

Transfusion Management of Massive Haemorrhage in Children

Signs of Hypovolaemic shock, Coagulopathy or Ongoing severe bleeding (overt / covert) and received 20ml/kg of red cells or 40ml/kg colloid/crystalloid in preceding hour

Ensure a Consultant (ED or Paediatric Anaesthetist) is called to take charge

Activate Massive Haemorrhage Pathway (MHP)

Call for extra help

Activate the trauma team – T&O, Gen Surg, Paediatric Specialty Trainees, Forewarn CT and Radiologist, Nurses and Healthcare

Phone ext 52630

“I wish to activate the paediatric massive haemorrhage protocol (MHP) for a patient of less than (or more than) 20kg”

Retrieve Emergency O Red Cells from the ED blood fridge

Continue resuscitation
Airway
Breathing
Circulation

Stop the Bleeding

Bloods to lab:

XM, FBC, PT, APTT, Fibrinogen, U+E, Ca²⁺, (A)BG

Give MHP 1

Administer up to:

Red cells 40 ml/kg
FFP 20 ml/kg
Platelets 10 ml/kg

Total volume will depend on: weight, rate of blood loss, clinical signs and response (Breslow tape)

Haemorrhage Control

Direct pressure (+/-tourniquet)
Stabilise fractures (+/- binder)
Surgical intervention
Interventional radiology
Endoscopic techniques

Aims for therapy

Hb 8-10g/dl
Platelets >75 x 10⁹/l
PT ratio < 1.5
APTT ratio <1.5
Fibrinogen >1g/l
Ionised Ca²⁺ >1.0 mmol/l
Temp > 36°C
pH > 7.35 (on ABG)
pH > 7.25 (capillary BG)
Monitor for hyperkalaemia

Reassess

Suspected continuing haemorrhage = further transfusion

Further bloods: FBC, PT, APTT, fibrinogen, U+E, Ca²⁺,(A)BG

Order then give MHP 2

Red cells 40 ml/kg
FFP 20 ml/kg
Platelets 10 ml/kg

Once MHP 2 administered, repeat bloods:

FBC, PT, APTT, fibrinogen, U+E, Ca²⁺ (A)BG
To inform further blood component requesting

Reminders:

Prevent Hypothermia

Use fluid warming device
Used forced air warming blanket

Continuous cardiac monitoring

Cryoprecipitate* (10ml/kg) if fibrinogen < 1g/l

Ca²⁺: Consider 0.2 ml/kg 10% Calcium Chloride (max 10ml) over 30 min

Stand down
Inform lab.
Return unused components.
Complete documentation

Weight	Red cells	FFP	Platelets	*Cryoprecipitate
<20kg	2 Adult units (500ml)	2 Paediatric units MB treated FFP (450ml)	1 Adult apheresis pack (200ml)	5 units (200ml)
>20kg	4 Adult units (1000ml)	4 Paediatric units MB treated FFP (900ml)	1 Adult apheresis pack (200ml)	10 units (400ml)

Dose examples: In a 5kg child, administer up to 200 mls RBC (40ml/kg) and 50mls platelets (10ml/kg). 30kg child - do not administer more than 4 adult units of RBC (33ml/kg) or 1 adult pack of platelets (6ml/kg)*Cryoprecipitate 10ml/kg MB treated, Group A; issued if Fibrinogen <1g/l

Without a known group, red cells will be group O RhD negative, FFP group AB,A or B, Platelets preferably group A. FFP and Cryoprecipitate are Gp A, Methylene Blue (MB) treated. Time to get: Red cells Gp Sp 15min, XM 45min: Platelets 15mins, FFP and Cryo MB 30mins

Tranexamic acid: preferably in first 3 hours of trauma: **Loading Dose** – 15mg/kg (max 1g) diluted in convenient volume of Sodium Chloride 0.9% given over 10 minutes. **Maintenance infusion** – 2mg/kg/hour. Suggested dilution 500mg in 500ml of sodium chloride 0.9% given at a rate of 2mls/kg/hour. For at least 8 hours or until bleeding stops. **Vitamin K and Prothrombin** for warfarinised patients: **Other haemostatic agents:**D/W Cons Haematologist

(A)BG:(Arterial) Blood Gas, APTT:Activated partial thromboplastin time, FFP:Fresh Frozen plasma, MHP:Massive Haemorrhage Protocol, NPT:Near patient Testing, PT:Prothrombin Time, XM:Crossmatch. **Thromboprophylaxis should be considered when patient stable V4 2013