

## Notes on the Massive Transfusion Protocol (MTP)

When should you order the Blood Bank to institute MTP? There are many definitions of massive hemorrhage, but for our purposes, any of the following should trigger the MTP **if** there is ongoing blood loss and/or hemodynamic instability:

- Four PRBC units given over a short period of time (about 60 minutes)
- EBL at 40% of the estimated blood volume (about an EBL of  $\geq 2L$ )
- A sudden major blood loss (about 1L in 10 minutes)
- Note that blood bank will proactively trigger MTP based on transfusion orders

To prevent coagulopathy, older MTPs dictated transfusing the blood components of PRBCs, FFP, and pooled platelets at 1:1:1

One pooled platelet unit is about 60 ml. One apheresis platelet unit is about 300 ml. Since we now use single-donor apheresis units instead of multi-donor pooled units, the new transfusion ratio is 5:5:1, **5 PRBC, 5 FFP, 1 apheresis platelet**. This is what will be prepared by blood bank

If there are time constraints, in order of increasing wait time and decreasing risk:

1. O-Neg
2. Type-specific only
3. T&S only - Patient's serum checked for reactions with common antigens
4. T&C – Patient's serum checked for reactions with the actual donor erythrocytes

Labs to be checked q30-60 min:

- ABG, CBC, INR/PTT
- Fibrinogen
- Ca (or 1g can be given empirically for every 5 PRBCs)
- Lactate

Goals:

- Hb  $\geq 7$
- Platelets  $> 50$ . Generally, each 100 ml of platelets will increase count by 10K
- INR  $< 1.5$
- Fibrinogen  $> 150$ . Give 5-10 units of cryoprecipitate for low fibrinogen

Adjuncts

- If possible, limit crystalloids and albumin to avoid further dilutional coagulopathy
- Avoid excess NS to avoid contributing to metabolic acidosis
- It is better to give the FFP concurrently with the red cells, not after
- Consider permissive hypotension during poorly controlled bleeding if end-organ ischemia and traumatic brain injury are not factors
- TXA 1-2g
- As a last resort, consider recombinant Factor VIIa (NovoSeven RT) in younger patients without history of arterial disease or thrombosis

