Massive Transfusion Protocol

MY 4/2024

Our Lady of the Lake Children's Hospital

Massive Transfusion Protocol

- The Children's Hospital Massive Transfusion Protocol (MTP) is established to provide rapid blood replacement during severe hemorrhage.
- MTP can take place in the Emergency Room (ER), Operating Room (OR), or Pediatric Intensive Care Unit (PICU)
- The Children's Hospital MTP follows policy NBL-003, please reference.

ER INITIAL PROCESS

Need for MTP is identified by the provider, based on MTP Criteria

MTP Criteria:

1. Massive blood loss with shock:

- Adult

ABC Score of ≥ 2

- o Penetrating mechanism (yes = 1, no = 0)
- o ED SBP of 90 mmHg or less (yes = 1, no = 0)
- o ED HR of 120 bpm or greater (yes = 1, no = 0)
- o Positive FAST (yes = 1, no = 0)

- Pediatric

ABC Score ≥ 2 with clinical judgment and SBP and HR below:

Age	SBP	HR
< 12 mos	< 60	> 160
1-5 yrs	< 70	> 140
> 5 yrs	< 80	> 120

2. Continued active bleeding

ER INITIAL PROCESS

- Scribe RN will phone CSR, to report MTP activation
- CSR to Voalte Message the “CH Mass Transfusion” team. The message will include:
  - “MTP activation”
  - MRN/Trauma Name
  - Weight in kg
  - Gender
  - Ordering physician
  - Location blood to be delivered to
  - Unit phone number for ongoing communication
- CSR to call 5-3333 so PBX can call MTP alert overhead
- The Trauma RN will call the Blood Bank representative signed into the CH Mass Transfusion Team in Voalte. If no one is signed in, or Voalte is down – call Transfusion Services at 4-1371. If Voalte Downtime, call PBX for overhead page.

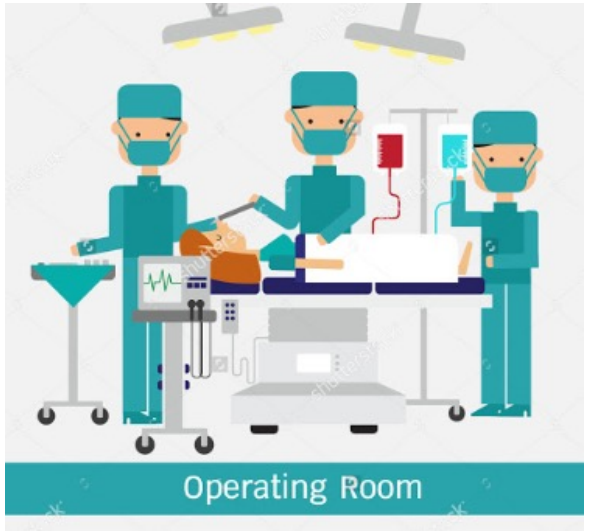
ER INITIAL PROCESS

- The scribe RN will order the MTP Protocol in EPIC
- One bedside RN will be designated as the MTP coordinator.
- MTP RN will ensure two large bore IV are established and collect stat type & match, CMP, CBC, and Coagulations Panel and send to lab, if not already completed.
- MTP RN will prepare Rapid Transfuser, including priming tubing.

OR INITIAL PROCESS

- Need for MTP identified by surgeon or anesthesia, based on identified MTP Criteria.
- Circulator RN to then use Voalte phone, access “CH Mass Transfusion Team”, call the Blood Bank representative (may be listed as “Med Tech”)
- Circulator RN to provide the following information to Blood Bank representative:

- “MTP activation”
- MRN/Trauma Name
- Weight in kg
- Gender
- Ordering physician
- Location blood to be delivered to
- Unit phone number for ongoing communication



- If no one is signed into the CH Mass Transfusion Team on Voalte, or if during Voalte downtime, call Transfusion Services at 4-1371.
- Circulator RN to contact PBX at 5-3333 to notify of MTP and provide location. PBX operator to alert overhead.

OR INITIAL PROCESS

- Anesthesia will order the MTP protocol in EPIC.
- While MTP is activated, anesthesia will ensure second large bore IV is established and collect stat type & match, CMP, CBC, and Coagulations Panel and send to lab, if not obtained already.
- Circulator RN will obtain or designate a team member to obtain the infusion device and needed supplies.
- Anesthesia or circulator/PACU RN will prepare Infusion device, including priming tubing.

PICU Initial Process

- Need for MTP identified by provider, based on identified MTP Criteria.

- RN to then use Voalte phone, access MTP team, call the Blood Bank representative (may be listed as “Med Tech”)

- RN to provide the following information to Blood Bank representative:

- “MTP activation”
- MRN/Trauma Name
- Weight in kg
- Gender
- Ordering physician
- Location blood to be delivered to
- Unit phone number for ongoing communication

- If no one is signed into the “CH Mass Transfusion Team” in Voalte, or if during Voalte downtime, call Transfusion Services at 4-1371.
- RN to contact PBX at 5-3333 to notify of MTP and provide location. PBX operator to alert overhead.

PICU Initial Process

- RN will order the MTP protocol in EPIC.
- While alert is activated, additional RN (MTP RN) will ensure second large bore IV is established and collect stat type & match, CMP, CBC, and Coagulations Panel and send to lab, if not obtained already.
- ER Charge nurse, or designee, will transport the Rapid Transfuser to the PICU.
- MTP RN will prepare Rapid Transfuser, including priming tubing.

Administration of Products (all units)

- RN to administer blood per protocol

  Patient ≤ 30kg, blood bank will deliver:

  – 2 units PRBC
  – 2 units of Thawed Plasma or FFP
  – 1/2 Platelet, Apheresis
  – **2 units Cryoprecipitate (Cryo) (**Not with First batch but send with all other batches)

***RN will administer in 10 mL/kg boluses to maintain 1:1:1 PRBC: FFP : platelets ratio. 1 unit of cryo per 10 kg of body weight will be administered with 2nd batch.**

For example: administer 1 unit PRBC, flush line, 1 unit Plasma, flush line, 1 unit PRBC, flush line, 1 unit Plasma. Platelets and cryo cannot be administered via the rapid infuser and may be given through a separate line.

Administration of Products

- Patient >30kg – 50kg
  - 4 units PRBC
  - 4 units of Thawed Plasma or FFP
  - 1 Platelet, Apheresis
  - **5 units Cryoprecipitate (Cryo) (**Not with First batch but send with all other batches)

- *RN will infuse at a 1:1:1 PRBC: FFP : platelets ratio. Cryo will be administered with 2nd batch.

- RN to maintain 1:1 PRBC:FFP ratio. For example: administer 1 unit PRBC, flush line, 1 unit Plasma, flush line, 1 unit PRBC, flush line, 1 unit Plasma, etc. Platelets and cryo cannot be administered via the rapid infuser and may be given through a separate line.

Administration of Products

- Patient > 50kg
  - 6 units PRBC
  - 6 units of Thawed Plasma or FFP
  - 20 units of Cryoprecipitate (Cryo)
  - 1 Platelet, Apheresis
- RN to maintain 1:1 PRBC:FFP ratio. For example: administer 1 unit PRBC, flush line, 1 unit Plasma, flush line, 1 unit PRBC, flush line, 1 unit Plasma, etc. Platelets and cryo cannot be administered via the level 1 infuser and may be given through a separate line.

Administration of Products

- If product type & matched, two RNs must sign off product and verify product while hanging.
- Pack red blood cells and plasma to be given via Rapid Infuser. Platelets and cryo CANNOT be given via Rapid Infuser. They can be given through additional line.
- The infusion rate for cryo is 1 to 2ml per minute but can be given faster in any emergent case. Blood admin filter tubing should be used (UpToDate, 2024).
- Monitor and avoid hypothermia. Administer blood products via blood warming device (level 1 infuser, Ranger, etc.)

Administration of Products

- Scribe RN to keep provider informed of thaw times throughout MTP.

PRODUCT	Thaw Time
Cryo	8 minutes
Plasma	16 minutes

TXA to be administered per provider order

- TXA can be found in the Trauma 1 pyxis under “Tranexamic Acid”

- Dosing:

Adult
- Dilute 1g TXA each in two 100cc bags 0.9% NaCl
- Loading dose: 1g TXA IVPB – administer immediately over 10 minutes
- Follow immediately with infusion 1 g TXA IVPB over 8 hours (12.5 ml/hr)

Pediatric
- Give 20mg/kg bolus over 10 minutes (maximum of 1000 mg) followed by same dose infused over 8 hours.
- If a dedicated IV for infusion is not available, give a repeat 20 mg/kg (maximum 1000 mg) bolus dose after 3 hours.
- if significant ongoing bleeding is observed, continue boluses every 8 hours, not to exceed 24 hours.

Clotting Factors

- Several studies in actively bleeding patients strongly suggest that efforts directed at reversing coagulopathy with factors are ineffective without first achieving adequate resuscitation (i.e. ineffective with temperature ≤ 35°C, inadequate tissue perfusion, and acidemia [pH ≤7.2])
- Contraindications: disseminated intravascular coagulation (DIC), heparin-induced thrombocytopenia (contains heparin), or hypersensitivity to any component of the formulation including human albumin

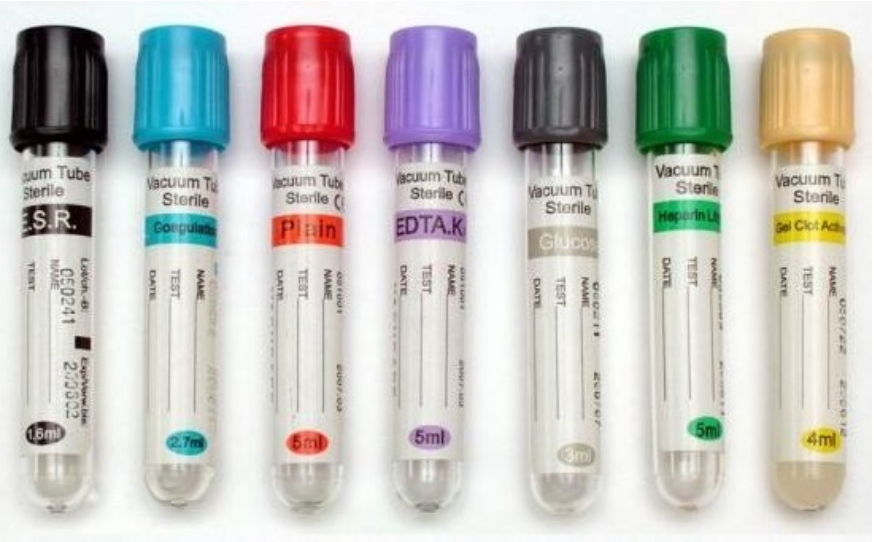
Calcium replacement

- Calcium replacement is recommended in pediatric patients. To be administered per provider order.

- Adult Dosing:
  - Administer calcium gluconate 1gm IV slow push over 10 minutes
  - Recommended to give 1 gm calcium gluconate for every 3 units FFP (i.e. Calcium Gluconate 2 gm per MTP batch)
- Pediatric Dosing:
  - Administer Calcium Gluconate 100 mg/kg (max 2000 mg)
  - IV slow push over 10 minutes.
  - Recommended to give calcium gluconate dose 100mg/kg (max 2000mg) with each MTP batch

Reassessment

- RN will ensure repeat labs are sent via ER tech or designated MTP runner after administration of each batch
- RN will ensure lab results are promptly communicated to provider



Changes in Status

- The RN will notify Blood Bank via Voalte when the patient changes location
- The RN will notify Blood Bank and PBX operator (at 5-3333) if patient expires or other need to terminate MTP.
- If MTP terminated, RN will ensure or delegate immediate return of all unused blood products to the blood bank. Task may be delegated to RN or tech.

Patient Transfers

- If patient transferred to OR or PICU during MTP activation, MTP RN to continue administration during transfer. The rapid infuser requires external battery pack to continue administration in transit. Battery pack to remain plugged in when not in use.

- Once patient arrives to unit, MTP RN will complete the infusing unit of blood. If patient is transferred to OR, the admitting RN/anesthesia will switch the patient to their infusion device. If patient is transferred to PICU from the ER, the same infusion device will be used. RN to complete SBAR handoff at bedside.

- When transferring patient to OR, ER staff can cross the “red line” during MTP. Circulator RN to meet ER team at “red line” during transfer.

- At time of transfer, scribe RN to assure bed requested and admit order has been placed. If patient is transported to the OR, scribe RN to also ensure that case is posted.

References

- Policy NBL-003 Massive Transfusion for Trauma Emergency Resuscitation
- UpToDate. (2024). Www.uptodate.com. https://www.uptodate.com/contents/cryoprecipitate-and-fibrinogenconcentrate