



Intended for use with the MHP: Activation and Coordination CDST (Section 9.0-Clinical Transfusion Manual)

Request immediate registration for ED patients and alert Transfusion Medicine Services/ Laboratory (TMS/Lab) of any potential MHP activations

Physician decides on MHP activation by considering the following:

- patient is critically injured and/or bleeding and/or at risk for critical bleeding
- uncrossmatched blood is ordered
- crossmatched blood is ordered (greater than 2 units)
- if TRAUMA- ABC Score¹ is positive (score is greater than or equal to 2)

START TRANSFER PROCESS EARLY if patient's needs exceed facility resources; contact The Patient Transfer Network (PTN) [formerly BCBedline] and initiate LLTO protocol: 1-866-233-2337

Physician does the following:

- assigns MHP Coordinator (contact person during MHP)
- if TRAUMA patient and arrived within 3 hours of injury orders tranexamic acid (tranexamic acid given IV as 1 g over 10 minutes then 1 g over 8 hrs)

MHP Coordinator does the following:

- contacts TMS/Lab and states "Activate MHP"- TMS/Lab to notify Pathologist
- activates Transfusion Reference Worksheet (826189)
- provides medical record number, patient name, location & diagnosis to TMS/ Lab
- acts as the primary contact between departments until transfer of care

Lab work is ordered and drawn:

NOTE: availability of blood tests is site specific

- GROUP & SCREEN, CBC, lytes, glucose (random), urea, creatinine, INR, PTT, fibrinogen, ionized calcium, lactate, ABG or venous blood gas
- repeat CBC, INR, PTT and fibrinogen every 30 minutes
- consider repeat ionized calcium and potassium every 60 minutes

MHP Coordinator ensures blood products are requested as ordered and TMS to issue in the following order:

NOTE: availability of blood products is site specific

- 4 units RBC, 2 units FP, then followed by
- 4 units RBC, 2 units FP, if clinically required
- 1 adult dose platelets, if clinically required
- cryoprecipitate (usual dose 10 units if fibrinogen less than 1.5 g/L, if clinically required)

Bleeding Controlled?
or
Patient Deceased?

YES

NO

Stop MHP:

- MHP Coordinator notifies TMS
- Ensures unused blood products are returned to lab

Continue MHP:

- MHP Coordinator ensures blood products are requested as ordered
- TMS & Lab to advise on lab results and blood component support as required
- continue patient support based on laboratory results and clinical status

Initial Management of Bleeding

- identify cause
- initial measures
 - compression
 - tourniquet
 - packing
- surgical assessment
 - early surgery or angiography to control bleeding
- correct coagulopathy

Resuscitation

- avoid hypothermia (aggressive rewarming)
- warm all fluids and blood products
- avoid excessive crystalloid
- tolerate permissive hypotension (80-100 mm Hg) except in head injury
- do not use any lab values in isolation to determine status of patient

Special Clinical Considerations

- tranexamic acid in trauma patients
- if on Warfarin consider reversal (see opposite)
- obstetric hemorrhage - consider Cryo/FP for early DIC
- intraoperative cell salvage where appropriate and available
- if signs or symptoms of hypocalcemia consider IV calcium chloride

¹ ABC Score

- penetrating mechanism (0-no, 1- yes)
- ED Systolic Blood Pressure 90 mm Hg or less (0-no, 1-yes)
- ED Heart Rate of 120 or greater (0-no, 1-yes)
- positive FAST (0-no, 1-yes)

Key

ABG	Arterial Blood Gas
CDST	Clinical Decision Support Tool
PTT	Partial Thromboplastin Time
ED	Emergency Department
RBC	Red blood cells
CBC	Complete blood count
PCC	Prothrombin Concentrate
FP	Frozen Plasma
FAST	Focused Assessment for Sonography in Trauma
INR	International Normalized Ratio
Cryo	Cryoprecipitate
TMS	Transfusion Medicine Services
Lab	Laboratory

Anticoagulants and Antidotes		
Anticoagulant	Examples	Antidote
Unfractionated heparin (UFH)	Heparin	Protamine sulfate
Low molecular weight heparin (LMWH)	Dalteparin, Enoxaparin	Protamine sulfate 60 - 80 % reversal
Heparinoid	Danaparoid	No specific antidote
Vitamin K antagonists	Warfarin (Coumadin)	Vitamin K 10 mg IV AND Prothrombin complex concentrate (PRC = PCC = octaplex) recommended dose 1000 units pending INR results Total shall not exceed 3000 units (requires Pathologist approval)
Direct thrombin inhibitors	Dabigatran (Pradaxa), Rivaroxaban (Xarelto), Apixaban (Eliquis)	No specific antidote Consider dialysis for Dabigatran
Pentasaccharides	Fondaparinux, Idraparinux	No specific antidote
Antiplatelet agents	ASA, NSAIDs, Clopidogrel, GP IIb/IIIa inhibitors	Platelet transfusion

Note: Contact Pathologist on call for advice on anticoagulant and antidote management

Resuscitation Targets	
Parameters	Values to aim for
Hemoglobin	Greater than 70 g/L (this value should not be used alone as a transfusion trigger)
Platelet	Greater than or equal to $50 \times 10^9/L$ Greater then or equal to $100 \times 10^9/L$ in CNS injury
INR	Less than 1.5
Fibrinogen	Greater than 1.5 g/L
Temperature	Greater than 35 degrees celcius
Acid-base status	pH greater than 7.2, base excess less than -6, lactate less than 4 mmol/L
Ionized calcium	Greater than 1.1 mmol/L

Developed by:

Clinical Massive Hemorrhage Stakeholders Group

Endorsed by:

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