

Indications

Requiring > 40 mL/kg (40% blood volume) or 4 u for adult / patient > 30 kg over 2 hours or less
Requiring or likely to require complete blood volume replacement or 10 u for adult in 24 hours

Age-specific blood volume:

Newborn – 1 month	90 mL/kg
1-12 months	85 mL/kg
1-14 years	80 mL/kg
> 14 years	75 mL/kg
Obese children	65 mL/kg

Pediatric protocol

MTP Pack 1	MTP Pack 2	MTP Pack 3	MTP Pack 4	MTP Pack 5
Children < 10 kg				
25 mL/kg PRBC, 20 mL/kg FFP, call for platelets for pack 2	25 mL/kg PRBC, 20 mL/kg FFP, 10 mL/kg platelets	25 mL/kg PRBC, 20 mL/kg FFP, 10 mL/kg platelets, 4 mL/kg cryo	25 mL/kg PRBC, 20 mL/kg FFP, 10 mL/kg platelets, 4 mL/kg cryo	25 mL/kg PRBC, 20 mL/kg FFP, 10 mL/kg platelets, 4 mL/kg cryo
Children 10-20 kg				
1u PRBC, 1u FFP (thaw FFP immed after PRBC issued), call for platelets for pack 2	1u PRBC, 1u FFP, 1 platelet pack	1u PRBC, 1u FFP, 1 platelet pack, 2.5u cryo	1u PRBC, 1u FFP, 1 platelet pack, 2.5u cryo	1u PRBC, 1u FFP, 1 platelet pack, 2.5u cryo
Children 20-49 kg				
2u PRBC, 2u FFP, call for platelets for pack 2	2u PRBC, 2u FFP, 1 platelet pack	2u PRBC, 2u FFP, 1 platelet pack, 5u cryo	2u PRBC, 2u FFP, 1 platelet pack, 5u cryo	2u PRBC, 2u FFP, 1 platelet pack, 5u cryo
Children > 50 kg				
4u PRBC, 4u FFP, call for platelets for pack 2	4u PRBC, 4u FFP, 1 platelet pack	4u PRBC, 4u FFP, 1 platelet pack, 10u cryo	4u PRBC, 4u FFP, 1 platelet pack, 10u cryo	4u PRBC, 4u FFP, 1 platelet pack, 10u cryo

References: <http://pediatrictraumasociety.org/multimedia/files/clinical-resources/MTP-2.pdf>
<http://pediatrictraumasociety.org/multimedia/files/clinical-resources/MTP-3.pdf>

Other medications

Calcium after every other MTP pack based on lab results

Calcium chloride 10-20 mg/kg IV (max 1 gm) central line preferred OR

Calcium gluconate 50-100 mg/kg IV (max 2 gm)

Tranexamic acid consider after 1st MTP pack, 20 mg/kg bolus over 10 minutes (max 1 gm)
followed by 20 mg/kg (max 1 gm) over 8 hours, not to exceed 24 hours

Recommended lab studies

Initial: Type & Cross, CBC (Hgb, plt), PT/PTT, Fibrinogen, ionized Ca, K+ (basic metab panel), pH

After first 80 mL/kg PRBC: repeat above + FDPs

After every 40 mL/kg PRBC from then on: repeat above + FDPs, lactate

Blood products

PRBC: 1 bag = 1 unit = 350 mL

FFP: 1 bag = 1 unit = 250 mL

Platelets: 1 bag = 1 pack = 5 units = 250 mL

Cryo: 1 bag = 5 units = 200 mL

Protocol at Harbor-UCLA for adults

Involve trauma surgery attending or chief resident in decision

Call Blood Bank and state that you are activating the MTP

Send a type and cross BEFORE starting transfusions

First MTP box ready within 10 min of phone call trigger: 6u PRBC, 4u thawed plasma (FFP)

Second MTP box ready within 30 min of initial phone call trigger

Successive boxes prepared and issued as needed q 30 minutes of prior box

Consider platelets, cryo (typically after 2nd box issued)

Cryo takes 30 min to thaw and pool – plan ahead and request

PRBCs type specific (preferred) or O negative or O positive for men, women > 55 years

Plasma (FFP) is Group A – incompatible with 14% of pts (B or AB), could cause some hemolysis

Return unused boxes to Blood Bank within 20 minutes if possible (so can return to inventory)

MTP automatically terminated 8 hours after initiation, or if you begin to order quantities less than amount in MTP box

Complications

Coagulopathy

Hypothermia

Hyperkalemia

Hypocalcemia

Transfusion reactions

Transfusion-related acute lung injury

Fluid overload