Major Haemorrhage in children

Clinical suspicion of MH with signs of hypovolaemia

>80 ml/kg 24 hours >40 ml/kg in 3 hours >3 ml/kg/min

*Please see guideline for age/weight blood loss estimates

Get help

Contact senior member of clinical team. Contact senior ward nurses.
Contact portering services

Contact transfusion

Contact transfusion

Ask transfusion to **'Initiate children's major haemorrhage (C-MH) protocol'**
Give the weight, age and location of the child

Assess ABC

Stop overt bleeding where possible

Suspect 40% blood loss if significant source of bleeding suspected and clinical parameters as follows:

Age	Heart rate	Systolic BP
<1 year	>160	<70
1–2 years	>150	<80
3–5 years	>140	<80
6–12 years	>120	<90
>12 years	>100	<100
Tachypnoea or increased work of breathing		
Urine output <0.5ml/kg/hour		

IV access

2 cannula (largest possible)
Send blood samples – crossmatch, FBC, PT / APTT / Fibrinogen,
Biochemistry (U&E, LFT, ionised Ca, phosphate)
Arterial / venous blood gas measurement

In trauma or surgical bleeding check if **Tranexamic acid given. If not give ASAP.** Initial bolus 15mg/kg (max 1g) followed by maintenance infusion 2mg/kg over 8 hours

Resuscitate

IV fluids – crystalloid or colloid – 10–20ml/kg
Give oxygen

Therapeutic aims

Hb	>80g/L
Platelets	>75 x 10^9/L
Fibrinogen	>1.5g/L
APTT/PT	<1.5x midpoint of normal range
Ionised calcium (on ABG)	>1mmol/L
pH	>7.2
Lactate	<1mmol/L
Core temperature	>35°C

Give blood

Before transfusion
- Check patient ID
- Use wristbands
- Ask parent if present

Blood loss >40% blood volume (ie. >30ml/kg) is immediately life-threatening
Give 20ml/kg red cells (up to four units). Aim for Hb>80g/L
Give Group O D negative if immediate need
and/or blood group unknown

Blood transfusion lab will provide group specific/
crossmatched red cells as required

Prevent coagulopathy

Primary C-MH pack
- Blood 30ml/kg (up to 5 units)
- FFP 15-30ml/kg FFP (up to 4 units)

Aim for Trauma: RBC: FFP 1:1

Other Major Haemorrhage RBC: FFP 2:1

Give platelets if over 40mls/kg of red cells given

Anticipate need for platelets and FFP after 20–30ml/kg blood replacement and continuing bleeding
Give Primary Children's Major Haemorrhage (C-MH) Pack
Order Secondary Children's Major Haemorrhage (C-MH) Pack
(Secondary pack to be given if bleeding continues)
Correct hypothermia and use fluid warmer
Correct hypocalcaemia (keep ionised Ca>1 mmol/L)
Contact Haematologist

Secondary C-MH pack
- Blood 30ml/kg (up to 5 units)
- FFP 15-30ml/kg (up to 4 units)
- Platelets 15ml/kg (up to 1 unit)
- Cryoprecipitate 10ml/kg up to 2 pools (300ml)

Maintain stability

Reassess
- Re-assess ABC and clinical parameters regularly
- Document status

Repeat blood gas (including Hb,
ionised Ca, Na, K, glucose) every 30 minutes
Repeat FBC, coagulation after every 40ml/kg blood components given
Monitor HR, BP, capillary refill, saturation, temperature, urine output

Get more help to stop bleeding

Contact paediatric surgeons, paediatric gastroenterologists,
PICU, radiology as appropriate

Major Haemorrhage (C-MH) packs for children

Red cells	Use O RhD negative until group is known – then use ABO and RhD suitable Move to crossmatch compatible as soon as all investigations are complete Consider age of patient to inform component specification (eg. paediatric red cells) if time permits
Platelets	Use group A High Titre Negative (HTN) until group is known – then use ABO suitable (A HTN for AB patients) Use apheresis if possible and if time permits
Fresh frozen plasma	Use group AB or group A until group is known – then use ABO suitable **Order of preference:** 1. Non-UK methylene blue treated (MB-FFP) 2. Octaplas (SD-FFP) 3. Standard FFP
Cryoprecipitate	Use group A until group is known – then use ABO suitable (A for AB patients) **Order of preference:** 1. Non-UK methylene blue treated cryoprecipitate 2. Standard cryoprecipitate

For platelets, FFP and cryoprecipitate

Avoid Group O for non-O patients where possible

	Weight		
	< 10kg	< 10–40kg	> 40kg
Primary pack	2 x Red cells 2 x FFP (~400ml)	4 x Red cells 4 x FFP (~800ml)	5 x Red cells 4 x FFP
Secondary pack	2 x Red cells 2 x FFP (~400ml) 1 x Adult platelet dose 3 x MB Cryoprecipitate (~50ml) or 1 adult pool	4 x Red cells 4 x FFP (~800ml) 1 x Adult platelet dose 10 x MB Cryoprecipitate (~160ml) or 2 adult pools	5 x Red cells 4 x FFP 1 x Adult platelet dose 10 x MB Cryoprecipitate (~160ml) or 2 adult pools