

[CorePendum: Thermal Burns](#)

[EM:RAP 2021 April CorePendum Spotlight: Thermal Burns](#)

Massive Hemorrhage Protocol (MHP)

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- Terminology is shifting from massive transfusion protocol (MTP) to massive hemorrhage protocol (MHP).
 - Patients need more than transfusion. MHP focuses on all of the measures required in hemorrhage control and treatment.
 - MHP includes simple concepts like keeping the patient warm and controlling hemorrhage, as well as complex principles like transfusion thresholds, ratios, and definitive hemorrhage control.
 - Principles apply to patients with trauma, gastrointestinal (GI) bleeding, ruptured ectopic pregnancies, ruptured AAA, and so on.
- Decision to activate MHP.
 - It is important to balance early aggressive administration of blood products, when necessary, with ensuring we are not wasting resources by overactivating.
 - Current scoring tools (eg, the ABC score) are created to predict the outcome of “who needs a massive transfusion” (defined as >10 units within 24 hours). This outcome is not as important as “what happens in the first 1, 2, or 4 hours.”
 - Revised Assessment of Bleeding + Transfusion (RABT) score.
 - Early evidence demonstrates superior performance to ABC score.
 - Components:
 - Penetrating injury
 - Positive FAST
 - Shock index >1.0
 - Pelvic fracture
 - A RABT score ≥ 2 predicts the need for massive transfusion.
 - The STAT Pack (see July Critical Care Mailbag).
 - Immediately administer 2 units of uncrossmatched packed red blood cells (PRBCs).

- After administration, reassess to see whether the patient has stabilized. If not, move forward with massive transfusion.
- If the patient stabilizes, stop there without administering fresh frozen plasma (FFP), platelets etc.
- Rule of 3: Once you've given 3 units of PRBCs, think ABC:
 - A: Activate MHP
 - B: Balance your products (aim for 1:1:1 or 2:1:1)
 - C: Consider giving calcium and concentrates (ie, fibrinogen)
- Tranexamic acid (TXA)
 - Administer TXA if systolic BP <90 mm Hg or HR >110 bpm in patients with trauma and suspected bleeding.
 - Early administration is important:
 - TXA is only beneficial if given within 3 hours of injury.
 - Survival benefit decreases by ~10% for every 15-minute delay.
 - Original protocol: 1 g bolus followed by 1 g over 8 hours.
 - Many trauma teams have moved to giving a 2 g bolus because the infusion over 8 hours ties up an IV.
- Keep patient warm
 - Small decreases in body temperature (anything <34°C) increase the need for transfusion.
 - Remove wet clothing and use a forced air warmer.
 - All blood products should be warmed as they are being transfused.
- Balance ratio of blood products
 - The optimal ratio is still under debate but most recommendations aim for 1:1:1 or 2:1:1.
 - By the time FFP arrives, the patient may have already received 2-4 units of PRBCs. This is okay and you can focus on “catching up” and balancing from this point forward.
 - The goal is to achieve balance by 1-3 hours.
 - Platelet administration:
 - Evidence is emerging that empiric platelet administration may be deleterious.
 - Moving toward “on-demand” platelet administration: If platelet count drops below 50 (or <100 if concomitant intracerebral hemorrhage), platelets are administered.

- Fibrinogen administration:
 - Current approach in US/Canada is that fibrinogen concentrate administration is driven by fibrinogen level (common trigger is level <1.5 g/L).
 - We are starting to see a move toward empiric fibrinogen administration, as levels are typically very low early in major hemorrhage.
 - Fibrinogen concentrate is superior to cryoprecipitate because cryoprecipitate has variable amounts of fibrinogen.
 - Fibrinogen concentrate dose = 4 g.
- Calcium administration:
 - Administer calcium (either 1 g CaCl₃ or 2-3 g calcium gluconate) after the third unit of PRBCs.
 - Repeat calcium dose for every 3-6 units of PRBCs given.
 - The risk of hypocalcemia is much worse than the risk of empiric administration.

References:

Tranexamic acid during prehospital transport in patients at risk for hemorrhage after injury: a double-blind, placebo-controlled, randomized clinical trial

Guyette FX, Brown JB, Zenati MS, et al. JAMA Surg 2020;156(1):11-20. doi: 10.1001/jama-surg.2020.4350. PMID: [33016996](https://pubmed.ncbi.nlm.nih.gov/33016996/)

[EM:RAP 2022 July Critical Care Mailbag: Critical Transfusions](#)

[CorePendium: Anemia and Transfusion](#)

MacGyver Hacks: Bugs and Enemas

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- The enhanced enema
 - The problem:
 - Sodium phosphate enemas are hyperosmotic agents. They work by drawing fluid into the bowel to soften stool, making it easier to move. To be effective, the enema has to be retained in the colon for a period of time.
 - Retention of the enema can be challenging, particularly in those with dementia or psychiatric disease and in those with learning disabilities. These patients are also likely to become constipated.