Massive Hemorrhage Protocol in Adults Flowsheet (MHP)

IDENTIFY / TREAT ACTIVE BLEEDING

STABILIZE AND TRANSPORT TO REFERRAL FACILITY (if applicable)

Care should be initiated within the resources and capabilities of the sending facility.

If patient is bleeding with anticipation of ongoing blood loss or bleeding requiring at least:

- one blood volume in 24 hours or;
- 50% blood volume in 3 hours or;
- 10 units of red blood cells (RBCs) in 24 hours.

PHYSICIAN ACTIVATION OF MHP

– Establish or assign patient identification.

Note: If the patient is transferred to another facility, the MHP will need to be activated in the second facility.

NURSING TO NOTIFY TRANSFUSION MEDICINE LABORATORY (TML) OF MHP ACTIVATION

– Provide contact information of physician leading the MHP.

– Provide patient information.

TML TO NOTIFY CANADIAN BLOOD SERVICES (CBS) THAT THE MHP HAS BEEN ACTIVATED

– Notify all other laboratories that the MHP is activated.

MEDICAL–SURGICAL INTERVENTIONS

- **Prior to initiation of treatment, send STAT:** CBC, INR/PTT, Fibrinogen, Electrolytes, Creatinine, Mg^{++}, Ionized Ca^{++}, serum lactate, Group and Screen, Blood Gas (blood work done based on facility's capabilities).
- **Consider cell salvage.**
- **Warm all fluids.**
- **Perform surgical/interventional radiology interventions as appropriate.**
- **Trauma-associated bleeding** – if within 3 hours of injury, consider tranexamic acid

Tranexamic Acid: Dosage– 1 gram IV over 10 minutes then 1 gram IV over 8 hours

	Bloodwork Indicator	Reversal Agent	Dosage
Oral Vitamin K1 antagonists (e.g. Warfarin)	INR 1.7–5	Prothrombin Complex Concentrate (PCC) AND vitamin K1	PCC 40 mL IV and 10 mg IV vitamin K1
	INR ≥5.1 or intracranial hemorrhage or unknown INR	PCC AND vitamin K1	PCC 80 mL IV and 10 mg IV vitamin K1
Heparin		Protamine	Protamine 1 mg IV for every 90 units of Heparin
Dabigatran		Idarucizumab	Idarucizumab 5 grams IV (administer in 2 infusions of 2.5 grams each no more than 15 minutes apart)
Apixaban, edoxaban, or rivaroxaban		No approved reversal agent. For ongoing life threatening bleeding may consider PCC	80mL IV (initial dosage). Another dose can be administered after 1 hour if bleeding continues as directed by managing MHP physician.
Note: Plasma or vitamin K will not reverse the anticoagulant effect in direct oral anticoagulant associated bleeding unless other concomitant coagulopathy is present.			

INITIAL TRANSFUSION MANAGEMENT

- **RBC and Plasma** in a 1:1 Ratio
- ***Consider*** **Platelets** 1 adult dose

REASSESS Q 30–60 minutes

- CBC, INR/PTT, fibrinogen.
- Blood chemistries as appropriate.

MAINTAIN

Temperature greater than 35.0°C
Systolic blood pressure greater than 70 mmHg
pH greater than 7.2
Ionized calcium greater than 1.13 mmol/L
Urine output greater than 0.5 mL/kg/hour

TRIGGERS & TARGETS GUIDING TRANSFUSION

Hemoglobin above 70 g/L	RBCs – 2–10 units
INR below 1.7	Plasma – 500–1500 mL
Platelet count above 50 x 10^9/L *OR* above 100 x 10^9/L (CNS injury)	Platelets –: 1 adult dose
Fibrinogen above 1.5 g/L *Consider transfusion with cryoprecipitate or fibrinogen concentrate if fibrinogen less than 2.0 g/L in post-partum hemorrhage*	Cryoprecipitate – 10 units Fibrinogen Concentrate – 2–4 grams

CONSIDER DISCONTINUING BLOOD COMPONENT THERAPY WHEN

- Shock has resolved.
- Bleeding is under control.

Nursing or Physician to inform TML when MHP is discontinued.

rFVIIa WARNING
rFVIIa should only be considered in rare circumstances ***after*** all other measures have been carried out and there is a likelihood the patient will survive.