

# 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

## 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

## Give blood

**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

### Therapeutic aims

Hb	>80g/L
Platelets	>75 x 10 <sup>9</sup> /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

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

### Before transfusion

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

### 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

## Prevent coagulopathy

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)

### Reassess

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

## Maintain stability

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

<b>Red cells</b>	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
<b>Platelets</b>	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
<b>Fresh frozen plasma</b>	Use group AB or group A until group is known – then use ABO suitable <b>Order of preference:</b> <ol style="list-style-type: none"> <li>1. Non-UK methylene blue treated (MB-FFP)</li> <li>2. Octaplas (SD-FFP)</li> <li>3. Standard FFP</li> </ol>
<b>Cryoprecipitate</b>	Use group A until group is known – then use ABO suitable (A for AB patients) <b>Order of preference:</b> <ol style="list-style-type: none"> <li>1. Non-UK methylene blue treated cryoprecipitate</li> <li>2. Standard cryoprecipitate</li> </ol>

## For platelets, FFP and cryoprecipitate

Avoid Group O for non-O patients where possible

	Weight		
	< 10kg	< 10–40kg	> 40kg
<b>Primary pack</b>	2 x Red cells 2 x FFP (~400ml)	4 x Red cells 4 x FFP (~800ml)	5 x Red cells 4 x FFP
<b>Secondary pack</b>	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