Massive Transfusion Protocol (MTP) – ADULT

University of Michigan 7/5/16 Rev 7

Appropriate Initial Interventions:
- Intravenous access – 2 large bore IVs and Central Venous Cath
- Labs: T&S, CBC, Plts, INR, PT, PTT, Fibrinogen, Electrolytes, BUN/Creatinine, ionized calcium, ROTEM
- Continual monitoring: VS, U/O, Acid-base status
- Aggressive re-warming
- Prevent / Reverse acidosis
- Correct hypocalcemia: CaGlucenate or CaCl
- Target goal ionized calcium 1.2 – 1.3
- If use CaCl 1 gm, give slowly IV
- Repeat lab testing to evaluate coagulopathy
- Stop crystalloid - avoid dilutional coagulopathy

Other considerations:
- Anticipate hypocalcemia and infuse 1g calcium gluconate per 1-2 units PRBC’s transfused
- Cell salvage: Anes Tech via front desk 93-64270 (Main & CVCOR)
- Heparin reversal: Protamine 1mg IV/100 U heparin
- Warfarin reversal: Vitamin K 10 mg IV; Consider Prothromin Comp
  4 Factor PCC Kcentra INR 2-4 25units/kg, INR>4-6, 35 units/kg, INR>6, 50 units/kg; repeat doing not recommended
- Chronic Renal Failure + VW Factor; DDAVP 0.3 µg/kg IV x 1 dose
- Consider antifibrinolytics:
  - Tranexamic acid 1 gm bolus plus infusion 1 gm over 8 hrs
  - Amicar 5 gm IV bolus then 1 gm/hr IV infusion
- Anesthesia: Page 8003; Trauma Chief (via web or operator)
- Rapid Response Team pager 90911 or call stat page 141

General Guidelines for Lab-based Blood Component Replacement in Adults:

<table>
<thead>
<tr>
<th>Product</th>
<th>Consider for</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBCs</td>
<td>N/A</td>
<td>MD discretion</td>
</tr>
<tr>
<td>FFP</td>
<td>INR &gt; 1.5</td>
<td>4 units FFP</td>
</tr>
<tr>
<td>Platelets</td>
<td>&lt; 100,000</td>
<td>One 5-pack Plts</td>
</tr>
<tr>
<td>Cryoprecipitate</td>
<td>Fibrinogen &lt; 100</td>
<td>Two 5-packs Cryo</td>
</tr>
</tbody>
</table>

Identify and Manage Bleeding
(Surgery, Angiographic Embolization, Endoscopy)

Adult: 4U RBCs in<4 hours and ongoing bleeding

Clinical Team Activates MTP & Designates Clinical Contact

Clinical Contact phones Blood Bank (BB) at 936-6888 and:
- Provides name of clinical contact person to Blood Bank (BB)
- Provides MR#, sex, name, location of patient
- Records name of BB contact, calls if location/contact information changes
- Sends person with patient name and MRN to pick up the cooler
- Ensures that MTP protocol electronic order is entered in CareLink

BB Prepares MTP Pack
MTP Pack: 5U RBCs; 5U FFP; One 5-pack Platelets or one apheresis platelet
This will result in an approximate 1:1:1 ratio

Hemostasis & resolution of coagulopathy?

Stop MTP
- Notify BB & return any unused blood ASAP
- Resume standard orders
- D/C MTP Electronic order

Clinical Contact calls BB at 6-6888 for another MTP pack
** MD can adjust pack based on labs PRN

Repeat Labs
- CBC, Platelets
- INR/PT, PTT
- Fibrinogen
- ABG (ionized Calcium, Potassium, Lactate, Hematocrit)

If persistent coagulopathy consider:
rFVIIa: .90 µg/kg dose

4 Factor PCC: Kcentra INR 2-4 25units/kg, INR>4-6, 35 units/kg, INR>6, 50 units/kg; repeat doing not recommended
Massive Transfusion Protocol (MTP) – Pediatric
< 50 KG

Appropriate Initial Interventions:
- Intravenous access – by weight (kg):
  - 1-5 kg: 22-24 gauge
  - 6-10 kg: 20-24 gauge
  - 11-25 kg: 18-22 gauge
  - 25-50 kg: 16-20 gauge

Admission weight (kg)
- Admission labs:
  - T&S, CBC, INR/PT, PTT, Fibrinogen, Electrolytes, BUN/Cr, ionized calcium, ABG, lactate
  - Continual monitoring of vital signs
  - Aggressive re-warming
  - Prevent / Reverse acidosis
  - Minimize crystalloid – avoid dilutional coagulopathy

Other considerations:
- Anticipate hypocalcemia with CaGluconate or CaCl
- 25units/kg, INR>4-6, 35 units/kg, INR>6, 50 units/kg; repeat doing not recommended
- Antifibrinolytic therapy:
  - Amicar 100 mg/kg bolus then 33.3 mg/kg/hour
- Cell salvage: Anes Tech via Mott OR Front Desk 76-32430

Additional help:
- Anesthesia: pager 1534
- Pediatric Surgical Fellow – pager via web or operator
- Rapid Response Team pager 90147 or call stat paging 141

General Guidelines for Lab-based Blood Component Replacement in Children with Massive Bleeding:

<table>
<thead>
<tr>
<th>Product</th>
<th>Consider For</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBCs (360 ml/unit)</td>
<td>N/A</td>
<td>30 ml/kg</td>
</tr>
<tr>
<td>FFP (250 ml/unit)</td>
<td>INR &gt; 1.5</td>
<td>20 ml/kg</td>
</tr>
<tr>
<td>Platelets (50 ml/bag)</td>
<td>&lt; 100,000</td>
<td>20 ml/kg</td>
</tr>
<tr>
<td>Cryoprecipitate (15 ml/unit)</td>
<td>Fibrinogen &lt; 100</td>
<td>0.2 units/kg</td>
</tr>
</tbody>
</table>

Identify and Manage Bleeding
(Surgery, Angiographic Embolization, Endoscopy)

≥ 30 mls/kg and ongoing uncontrolled bleeding

Clinical Team Activates MTP & Designates Clinical Contact

Clinical Contact phones Blood Bank (BB) at 936-6888 and:
- Provides name of clinical contact person to BB
- Provides MR#, sex, name, location and weight of patient
- Records name of BB contact, calls if location/contact information changes
- Sends person with patient name and MRN to pick up the cooler
- Ensures that MTP protocol electronic order is entered in CareLink

BB Prepares MTP Pack
MTP Pack: 5U RBCs; 5U FFP; 5 Random Platelets or one apheresis platelet
This will result is an approximate 1:1:1 ratio

Hemostasis & resolution of coagulopathy?

YES

Stop MTP
- Notify BB & return any unused blood ASAP
- Resume standard orders
- D/C MTP Electronic order

Repeat Labs
- CBC, Platelets
- INR/PT, PTT
- Fibrinogen
- ABG (Ionized Calcium, Potassium, Lactate, Hematocrit)

With Orange Card

NO

If persistent coagulopathy consider:
rFVIIa 90 µ/kg dose

Clinical Contact calls BB at 6-6888 for another Peds MTP pack
** MD can adjust pack based on labs PRN