

## Massive Hemorrhage Protocol (MHP) Checklist

### Time & Pack

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<th>TIME &amp; PACK</th>
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</table>
| **Activation & Pack 1** (date dd _ _ / mo _ _ / yr _ _ / time _ _ / _ _)
| MHP Lead RN: _________________________ |
| Call to hospital locating (ext. - - - - - ) to activate **CODE TRANSFUSION** |
| Provide patient number, name, sex, age, body weight in kg (if < 13 years of age), location, and information regarding patient use of antiplatelet or anticoagulants to blood bank at ext. - - - - - |
| Anti-platelets □ Yes; Anticoagulant □ Yes, drug name: __________________________ |
| Ensure identification band is affixed to patient |
| Obtain group and screen sample |
| Obtain baseline blood work |
| **Tranexamic acid:** Consider administering 30 mg/kg iv bolus tranexamic acid (maximum dose 2 g) over 20 minutes and an iv/io infusion of 10 mg/kg/hour |
| **Hypothermia prevention:** |
| Measure and document patient temperature |
| Obtain blood warmer for all infusions |
| If patient temperature less than 36⁰C start active warming |
| **Definitive hemorrhage control:** Notify if required: |
| Operating Room □ Interventional Radiology □ Gastroenterology |
| **Obtain 1st MHP pack (if not obtained before activation):** |
| Pack arrival time (_ _ / _ _ _ _ _ _ _ _ _ _ _ ) |
| 1 - 4 units Red Cells (RBCs) [# units dependent on the patient’s body weight (kg); 20 ml/Kg per dose, unless laboratory results direct otherwise] |
| **Use Rh-negative blood only for females** |
| Avoid additional boluses or infusions of crystalloid except on physician order |
| □ **Platelets:** If platelet count below 50 x10⁹/L or patient on an antiplatelet drug, transfuse 10 mL/kg of pooled platelets |
| □ **Fibrinogen:** if fibrinogen less than 1.5 g/L, administer 50 mg/kg fibrinogen concentrate (max dose 4 g if > 30 kg; max dose 2 g if < 30 kg) over 5 min by iv push |
| □ **Calcium:** 20 mg/kg (maximum 1 g) Calcium Chloride or 60 mg/kg (maximum 3 g) Calcium Gluconate iv push after pack 1 or ionized calcium <1.15 mmol/L |
| **Anticoagulant reversal:** |
| □ If Warfarin: PCC 15 IU/kg (for INR <3 or if INR unknown) or PCC 30 IU/kg (for INR > 3) iv over 10 minutes AND Vitamin K 1- 10 mg (neonate to adolescent) iv over 10 min |
| □ If Xa inhibitors (e.g., apixaban, rivaroxaban), Dabigatran, or Heparins: consultation with hematologist recommended |

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To be repeated on each page
**PACK 2 (Arrival time __/__)**

- Obtain hour one blood work
- Review last set of blood work to ensure at target: Hemoglobin greater than 80 g/L, INR less than 1.8, fibrinogen greater than 1.5 g/L, platelets greater than 50x10⁹/L, blood glucose > 4 mmol/L, ionized calcium ≥ 1.15 mmol/L & potassium < 5.8 mmol/L
- Measure and document patient temperature
- If patient temperature less than 36°C start active warming

**Obtain 2nd MHP pack (if needed):**

- Transfusions based on laboratory measures where feasible
  - 1 - 4 units Red Cells (RBCs) [# units dependent on the patient’s body weight (kg); 20 ml/Kg per dose, unless laboratory results direct otherwise]
  - 1 - 4 units Frozen plasma [# units dependent on the patient’s body weight (kg); 10-20 ml/Kg per dose, unless laboratory results direct otherwise]
- Platelets: if platelet count below 50x10⁹/L, 10 mL/kg of pooled platelets
- Fibrinogen: if fibrinogen less than 1.5 g/L, administer 50 mg/kg fibrinogen concentrate (max dose 4 g if > 30 kg else max 2 g if < 30 kg) over 5 min by iv push
- **Anticoagulant reversal (only if ongoing hemorrhage):**
  - If Xa inhibitors (second dose): consultation with hematologist recommended
  - Calcium: 20 mg/kg (max 1 g) Calcium Chloride or 60 mg/kg (max 3 g) Calcium Gluconate iv push after pack 2 or ionized calcium <1.15 mmol/L

**PACK 3 (Arrival time __/__)**

- Obtain hour 2 blood work
- Review last set of blood work to ensure at target including blood glucose > 4 mmol/L, ionized calcium ≥ 1.15 mmol/L & potassium < 5.8 mmol/L
- Measure and document patient temperature
- If patient temperature less than 36°C start active warming

**Obtain 3rd MHP pack (if needed):**

- Transfusions based on laboratory measures where feasible
  - 1 - 4 units Red Cells (RBCs) [# units dependent on the patient’s body weight (kg); 20 ml/Kg per dose, unless laboratory results direct otherwise]
  - 1 - 2 units Frozen plasma [# units dependent on the patient’s body weight (kg); 10 ml/Kg per dose, unless laboratory results direct otherwise]
  - 50 mg/kg fibrinogen concentrate (max dose 4 g if > 30 kg; max 2 g if < 30 kg) over 5 min by iv push
- Platelets: if platelet count below 50 x10⁹/L, 10 mL/kg of pooled platelets
- Calcium: 20 mg/kg (max 1 g) Calcium Chloride or 60 mg/kg (max 3 g) Calcium Gluconate iv push after pack 3 or ionized calcium <1.15 mmol/L
**PACK 4 (Arrival time __/__)**

- Obtain hour 3 blood work
- Review last set of blood work to ensure at target including blood glucose > 4 mmol/L, ionized calcium ≥ 1.15 mmol/L, potassium < 5.8 mmol/L & magnesium ≥ 0.70 mmol/L
- Measure and document patient temperature
- If patient temperature less than 36°C start active warming

**Obtain 4th pack (if needed)**

Transfusions based on laboratory measures where feasible

- □ 1 - 4 units Red Cells (RBCs) [# units dependent on the patient’s body weight (kg); 20 ml/Kg per dose, unless laboratory results direct otherwise]
- □ 1 - 2 units Frozen plasma [# units dependent on the patient’s body weight (kg); 10 ml/Kg per dose, unless laboratory results direct otherwise]

- **Platelets**: if platelet count below 50 x10⁹/L, 10 mL/kg of pooled platelets
- **Fibrinogen**: if fibrinogen less than 1.5 g/L, administer 50 mg/kg fibrinogen concentrate (max dose 4 g if > 30 kg; max 2 g if < 30 kg) over 5 min by iv push
- **Calcium**: 20 mg/kg (max 1 g) Calcium Chloride or 60 mg/kg (max 3 g) Calcium Gluconate iv push after pack 4 or ionized calcium <1.15 mmol/L

**PACK 5 (Arrival time __/__)**

- Obtain hour 4 or greater blood work
- Review last set of blood work to ensure at target including blood glucose > 4 mmol/L, ionized calcium ≥ 1.15 mmol/L, potassium < 5.8 mmol/L & magnesium ≥ 0.70 mmol/L
- Measure and document patient temperature
- If patient temperature less than 36°C commence active warming

**Obtain 5th (if needed)**

Transfusions based on laboratory measures where feasible

- □ 1 - 4 units Red Cells (RBCs) [# units dependent on the patient’s body weight (kg); 20 ml/Kg per dose, unless laboratory results direct otherwise]
- □ 1 - 2 units Frozen plasma [# units dependent on the patient’s body weight (kg); 10 ml/Kg per dose, unless laboratory results direct otherwise]

- **Platelets**: if platelet count below 50 x10⁹/L, 10 mL/kg of pooled platelets
- **Fibrinogen**: if fibrinogen less than 1.5 g/L, administer 50 mg/kg fibrinogen concentrate (max dose 4 g if > 30 kg; max 2 g if < 30 kg) over 5 min by iv push
- **Calcium**: 20 mg/kg (max 1 g) Calcium Chloride or 60 mg/kg (max 3 g) Calcium Gluconate iv push after each pack or ionized calcium <1.15 mmol/L

**TERMINATION (time __/__)**

Once hemorrhage control is obtained and patient is hemodynamically stable call blood bank and the hematology laboratories to terminate the protocol

- Measure and document patient temperature
- Return all unused blood products in appropriate storage containers
- Complete this form and place in patient chart
- Complete handover SBAR tool below with receiving team
### HANOVER SBAR TOOL FOR HANOVER TO THE CRITICAL CARE TEAM

(Time ___/__/__)

**S: SITUATION (Relay the following)**

- Patient age, sex, weight
- Patient estimated blood volume (70 ml/kg) _______ L
- Context (trauma ± TBI, surgery, or other)

**B: BACKGROUND (Relay the following)**

- TXA administration ______ g
- Total volume (mL-unless specified) of blood products ______ RBC
  ______ Plasma
  ______ PLTs
  ______ g Fibrinogen
  ______ IU PCC
- Total (L) crystalloid and/or colloid and urine output ______ L of non-blood product fluid; ______ L of urine output
- IV / IO access and need for vasopressors
- For trauma, external/internal bleeding ± TBI management
- Consultant(s) involved (e.g., surgery, radiology or gastroenterology)
- Complications (hypothermia, coagulopathy, acidosis or arrhythmias)

**A: ASSESSMENT (Relay the following)**

- Hemodynamic status (stable or unstable, vitals and temperature)
- Definitive hemorrhage control achieved? YES / NO
- Critical labs (specify) and latest blood work results
  Hgb _____ PLT _____ INR _____ Fibrinogen _____ Lactate _____ Calcium _____
- Availability of blood products from blood bank/coolers at bedside

**R: RECOMMENDATION (Consider the following)**

- Consider need for additional blood products since last set of labs
- Consider need for further consultation, tests and drug re-dosing