# Massive Haemorrhage - Full Clinical Guideline RDH site specific

Reference no.: CG-HAEM/2017/005

## 1. Summary

It is imperative to recognise major blood loss early and a successful outcome requires prompt action and good communication between clinical specialities, diagnostic laboratories, hospital transfusion laboratory staff and NHS Blood and Transplant (NHSBT).

Although there is limited evidence on best management of massive transfusion there is some evidence that the early transfusion of fresh frozen plasma (FFP) and platelets may lead to improved patient outcomes.

**For Massive Obstetric Haemorrhage follow specific guideline:** Postpartum Haemorrhage – Prevention and Management Full Clinical Guideline

**For Paediatric Massive Haemorrhage follow specific guideline:** https://derby.koha-ptfs.co.uk/cgi-bin/koha/opac-detail.pl?biblionumber=3053

## 2. Introduction

There is a spectrum of severity and presentation of major haemorrhage, which at one extreme is seen as acute major blood loss associated with haemodynamic instability and risk of shock, but also those in whom the bleeding appears controlled but still require 'massive' transfusion.

Massive blood loss can be defined as the loss of total blood volume within a 24hr period. Alternate definitions that may be more helpful in the acute situation include a 50% blood volume loss within 3hr or a rate of loss of 150 ml/min.

These are retrospective definitions, arguably arbitrary, and difficult to apply in the acute situation. The current trend is towards the use of a more anticipatory or dynamic definition for major haemorrhage, based on the clinical status of the patients, their physiology and response to resuscitation therapy, e.g., heart rate >110beats/min and/or systolic blood pressure < 90mmHg. It is important to emphasise that these physiological changes may be masked in some patient groups, e.g., the elderly or pregnancy, potentially delaying diagnosis.

## 3. Aim and Purpose

To offer guidance for all clinical staff managing patients during a massive haemorrhage episode at the Royal Derby Hospital.

## 4. Definitions

NHSBT – National Health Service Blood and Transplant
FFP – fresh frozen plasma
Cryo - cryoprecipitate
TRALI – transfusion related acute lung injury
ED – Emergency Department
FBC - Full Blood Count
ABG - Arterial Blood Gas
Ca2+ - Calcium

U+E - Urea & Electrolytes

## 5. Guideline

The clinician in charge has the responsibility of initiating a Massive Haemorrhage Alert and contacting Blood Bank (see Appendix 1). Baseline blood samples for an ABO group and antibody screen should be taken as early as possible, and ideally before the start of the first transfusion. Accurate patient and sample identification are fundamental to providing safe transfusion.

In addition, samples for baseline FBC, coagulation screen (including Fibrinogen), ABG, U+E, Ca2+ should be taken. Test sample using ROTEM if available.

1. Clinician in Charge declares a Massive Haemorrhage situation.
2. Designates named person to liaise with Blood Bank and a designated "runner" who collect blood components and delivers urgent samples to laboratory.
3. Nominated Clinician contacts Blood Bank and states: "Massive Haemorrhage Alert".
4. Give patient details (if ID available)
5. Provide location including contact number.

**Blood provision for massively bleeding patients:**

1. If no valid Group & Screen sample is available:
    a) 4 x Group O Emergency Red Cells (ready immediately)
    b) 3 x Group A FFP units (ready in 20-30 minutes)

2. After receipt of correctly labelled Group & Screen sample:
    a) Group O Red Cells & Group A FFP are provided until testing of second sample is completed.

3. Fully compatible (cross-matched) red cells can be available after 40 minutes (for patients with negative antibody screen). If the patient is eligible for Electronic Issue, then for subsequent orders red cells can be ready in 5 minutes.

4. 1 x Dose of suitable Platelets available when required.

5. 2 x Cryoprecipitate units if required (ready 20 minutes).

6. Concessionary release of blood

    Concessionary release of blood components or blood products is sometimes the necessary and appropriate course of action in the best interest of patients (bleeding patients with multiple antibodies, antigen negative blood not available, blood that will not meet patient's special requirements etc.). A concessionary release requires authorisation prior or as soon as practicable, preferably by a Haematologist who should discuss the possible consequences with the clinicians in charge of the patient.

**BLOOD COMPONENTS**

In acute bleeding consideration must be given to therapeutic platelets, fresh frozen plasma, and cryoprecipitate to allow prompt action; this is especially important for platelets (short shelf life and delivery time from NHSBT).
Early consultation with the hospital transfusion laboratory provides an opportunity for them to check blood stocks, reschedule non-urgent work and anticipate blood component requirements.

**Red cells**

Haematologically, the purpose of using RBCs is to maintain Hb at a level high enough to support adequate oxygen delivery to the tissues. Consideration should be given to blood being transfused through a warming device to minimise the development of hypothermia. Rapid infusion over 5–10 min may be required, which may be facilitated using appropriate infusion devices designed for the purpose. Once bleeding is controlled, there is no indication to restore Hb to physiological levels.

If available, cell salvage should be used to minimise allogenic blood use.

Emergency blood group O red cells should be used in absence of valid sample for crossmatch. Concessionary released red cells can be made available for patients with complex serology or special requirements if required (consult with haematology consultant on call and transfusion laboratory).

**Platelet Concentrates**

A measure of platelet count does not provide an assessment of platelet dysfunction seen in patients with shock and hypotension. Significant thrombocytopenia is considered a late event in major haemorrhage, typically seen after a loss of at least 1.5 blood volumes. As a pragmatic approach in cases of major bleeding, it is suggested that platelet transfusion should be given to maintain the platelet count at $>50\times10^9$ /l, although higher thresholds may be indicated in patients with intracranial/spinal bleeding, or in actively bleeding patients with falling platelet counts.

Consideration should be given to delivery times of platelets from the NHSBT if needed.

**Fresh Frozen Plasma**

Plasma provides a balanced source of all coagulant factors and volume expansion.

There is some evidence that early transfusion of FFP with Red cells reduces the risk of coagulopathy and can decrease mortality in massive bleeding.

Ensure enough is given- 15 - 20ml /kg weight (1 litre usually 3 units).

Fresh frozen plasma, once thawed, may be stored at 4ºC for up to 120 hours. FFP takes 20 minutes to thaw.

If major bleeding is on-going and results of standard coagulation tests or near-patient tests are not available, we suggest that units of FFP be transfused in at least a 1:2 ratio with units of RBCs.
If major bleeding is on-going, and laboratory results are available, we suggest further FFP be administered aiming to maintain the PT ratio at <1.5-times mean normal (or equivalent).
If ROTEM is used, follow the results to guide requirement for FFP transfusion (Appendix 1).

**Cryoprecipitate**

Hypofibrinogenemia is common in major haemorrhage. Cryoprecipitate should be given if fibrinogen concentrations fall below 1.5g/l (non-pregnant women) or if indicated by ROTEM results. An adult dose comprises of two units of pooled cryoprecipitate. Cryo is available on site but allow for 15-20 minutes thawing time.

It is essential that laboratory tests for coagulation (and/or ROTEM if available) are monitored frequently throughout the massive haemorrhage episode as a guide to the most appropriate blood component.

## RISKS OF MASSIVE TRANSFUSION

**Positive Patient ID not performed.**

The most frequently reported adverse event associated with blood transfusion is the giving of the wrong blood to the patient and this risk is particularly high in emergency situations. Strict adherence to Trust checking procedures at collection and administration must be maintained. Minimum patient details include unique ED number and gender checked against patient wrist band. All patients receiving a blood transfusion must wear a patient identification wristband containing the unique identifier.

**Atypical antibodies**

In a patient with known red cell antibodies or positive antibody screen, the risk of a haemolytic transfusion reaction will need to be assessed against the risk of withholding transfusion until compatible blood can be provided.

**TRALI**

Transfusion Related Acute Lung Injury (TRALI) and other immunologically mediated reactions are uncommon but occur 5-6 times more frequently following the administration of platelets and FFP than red cells.

## IMPORTANT POINTS TO REMEMBER

Maintain communication with the Transfusion Laboratory. Inform the Haematologist on duty of the situation if necessary.

Red cells can be returned to the Transfusion Laboratory or satellite blood fridge (RDH only) if no longer required. If placed in a satellite blood fridge they must be correctly signed

in on the paperwork provided. All other blood components (FFP, Cryo, Platelets) **MUST** be returned to the Transfusion Laboratory ASAP if no longer required.

Accurate documentation of blood components transfused is necessary to comply with the legal requirement for full traceability.

## 6. Communication

Summary guideline (Appendix 1) is available on the guidelines site (Koha):
https://derby.koha-ptfs.co.uk/cgi-bin/koha/opac-detail.pl?biblionumber=2162

## 7. References

- Haematological management of major haemorrhage BSH guideline 2022

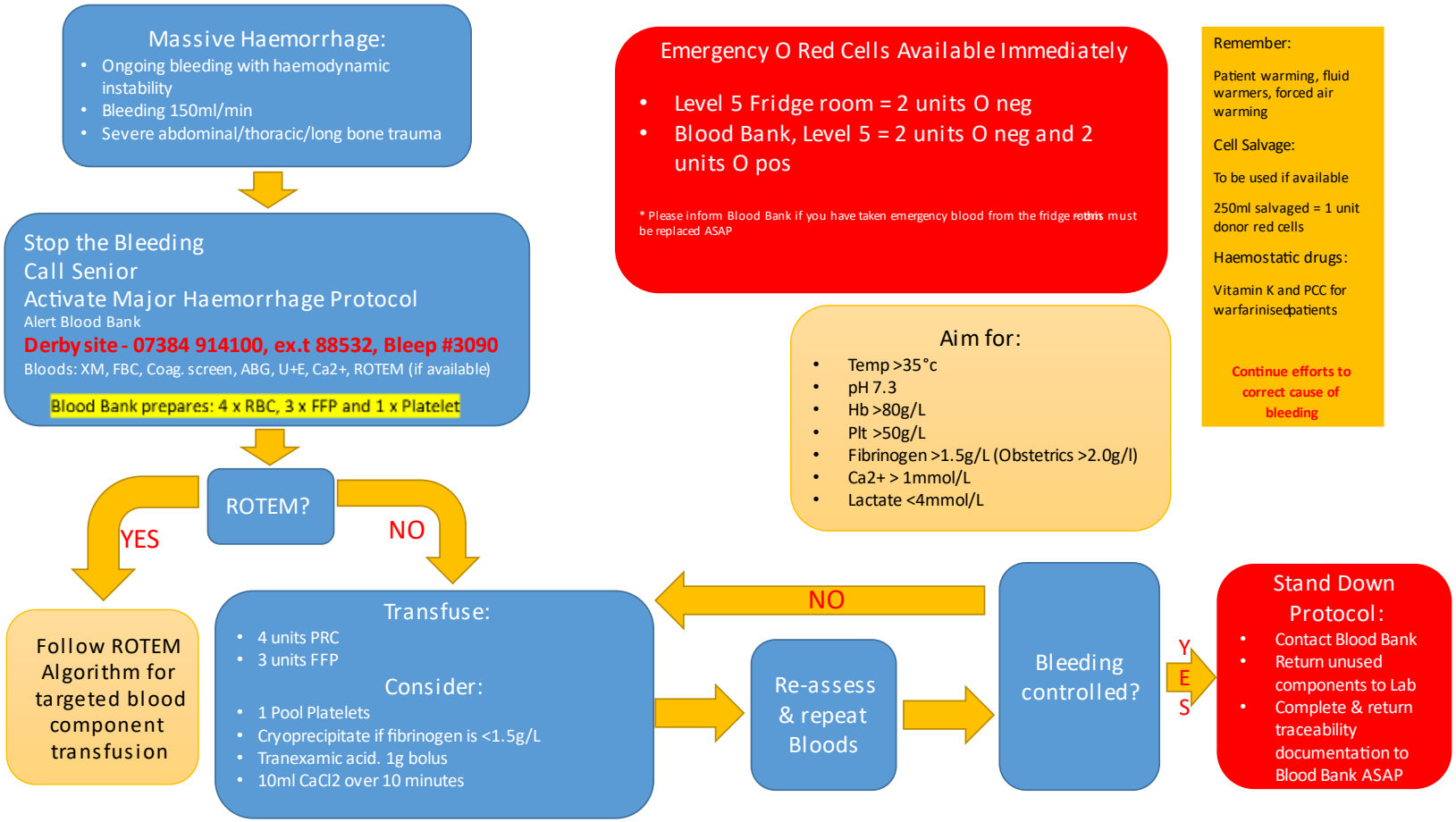
- TRUST POLICY FOR THE TRANSFUSION OF BLOOD AND BLOOD COMPONENTS (RDH specific)

## 8. Documentation Control

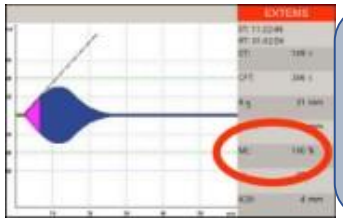
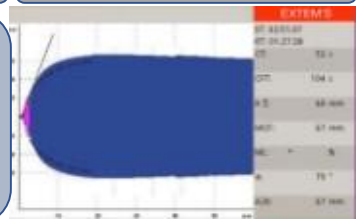
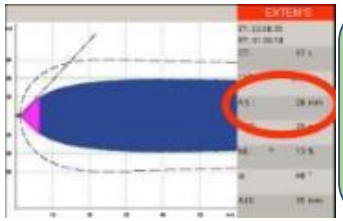
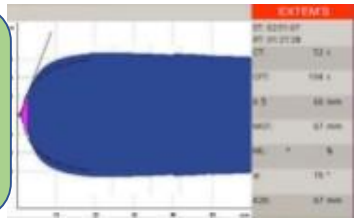
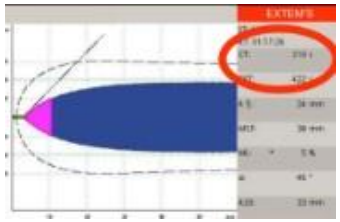
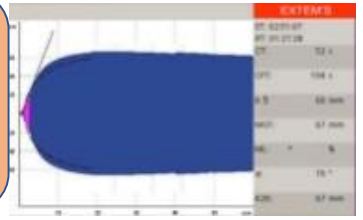
| | | | | |
|---|---|---|---|---|
| **Reference Number** CG-HAEM/2017/005 | **Version:** 3.0.0 | **Status** Final | **Author:** Heather Rankin **Job Title:** Transfusion Practitioner In consultation with Hospital Transfusion Committee | |
| **Version / Amendment History** | **Version** | **Date** | **Author** | **Reason** |
| | 2.0.0 | 16/07/2020 | K Kacinova – Transfusion Practitioner | Amendment following review |
| | 3.0.0 | 13/10/2023 | K Kacinova – Transfusion Practitioner | ROTEM added. New BSH guideline available |
| **Intended recipients:** All staff with responsibility for any step of the blood transfusion process at Royal Derby Hospital. | | | | |
| **Training and Dissemination:** Theory training is required by all staff involved all steps of the transfusion process. Competency assessment is required by staff involved with venepuncture for blood bank samples, collection, and administration of blood. Theory training is incorporated in Trust Induction and requires 3 yearly updates. Guideline is disseminated via KOHA on NETi. | | | | |
| **Linked documents:** Trust Policy for The Transfusion of Blood and Blood Components RDH specific | | | | |
| **Business unit sign off:** | **Approved by HTC 31.10.2023** | | | |
| **Divisional sign off:** | | | | |
| **EIRA Stage One Completed Yes / No**<br>**Stage Two Completed Yes / No** | | | | |
| **Date of approval:** | **Nov 2023** | | | |
| **Review Date and Frequency:** | **Nov 2026** | | | |
| **Contact for approval:** | **Transfusion Practitioner** | | | |
| **Lead Executive Director Signature:** | **Trustwide CGG** | | | |

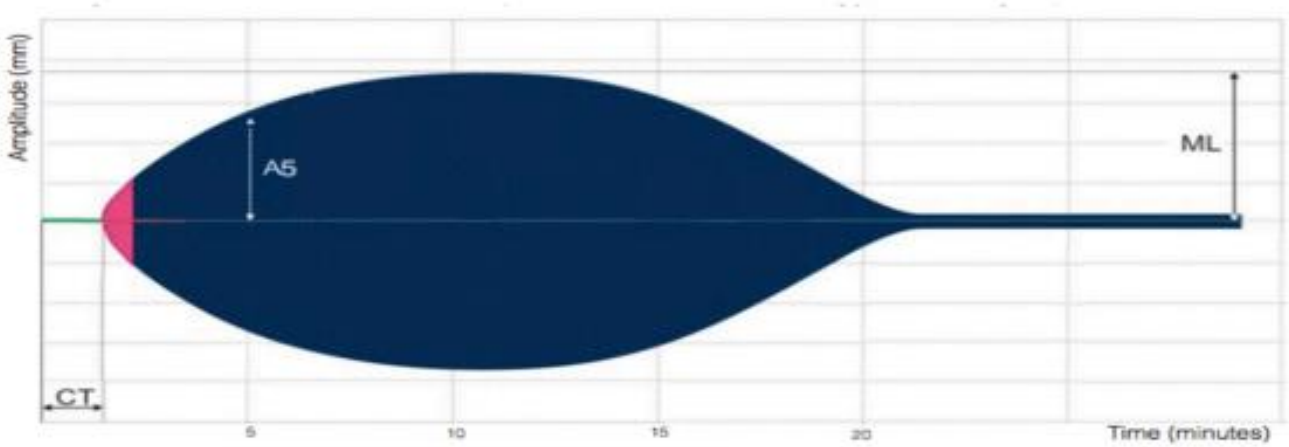
## 9. Appendices

Appendix 1. Massive Haemorrhage - Summary Clinical Guideline



Appendix 2 - ROTEM protocol

| Abnormality | Criteria | Diagnosis | Intervention | Corrected? |
|---|---|---|---|---|
| Fibrinolysis |  | Early Diagnosis:<br>**Extem A5≤35mm**<br>**Fibtem CT>600sec**<br>Late Diagnosis:<br>**Extem/Fibtem ML >5%** | Highly suggestive of excess fibrinolysis<br><br>Excessive fibrinolysis | **Tranexamic acid, 1g IV**<br>Considder repeating if ongoing blood loss of >1L following first dose |  |
| Fibrinogen |  | Fibtem <5mm | Low Fibrinogen | Cryoprecipitate |  |
| Plateletes |  | Extem A5<35mm and Fibtem >10mm<br><br>Extem A5<25mm and Fibtem <10mm | Low Platelets<br><br>Low platelets and low Fibrinogen | Give Platelets<br><br>Give Platelets and Fibrinogen |  |
| Factors |  | • **Extem CT 80-140 sec** Fibtem A5 <10mm<br>• **Extem CT>80 sec** but Fibtem A5 >10mm<br>• **Extem CT>140** and Fibtem A5 <10mm | • Low Fibrinogen<br>• Low Clotting Factors but normal Fibrinogen<br>• Low Fibrinogen and low Clotting factors | • Correct Fibrinogen<br>• Give FFP<br>• Give FFP +/- Cryoprecipitate |  |




| Fibrinogen Dosing Guide | | |
|---|---|---|
| **FIBTEM A5 Target: ≥ 12mm** | | |
| **FIBTEM A5 Cryoprecipitate*** | **Increase required** | **Cryoprecipitate*** |
| 9-10mm | 2-3mm | 2 units |
| 7-8mm | 4-5mm | 3 units |
| 4-6mm | 6-8mm | 4 units |
| <4mm | ≥9mm | 4-5 units |
| *Cryoprecipitate dosing is for standard adult units (Cryo 1 unit = Fibtem A5 increase of approx. 2mm) | | |