blood Count
- 4.2 CT X-ray computed tomography
- 4.3 DIC disseminated intravascular coagulopathy
- 4.4 EEG Electroencephalography
- 4.5 ENT Ear, nose and throat
- 4.6 GVHD Graft versus host disease
- 4.7 HLA Human leukocyte antigen
- 4.8 HSCT Hematopoietic stem cell transplant
- 4.9 IM Intramuscular
- 4.10 IV Intravenous
- 4.11 IVIG Intravenous immunoglobulin
- 4.12 LP Lumbar puncture
- 4.13 MRI Magnetic resonance imaging
- 4.14 PLT Platelet
- 4.15 TBI Total body irradiation
- 4.16 TTP Thrombotic thrombocytopenic purpura

#### **5 MATERIALS**

- 5.1 NA

#### **6 EQUIPMENT**

- 6.1 NA

#### **7 SAFETY**

- 7.1 NA

#### **8 PROCEDURE**

- 8.1 Assessment:
  - 8.1.1 Monitor Automated Blood Counts (ABC) and coagulation studies as ordered

- 8.1.2 Observe patient for signs of unusual bleeding: blood in bodily secretions, bruising, hematoma, petechiae, and blood in urine, stool (diapers or pull-ups)
- 8.2 Safety-Preventive Measures:
  - 8.2.1 Avoid intramuscular (IM) injections
  - 8.2.2 Avoid rectal temperatures, enemas, or suppositories or other manipulations
  - 8.2.3 Implement measures to minimize nausea and vomiting
  - 8.2.4 Implement measures to prevent and treat constipation or diarrhea
  - 8.2.5 Provide assistance with ambulation as needed
  - 8.2.6 Maximize the use of slippers or shoes when the patient is out of bed
  - 8.2.7 Minimize risk for falls
  - 8.2.8 Prohibit blade razor use by thrombocytopenic patients
  - 8.2.9 Assist patient to trim nails, using caution to minimize risk of injury
  - 8.2.10 Provide soft toothbrushes or toothettes for patient use
  - 8.2.11 Use protective gear in toddlers (e.g. helmets, knee pads, crib bumpers)
  - 8.2.12 Apply direct pressure to all sites of invasive procedures for 5-10 minutes, and then apply pressure dressing. Observe site frequently for excessive bleeding
    - 8.2.12.1 Topical thrombin or surgicel or other topical clotting agents may be needed at the site
- 8.3 Patient Teaching:
  - 8.3.1 Instruct patient to use soft toothbrush, toothettes, soft gauze, or rinsing for mouth care.
  - 8.3.2 Instruct patient to use electric razor only.
  - 8.3.3 Instruct patient to avoid scratching or rubbing skin.
  - 8.3.4 Instruct patient to avoid bending over with head lower than shoulders.
  - 8.3.5 Instruct patient to avoid nose blowing if possible. Encourage gentle blowing, sneezing, or coughing.
  - 8.3.6 Avoid jumping, diving, contact sports, biking, roller blading, etc.
- 8.4 Blood Product Administration:
  - 8.4.1 See related policies:
    - 8.4.1.1 DUH Policy: *Blood Product Administration Policy*
    - 8.4.1.2 PBMT-GEN-041 *Infusion of Platelets*
    - 8.4.1.3 PBMT-GEN-039 *Continuous Platelet Infusion*

- 8.4.2 Follow Duke Hospital Process Standards Blood Products Administration procedure when administering any blood product.
- 8.4.3 Administer blood products as needed to maintain hematocrit and platelet (PLT) at levels ordered by physician.
  - 8.4.3.1 Administer only leuko-depleted, irradiated blood products.
- 8.4.4 Anticipate need to administer platelets before and during invasive procedures.
- 8.4.5 Check human leukocyte antigen (HLA) antibodies per order. If antibodies are positive and patient is becoming refractory to platelets, discuss with physician the possible need for HLA-matched platelets and/or intravenous immunoglobulin (IVIG) therapy.
- 8.4.6 Pre-medicate with acetaminophen and diphenhydramine prior to blood product administration, if indicated and ordered.
- 8.4.7 Administer platelets per institutional policy and include the following guidance:
  - 8.4.7.1 Obtain post-platelet transfusion count 30-60 minutes after transfusion is completed if indicated.
  - 8.4.7.2 Transfuse volume reduced products to patients less than (<) 10 kg.
  - 8.4.7.3 Transfusion parameters may be individualized for clinical status and/situations (i.e. active bleeding, high risk procedures).
- 8.5 Nosebleed:
  - 8.5.1 Apply pressure for 5-10 minutes.
  - 8.5.2 Apply ice packs to nasal area.
  - 8.5.3 Administer platelets as indicated.
  - 8.5.4 Anticipate consultation with ENT service for continued bleeding.
  - 8.5.5 Consider topical thrombin or other interventions per standard of care.
- 8.6 Cranial:
  - 8.6.1 Perform frequent neurological assessments.
  - 8.6.2 Implement measures to minimize nausea, vomiting, or constipation.
  - 8.6.3 Avoid placing patient in Trendelenberg position.
  - 8.6.4 Anticipate order for imaging studies (CT, MRI), EEG, LP, and consultation with Neurology Service for evaluation of altered neurological function.
- 8.7 Hemorrhagic Cystitis:
  - 8.7.1 Monitor urinary output and assess for presence of blood in urine.

- 8.7.2 Maintain adequate intravenous (IV) hydration.
- 8.7.3 For Pediatrics: Anticipate additional orders such as continuous bladder irrigation, aminocaproic acid (Amicar) or conjugated estrogens (Premarin) for patient with hematuria.
- 8.7.4 For Adults: Anticipate additional orders for continuous bladder irrigation for patient with hematuria.
  - 8.7.4.1 Refer to Duke Hospital Process Standards procedure for Continuous Bladder Irrigation.
  - 8.7.4.2 Consider addition of aminocaproic acid
- 8.7.5 Consider antimicrobial therapy, depending on an etiology, including but not limited to ciprofloxacin, CMX001, cidofovir, or other relevant agent.
- 8.8 Menstrual Bleeding:
  - 8.8.1 Perform perineal pad count.
  - 8.8.2 Anticipate order for hormone therapy for patient with significant or prolonged vaginal bleeding.
- 8.9 Active Bleeding:
  - 8.9.1 Place patient on bedside monitor for frequent vital sign monitoring.
  - 8.9.2 Obtain orthostatic vital signs if possible. An orthostatic systolic decrease of 10-20 mmHg or increase in pulse of 15 beats/minute is considered to be significant.
  - 8.9.3 Apply direct pressure or pressure dressings as necessary.
  - 8.9.4 \* Anticipate order for increased frequency of ABC and coags.
  - 8.9.5 \* Administer crystalloid bolus and blood products as ordered.
  - 8.9.6 \* Anticipate order to increase threshold for platelet transfusion.
  - 8.9.7 \* Anticipate order for aminocaproic acid (Amicar) infusion, particularly with diffuse alveolar hemorrhage. Additionally, anticipate order for high dose steroids including methylprednisolone 250 mg IV every 6 hours, particularly with diffuse alveolar hemorrhage
  - 8.9.8 \* Anticipate possible consultation with Pulmonary or Gastrointestinal Service for endoscopic evaluation of bleeding source.
  - 8.9.9 \* Anticipate possible consultation with Coagulation Service for refractory bleeding.
  - 8.9.10 \* Vasopressor infusion should not be initiated until intravascular space is adequately replenished.
- 8.10 Coagulation Factor VIIa recombinant
  - 8.10.1 Consider administration of these products in active bleeding or risk of bleeding

8.10.1.1 Risk of bleeding

8.10.1.1.1 coagulation Factor VIIa recombinant (Novoseven) 15-30 mcg/kg IV

8.10.1.2 Intrapulmonary hemorrhage

8.10.1.2.1 coagulation Factor VIIa recombinant (Novosen RT) intra pulmonary 50 mcg/kg x 1

8.11 Reportable Conditions:

8.11.1 Heart Rate greater than (>) 120 beats per minute (or as indicated for age)

8.11.2 Systolic Blood Pressure less than (<) 90 (or as indicated for age)

8.11.3 Mean Arterial Pressure less than (<) 60 (or as indicated for age)

8.11.4 Orthostatic changes

8.11.5 Active, unusual, or uncontrolled bleeding

8.11.6 Platelet count less than (<) 10K despite platelet transfusion

8.11.7 Decreasing hematocrit

8.11.8 Mental Status Changes

## 9 RELATED DOCUMENTS/FORMS

9.1 DUH Policy: Blood Product Administration Policy

9.2 PBMT-GEN-041 Infusion of Platelets

9.3 PBMT-GEN-039 Continuous Platelet Infusion

## 10 REFERENCES

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10.5 Heslet L. et al. Successful pulmonary administration of activated recombinant factor VII in diffuse alveolar hemorrhage. Critical Care. 2006.

10.6 Palaszewski D, et al. Obstetrics and Gynecology. 2021;137(1):e7-e12.

10.7 Wanko SO, Broadwater G, Folz RJ, Chao N. Biol Blood and Marrow Transplantation 2006;12:949-953.

**11 REVISION HISTORY**

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06	<u>MC authors:</u> Sally McCollum/ Jennifer Frith  <u>Content SMEs:</u> Jill Lawrence; Liz Rogers	Section 8.7.4: addition of aminocaproic acid  Section 8.9.7: addition of methylprednisolone  Section 8.10: Information added for coagulation Factor VIIa recombinant products.  Section 10: Additional references added



## Signature Manifest

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### Author

Name/Signature	Title	Date	Meaning/Reason
Sally McCollum (MOORE171)		09 Mar 2022, 01:44:59 PM	Approved

### Management

Name/Signature	Title	Date	Meaning/Reason
Nelson Chao (CHAO0002)		09 Mar 2022, 01:48:19 PM	Approved

### Medical Director

Name/Signature	Title	Date	Meaning/Reason
Joanne Kurtzberg (KURTZ001)		09 Mar 2022, 01:48:32 PM	Approved

### Quality

Name/Signature	Title	Date	Meaning/Reason
Bing Shen (BS76)		15 Mar 2022, 10:38:56 AM	Approved

### Document Release

Name/Signature	Title	Date	Meaning/Reason
Betsy Jordan (BJ42)		15 Mar 2022, 12:48:13 PM	Approved