Laboratory Guide to Massive Transfusion

Definition: Anticipated loss of 90% or more of a patient's total blood volume in 3 hours or less and/or anticipated need for more than 10 units of blood in a 24 hour period.

Early recognition **Prompt action** **Good Communication**

Objective	Main Points	Comments
Restore circulating volume	1. Insert wide-bore IV 2. Give adequate volumes of warmed crystalloid (+/- colloid) 3. Aim to maintain normal BP and urine output of >30 ml/hr	-14 G or larger -Monitor CVP -Blood loss often underestimated
Initiate massive transfusion protocol	1. Designate one person to communicate with Transfusion Lab. 2. Call Transfusion Lab to initiate massive transfusion protocol. 3. Confirm the availability of crossmatch specimen and estimated delivery time for blood, plasma and platelets. 4. Order crossmatch for 6 units of packed red cells. 5. Consider unmatched or group specific red cells. 6. Consider blood salvage if available and appropriate.	-Unmatched O Neg – 10 minutes -Unmatched ABO group specific – 15 minutes * -Fully crossmatched – 45 minutes* *Excluding collection and delivery time for crossmatch specimen. A stat crossmatch can be performed in 10 minutes if a pre-operative group and screen has been done and the patient does not have alloantibodies.
Transfusion Laboratory protocol activated	1. Notify Hematopathologist. 2. Notify Hematology lab to optimize turn around time of stat blood work. 3. Issue multiple units of red cells in the most expedient fashion possible. 4. Assess platelet stores and order enough to have 10 units available. 5. Thaw 2 units of FFP. 6. Issue up to 6 units of FFP and one adult dose of platelets without requirement for supporting lab data or pathologist approval. 7. Keep 6 units RBC crossmatched on hand.	-Transfusion lab staff empowered to issue blood components without waiting for lab data or pathologist approval.
Avoid hypothermia	1. Pre-warmed crystalloid 2. Rapid infusion blood warmer 3. Warm ambient room temp 4. Warming/reflective blankets 5. Warm saline for irrigation 6. Warmed & humidified anaesthetic gases	-Hypothermia impairs coagulation and platelet function. -Most under recognized cause of coagulopathy. -Common in massive transfusion. -Worse in thoracic / abdominal surgery. -Prophylactic FFP contributes to hypothermia. -Aim for temp > 35^{o}C.
Achieve hemostasis	1. Treat any surgical source of bleeding. 2. Correct coagulopathy with judicious use of blood components.	
Order lab tests	1. CBC, INR, PTT, CBC, Fibrinogen after 6 units packed cells. 2. Repeat as required to guide component therapy.	
Request platelets	1. Not always available on site. 2. Allow 1-2 hours for delivery from blood centre. 3. Expect count<50 with 2 x blood volume replacement.	-Target: >50 x 10*9/L (>100 is desirable for multiple or CNS trauma, however >75 is more realistic) -Initial adult dose=1 buffy coat or 1 apheresis unit (Child <20Kg: 10-15 mL/kg)
Request FFP	1. Consider after 6-10 units red cells or 1-2 x volume replacement. 2. Ideally based upon INR/PTT results. 3. Allow 30 minutes thawing time.	-Aim for PT and PTT <1.5 x mid normal -Dosage 10 – 15 ml/kg (4 units/70 kg)
Request cryoprecipitate	1. Primarily to replace fibrinogen if < 1.0 g/L. 2. Expect < 1 g/L with 1.5 x volume replacement. 3. If time permits, measure fibrinogen first. 4. Allow 30 minutes to thaw and pool.	-Dosage 1-1.5 units/10kg (10 units/70 kg) -Limited on site supply -For continued non-surgical bleeding despite plasma and platelet transfusion

References: LA County & UCLA Trauma Surgery and Critical Care Protocols
Stainsby, D.; MacLennan, S.; Hamilton, P.J. (2000). Management of massive blood loss: A template guideline. British J of Anaesth, 85(3): 487-91