# 4.4 MANAGEMENT OF MASSIVE BLOOD LOSS IN TRAUMA

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B. BACKGROUND
C. EMERGENCY MANAGEMENT
D. LABELLING
E. MASSIVE BLOOD LOSS PROTOCOL IN TRAUMA

## A. DEFINITION

'Massive' blood loss is difficult to define. In the ED it is almost exclusively seen in the setting of major trauma and the following should be read in conjunction with section 4.4 'Major Trauma'

Losses may be difficult to quantify in the evolving acute situation. The normal total paediatric blood volume is 70-80mls/kg.

Classically massive blood loss is defined as loss of 50% of blood volume in 3hrs *or* 2-3ml/kg/min

Consider problems when loss of blood volume at 50%, **40mls/kg of resus fluid given in previous hour with ongoing severe bleeding +/- signs of hypovolaemic shock / coagulopathy. Use the clinical picture - shock is a clinical diagnosis.**

## B. BACKGROUND

The early recognition of massive blood loss and the steps taken to initiate an action plan can help avoid fatal consequences of hypovolaemic shock.

Successful management of cases of massive blood loss depend on good communication between medical, nursing and laboratory staff. It is essential that our response is consistent both in the clinical areas and blood bank.

This is to be used in conjunction with paediatric resuscitation guidelines and blood administration policies for the Trust. It is essential that the administration of blood and blood components follows the correct identification of patient and product outlined in the integrated care pathway (ICP). Wrong blood to the wrong patient is a particular risk in an emergency and final safety checks **must be done at all times.**

## C. EMERGENCY MANAGEMENT

See Massive Blood Loss Protocol (E) on the following page.

The flowchart suggests when intervention may be required and the volumes needed.

In cases of massive blood loss, the use of larger volumes of products in the early stages may be more beneficial but care must be taken with volume overload. Give all products as rapidly as possible (in boluses) when required.

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Communicate with blood bank as soon as possible. FFP/Octaplas takes time to defrost. This will be the actioned by blood bank staff if a 'massive blood loss' event is declared; this takes 20-30 minutes. Unlike other trusts there are not 'pre-defrosted' trauma packs as this would lead to significant waste. It can take up to one hour to get platelets if there are none in the trust. The standard platelet prescription is 10mls/kg. 20mls/kg of platelets are required after 50% blood loss and 40mls/kg if there is ongoing blood loss. Whilst in the Emergency Department blood transfusion is based on clinical findings, the following blood result triggers may help to guide prolonged care. The threshold for platelets is 75 in bleeding patients. The platelet threshold is 100 in those with high energy trauma, CNS injury or if platelet function is abnormal. Cryoprecipitate is required if the fibrinogen is <1.5.two units of cryoprecipitate provides 3.2-4g in a volume of 150-200mls. Normally cryoprecipitate is administered at 10mls/kg.

Treatment should be guided by laboratory results as early as possible and the advice of a senior haematologist sought. Where massive loss occurs treatment needs to proceed on clinical grounds.

**D. LABELLING**

YAS crews can contact the **Red Telephone** in the Emergency Department directly from the site of the incident or while on their way to SC (NHS) FT.

If the Ambulance crew notify us of an injured child who may need a blood transfusion, please request details of the child, if available. Inform the ED reception clerk to prepare ED notes with the PAS number to use for any investigations, even if the child's name and age are not known. This can help pre-prepare the request forms for blood bank samples. **Please note that the information on the blood sample bottles MUST be written by hand**. This should always include the

- hospital number
- patient's **full** name
- date of birth, if known.

Incomplete request forms and blood bottle labels for transfusion samples from the ED is a clinical risk. There is no substitute for taking time to do this correctly, even in the acute trauma scenario. **An absolute minimum required to be filled in on both bottle and form is a gender and a unique ID number (PAS, ED or NHS number).** If this is not done, blood bank will return the sample and not process the request.

There is a process for unknown patients. Use the patient details provided by the reception staff and add the gender of the patient to the sample.

In a major incident the stickers specifically designed for use in this situation can be used to label blood forms and samples.

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As part of a trauma call, if you feel it is likely you will need blood for an injured child, please contact the biomedical scientist on-call early to give him / her time to come from home and cross-match the blood.

There are always 3 units of Group O Negative available in the hospital blood bank. The hospital porters know where to find them, if urgently needed. Consider having O negative blood available before / shortly after the child arrives if massive haemorrhage likely. If the patient is male, O positive blood may be used to preserve O Negative stocks.

If a blood transfusion is required for any LIFE THREATENING situation, this is done under common law, in the best interest of the child. In this situation, consent from the child's family e.g. Jehovah's Witness, is NOT REQUIRED.

Children who are having blood transfusion must have wristband in place as this is necessary for administration checks.

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## E. PROTOCOL

GUIDELINES FOR THE MANAGEMENT OF NON-TRAUMA MASSIVE BLOOD LOSS

### TRANSFUSION MANAGEMENT OF MASSIVE BLOOD LOSS PATHWAY

**CALL FOR HELP**

Ward - cardiac arrest team via 2222 ED - trauma team via 2222
Theatres - intercom 'ALL HELP' **F70**
**STATE 'MASSIVE BLOOD LOSS'** and location
Team Leader / senior clinician activate Massive Blood Loss protocol

**RESUSCITATE: ABC**
Assess hypovolaemia - HR, BP, temp and saturations and give oxygen
**2 large IV cannula or IO access**
Send samples – cross match, FBC, clotting, U&E +/- ABG
(Bottles - 1 large pink, 1 small pink, 1 purple, 1 orange)
Patient must have a wristband.

**1 PERSON PHONE URGENTLY**
Blood Bank
Porters
On call Haematologist
Senior clinician in charge
State **MASSIVE BLOOD LOSS**

**STOP BLEEDING**
Apply pressure/pack/tourniquet.
Involve surgeons
Pelvic binder/manage fractures.

**PREVENT HYPOTHERMIA**
Warm fluids
Air warming blanket
Keep covered

**EMERGENCY O NEG RED CELLS**
3 units in BLOOD BANK fridge

**TRANEXAMIC ACID** IV/IO
15 mg/kg over 10 mins (max 1g) then 2 mg/kg/hr infusion for 8 hours or until bleeding controlled

**Theatres/Wards**
10 ml/kg WARM crystalloid +/- 10 ml/kg if O neg blood not yet available
**RBC 10 ml/kg**
**Octaplas 10 ml/kg (FFP)**

**ED/ Major Trauma**
DO NOT GIVE CRYSTALLOIDS
**RBC 10 ml/kg**
**Octaplas 10 ml/kg (FFP)**

**ONGOING LOSSES**

**2nd bolus of products**
RBCs 10 ml/kg & Octaplas 10 ml/kg
Platelets 10-20 mls/kg (up to 40mls/kg if ongoing losses)
Cryoprecipitate 10 ml/kg
(as directed by Cons Haematologist)

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|---|---|
| Blood Bank | 17478 |
| Haematology | 17221 |
| Cons Haematologist | Via switch |
| PCCU (Red phone) | 0114 2688191 |
| General porter | 528 / 529 |
| Theatre porter | 075 / 042 |

**Therapy Aims**
**ED** – systolic or age equivalent, palpable radial pulses, higher SBP if head injury predominates

Hb 80-100 g/L
Platelets >50 x $10^9$/L
APTT <1.5 upper limit of normal
pH >7.35(ABG) pH >7.25 (cap)
Fibrinogen >1g/L
Ionised $Ca^{2+}$ >1mmol/L
Temp > 36 °C
Monitor potassium

**AT THE POINT OF STAND DOWN** – Inform Blood Bank; return unused components

Consider
- DIC risk also increases with acidosis and shock
- **Low calcium / magnesium** – 0.14 ml/kg 14.7% calcium chloride (1mmol/l) **max 7ml**; magnesium sulphate 0.2mmol/kg **(max 2g)**
- Volume overload
- Recheck all blood and clotting parameters as soon after transfusion to guide further treatment
- Consider **cell salvage**
- Complete all **documentation**

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**References:**

1. SC(NHS)FT intranet for Transfusion related guidelines
2. Integrated Care Pathway for blood transfusion SCH(NHS)FT Leaflet 283
3. Guideline for Management of non-trauma massive blood loss CAEC 1451
4. Yorkshire and Humber Paediatric Major Trauma Guidelines

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