2023 Pediatric Massive Transfusion Guideline

Massive Transfusion: 40mL/kg in 24hrs. Any blood product

Start

Known or suspected massive bleeding with associated hemodynamic instability

YES

Initiate Massive Transfusion Protocol

YES

- Designate roles (including blood bank runner)
- Enter orders
- Communicate with blood bank

Initiate Prompt Transfer to PED1

While awaiting transfer continue resuscitation

ATLS recommendation

- Provide initial bolus followed by weight-based blood product resuscitation
- Place 2 large bore PIVs
- Minimize crystalloid in bleeding pediatric patient

Place Lab Orders

- Type and Screen
- CBC
- PT/INR
- **Fibrinogen
- BMP/ionized CA (iStat CG8+)
- Lactate
- HCG for female ≥ 12yo

Use whole blood if available
Weight < 20 kg

- 40 mL/kg, then move to component

Administration
Weight < 20 kg

1. #10 ml/kg platelets
2. 20 ml/kg PRBC's
3. 20 ml/kg FFP
4. 20 ml/kg PRBC's
5. 20 ml/kg FFP
6. 20 ml/kg PRBC's
7. Repeat

Use whole blood if available
Weight ≥ 20 kg

- 4 units, then move to component

Administration
Weight > 20 kg

1. #1 bag platelets
2. 1 bag PRBC's
3. 1 bag FFP
4. 1 bag PRBC's
5. 1 bag FFP
6. 1 bag PRBC's
7. Repeat

#Platelets may not be available at all hospitals.

- Important to provide PRBC's and FFP while waiting for PED1 transfer
- Run through separate line (not rapid infuser)
- 1 pack platelets= 6 units

Additions

Tranexamic Acid (TXA)

- 15mg/kg loading dose over 10 min
- Follow with 2mg/kg/hr. for 8hrs

Ca Gluconate

- Give at the end of each round
- 100 mg/kg over 10 min. (Max 2g per does)
- Central line recommended

****Cryprecipitate**

- Consider if fibrinogen < 250
- 50 mL/10kg

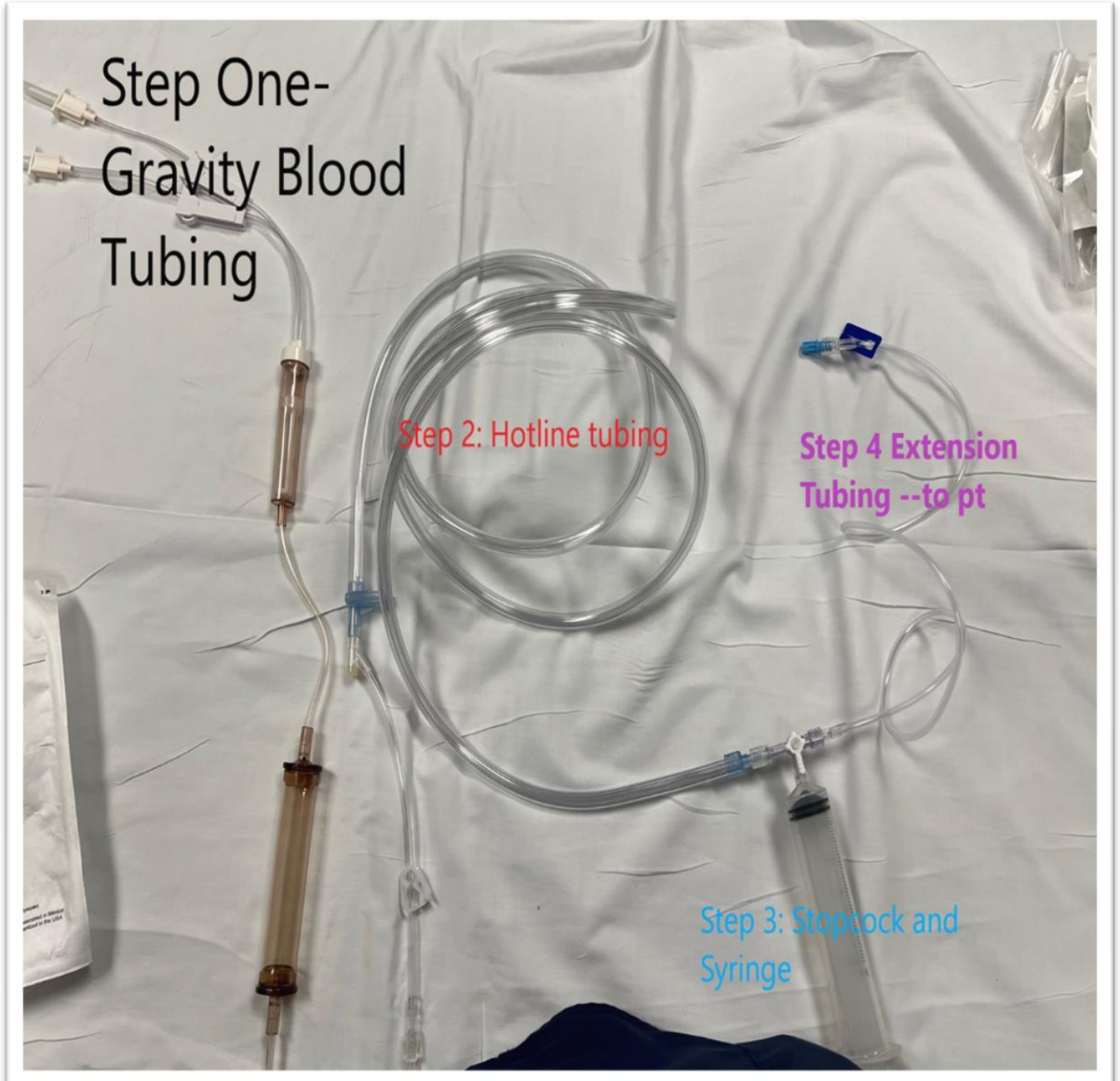
This algorithm does not replace clinical judgment and is not intended to be prescriptive for all patients.

Massive transfusion to remain active until cancelled by Attending Physician

UTAH PEDIATRIC TRAUMA NETWORK

Equipment Setup

Pt < 20 kg. Use Hotline



Equipment Setup

> 20 Kg. Belmont if available

MASSIVE TRANSFUSION Packs to repeat until termination of MTP

Ratio Goal 1:1:1

Be mindful of administration rate to prevent volume overload in children!

***DO NOT USE BLOOD WARMER FOR PLATELETS OR CRYOPRECIPITATE**

- **Neonates < 4 months should receive IRRADIATED PRBC whenever possible (Don't delay PED1 transfer).**
- **Blood products are generally delivered as full units and not in aliquots (syringes).**
- **When possible, patients should be transfused with type specific CROSSMATCHED blood (Don't delay PED1 transfer).**
- **Patients should be transfused with UNCROSSMATCHED blood if crossmatching will delay transfusion.**
- **PRBCs should be type O- for females with unknown blood type who are <55 years of age**
- **Thawed group AB (preferred) or A plasma should be issued ONLY if blood type is unknown, or for neonates < 4 months old.**

TABLE 10-5 NORMAL VITAL FUNCTIONS BY AGE GROUP

AGE GROUP	WEIGHT RANGE (in kg)	HEART RATE (beats/min)	BLOOD PRESSURE (mm Hg)	RESPIRATORY RATE (breaths/min)	URINARY OUTPUT (mL/kg/hr)
Infant 0–12 months	0–10	<160	>60	<60	2.0
Toddler 1–2 years	10–14	<150	>70	<40	1.5
Preschool 3–5 years	14–18	<140	>75	<35	1.0
School age 6–12 years	18–36	<120	>80	<30	1.0
Adolescent ≥13 years	36–70	<100	>90	<30	0.5

TABLE 10-4 SYSTEMIC RESPONSES TO BLOOD LOSS IN PEDIATRIC PATIENTS

SYSTEM	MILD BLOOD VOLUME LOSS (<30%)	MODERATE BLOOD VOLUME LOSS (30%–45%)	SEVERE BLOOD VOLUME LOSS (>45%)
Cardiovascular	Increased heart rate; weak, thready peripheral pulses; normal systolic blood pressure (80 – 90 + 2 × age in years); normal pulse pressure	Markedly increased heart rate; weak, thready central pulses; absent peripheral pulses; low normal systolic blood pressure (70 – 80 + 2 × age in years); narrowed pulse pressure	Tachycardia followed by bradycardia; very weak or absent central pulses; absent peripheral pulses; hypotension (<70 + 2 × age in years); narrowed pulse pressure (or undetectable diastolic blood pressure)
Central Nervous System	Anxious; irritable; confused	Lethargic; dulled response to pain[a]	Comatose
Skin	Cool, mottled; prolonged capillary refill	Cyanotic; markedly prolonged capillary refill	Pale and cold
Urine Output[b]	Low to very low	Minimal	None

[a]A child's dulled response to pain with moderate blood volume loss may indicate a decreased response to IV catheter insertion.
[b]Monitor urine output after initial decompression by urinary catheter. Low normal is 2 ml/kg/hr (infant), 1.5 ml/kg/hr (younger child), 1 ml/kg/hr (older child), and 0.5 ml/hg/hr (adolescent). IV contrast can falsely elevate urinary output.

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