GG&C Major Haemorrhage Protocol
For Acute Hospitals only

(Excluding ACHs and Royal Hospital for Children)

Title:	GG&C Major Haemorrhage Protocol
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Contents

1. Introduction

1.1. Objective

- Allow rapid and appropriate transfusion response to major haemorrhage
- Open channel of communication between clinical area and blood bank
- Provide quick and effective delivery of blood components for patients with major haemorrhage.

1.2. Target Population

- Adult, including obstetric patients
- All GG&C Acute Hospitals
- Please note this MHP is for use in GG&C Acute Hospitals only.
- For ACH and Royal Hospital for Children's protocols please see GG&C Sharepoint.

1.3. Definition of massive bleeding

Subjective
Clinical concern that patient is experiencing bleeding problems requiring multiple transfusion support – clinician discretion.

Objective, for example

- blood loss > 150mL/min
- 20% blood volume loss in < 1hour
- 50% blood volume loss in < 3 hours
- 4 units RBC transfused in < 4 hours.
- Loss of 1 blood volume within a 24 hour period.

1.4. Trigger for Major Haemorrhage Protocol (MHP) activation

An experienced clinician determines that patient fulfils one of the above criteria.

1.5. Responsibilities

It is imperative that everyone involved in major haemorrhage is aware of their roles and responsibilities.

Clinical staff:

- Identify when Major haemorrhage protocol is required
- Be aware of local policy
- Trigger alert as per policy
- Identify a communication lead to communicate with Blood Bank

Blood Bank:

- Respond to alert immediately
- Contact the clinical area and ascertain patient details and requirements
- Inform clinical area if historical/ current sample is available
- Supply blood and blood components as required
- Inform clinical area when blood and/or components ready for collection or, in QEUH, when ready to be delivered or when available in fridge.

Switchboard:

- Trigger Major Haemorrhage page and supply Hospital, clinical area/ location and contact number.
  The switchboard alert will notify:
    - Adult emergency team
    - Anaesthetist may be contacted depending on site
    - Blood bank laboratory/ biomedical scientists or, in QEUH, the haematology lab page
    - Porter/ MLA depending on site
    - Haematologist on-call may be contacted depending on site.

Porters/ MLAs:

- Will attend clinical area for samples and/or the Blood Bank for collection of blood products as required; collect Emergency O negative units (or emergency O Pos at QEUH) from satellite fridge or blood bank as per local policy.

2. Activating Major Haemorrhage (MH) response

2.1. How to activate MH response

All sites: Phone **2222** and say "Major Haemorrhage"
State: hospital, clinical area, extension number

2.2. General response to MH

- Control bleed:
    - Local measures for haemorrhage control eg pressure, tourniquets, specialist dressings
    - Early surgical or obstetric intervention to control bleeding
    - Consider interventional radiology
    - Consider tranexamic acid (except in GI bleeds)
- Insert wide bore cannulae
- Controlled hypotension may be tolerated until red cells can be given
- Consider warmed crystalloid or colloid where hypotension not tolerated
- Avoid hypothermia - warm fluids. Use a fluid warmer
- Aim for urine output > 0.5 mL/ kg/ h
- Take appropriate blood tests (FBC/ Coagulation/ transfusion sample if req'd/ U+Es) and send urgently to appropriate Lab.
- Do not delay blood transfusion

Avoid DIC (disseminated intravascular coagulation):
As above,
Maintain blood pressure,
Treat/ prevent acidosis,
Treat/ prevent Hypothermia,
Check calcium,
Arrest bleeding,
Early use of blood components

2.2. Immediate blood tests

- FBC
- Emergency Crossmatch (which **must** be accompanied with request form which must be signed)
- A confirmatory Group & Save sample may be required
- Clotting screen (including Fibrinogen); Biochemistry (including Calcium); consider any other tests appropriate for management of patient.

  ROTEM/ TEG may be performed where available

2.2. Information required by Blood Bank

- Urgency of the situation
- **Patient details:**
- *Conscious patient* – Minimum Data Set i.e. Full name; DOB; CHI number (sometimes this will be TJ number), gender
- *Unconscious/ unidentified patient* – minimum of gender and TJ number (QEUH-factitious D.O.B 01/01/1901 & labelled Unknown/ unknown)
- Major haemorrhage location (Hospital and clinical location)
- Designated communication lead
- Contact number – need to establish clear lines of communication
- Establish product requirements
- Establish which samples & forms have been sent to the Blood Bank
- Patient diagnosis, location of patient and any likely transfers
- NB. QEUH require forms and collection cards for 'named' patient.

3. Blood component support

3.1. Blood Component Availability

Note: Factor in time for samples and/or form to reach labs and any blood or blood component to be delivered to clinical area.

Red Cells

- **Immediate requirement**: Use Group O RhD Negative blood (or Group O RhD Positive blood at QEUH - available for all adult males over 18y of age or females older than 50 years)
- There is a stock of Group O RhD Negative / and Group O RhD Positive blood in local Blood Banks or in designated blood fridges as listed in the GG&C Clinical Transfusion Policy which can be accessed via GG&C Sharepoint

From receipt of sample in lab:

- **15 - 20 minutes approx** – for group specific blood (or electronic issue if eligible) for previously grouped patients with a valid current sample (plus previous historical record as per confirmatory sample policy)
- **45 - 50 minutes approx** – for fully crossmatched blood

*Note times are approximate and apply if no antibodies present; where antibodies are present, the next best option will be provided to minimise delay.

Fresh Frozen Plasma (FFP)/ Cryoprecipitate (Cryo) – allow 20 minutes for thawing (plus delivery time)

QEUH - Pre-thawed FFP - available for immediate release and emergency labelled

Platelets - stock platelets should normally be available for immediate use, however, note that platelets may have to be ordered from SNBTS at Gartnavel Hospital and transport time would need to be factored in.

3.2. Severe Trauma

Where **severe trauma** and potential for **coagulopathy** (with signs of poor perfusion after initial fluid resuscitation and suspected active haemorrhage) and no results available:

If no crossmatched or group specific blood available, use emergency Group O RhD Negative/ (QEUH- Group O RhD Positive for males over 18y and females over 50y of age) as required.

Order Pack A – 6 RBC / 4 FFP in first instance. Platelets will be supplied by blood bank on request after discussion with Duty Haematologist (no discussion required at QEUH). Note that there may be no stock locally and transportation from SNBTS Gartnavel will be required. For obstetric major haemorrhage, cryoprecipitate can be issued on request without discussion with a haematologist.

Order Pack B – if bleeding persists, 4 RBC / 4 FFP / 1 unit Platelets / 2 pools Cryo will be supplied by Blood Bank on request. The BMS in Blood Bank will notify the Duty Haematologist on call (if not already involved) as soon as Pack B requested. Note, this should not delay the issue of Pack B.
Further component requests should be modified according to available blood results and discussion with Duty Haematologist.

Once results available, tailor blood product support to maintain:

Target	Trigger	Action
Hb 70 – 90 g/L (consider 80-90 in patients with cardiovascular disease)	Hb < 70 g/L (80 in patients with cardiovascular disease)	Transfuse RBC
PT & APPT normalise	If APTT/ PT ratio >1.5 x normal	Transfuse 4 units of FFP Aim to maintain a ratio of no greater than 2 units CRC to 1 unit FFP In severe trauma 1:1 ratio) where no coagulation results available to guide therapy
Fibrinogen ≥1.5g/L (> 2 g/L in obstetric haemorrhage)	If Fibrinogen < 1.5g/L (2 g/L in obstetric haemorrhage)	Transfuse 2 pools of Cryo
Platelets > 50 $x10^9$/L Consider requesting where platelets < 100 to allow time for delivery) **Where CNS bleeding suspected aim for platelets > 100**	Platelets < 50 $x 10^9$/L **In CNS bleeding < 100 x 10^9/L**	Transfuse 1 unit of Platelets (2 units if < 30)

QEUH – May be guided by ROTEM algorithm results, therefore following pack requirements may not apply.

3.3. Massive haemorrhage, but no immediate risk for coagulopathy (as determined in 3.1 above)

- Access nearest available Group O RhD Negative units (QEUH – Group O RhD Positive units for males >18y and females > 50y of age) if group specific blood not rapidly available.
- Liaise with blood bank via communication lead for ongoing blood component support.
- Anticipate need for treating coagulopathy if bleeding persists – need for Fresh Frozen Plasma (allow for defrosting time and delivery), platelets and possibly cryoprecipitate (allow for defrosting time and delivery).

Once results available, tailor blood product support to maintain:

Target	Trigger	Action
Hb 70 – 90 g/L (consider 80-90 in patients with cardiovascular disease)	Hb < 70 g/L (80 in patients with cardiovascular disease)	Transfuse RBC
PT & APPT normalise	If APTT/ PT ratio >1.5 x normal	Transfuse 4 units of FFP. Aim to maintain a ratio of no greater than 2 units CRC to 1 unit FFP In severe trauma 1:1 ratio)
Fibrinogen ≥1.5g/L (> 2g/L in obstetric haemorrhage)	If Fibrinogen < 1.5g/L (>2g/L in obstetric haemorrhage)	Transfuse 2 pools of Cryo
Platelets > 50 x10^9/L Consider requesting where platelets < 100 to allow time for delivery) **Where CNS bleeding suspected aim for platelets > 100**	Platelets < 50 x 10^9/L **In CNS bleeding < 100 x 10^9/L**	Transfuse 1 unit of Platelets (2 units if < 30)

3.4 Gartnavel General Hospital

- Major haemorrhages which occur during the Blood Bank operational hours of 9am- 8pm will be dealt with by the GGH Blood Bank. Outwith these hours any MH will be managed by staff at the GRI Blood Bank
- The MH policy for GGH is available on GG&C Sharepoint, North Glasgow MH information.

3.5 Stobhill Hospital

- All major haemorrhages are dealt with by the Blood bank at GRI. Link to further information.

3.6 Victoria ACH

- All major haemorrhages are dealt with by the Blood bank at QEUH. Link to further information.

3.7 Vale of Leven Hospital

- Outwith the Blood Bank operational hours of 9am - 5pm, there is availability of 2 Emergency O RhD Negative units in the Blood Fridge in the Theatre corridor which can be accessed by Portering staff or the hospital at night team.
- If a patient is bleeding or has the potential to bleed they will be transferred to another acute site. If blood products are required for the transfer, the Medical Retrieval Team will be contacted by Clinical staff, and this team will attend with Blood to support the transfer of the patient.

3.8 Additional interventions

- Cell salvage – should be used where appropriate, if local reliable availability
- Other pharmacological interventions using factor concentrates, anti-fibrinolytics (Tranexamic Acid) and fibrin sealants should be considered where appropriate. Tranexamic acid should not be used for GI bleeds except as part of a clinical trial
- Emergency Beriplex available at A&E or from labs for warfarin reversal
- Beriplex can be issued after consultation with the haematologist unless pre-authorised for a specific area e.g. A&E
- Novo 7 – although current EMEA recommendation is that Novo 7 is not for use outside licensed indication, consideration should be given to its use where treatment options are limited and patient is exsanguinating. Consultation with the haematologist is required before use and the decision to use will be taken by the clinician in charge. Further information on Novo 7 can also be found in policy on GG&C Sharepoint

3.9 Management of adverse complications

The following complications should be anticipated and managed appropriately in patients receiving multiple units of blood components.

Hypothermia – monitor temperature, keep patient warm and consider the use of a blood warmer.

Hyperkalaemia – monitor potassium, initiate local protocol for treatment of any hyperkalaemia (glucose + insulin + bicarbonate).

Acidosis – monitor patient closely, take corrective action.

Hypocalcaemia – monitor calcium levels – if ECG changes or clinical evidence of hypocalcaemia, give 10mls of 10% calcium chloride (for adults) IV, and if necessary repeated until ECG is normal.

3.10 Management of Warfarin (Vitamin K antagonist) reversal

Vitamin K antagonists e.g. Warfarin will require immediate reversal with Pro-thrombin complex concentrate e.g. Beriplex Four Factor Concentrate and Vitamin K in patients experiencing massive haemorrhage. Beriplex can be obtained from the laboratory or in A&E. Haematology advice should be sought immediately.
It may be necessary to discuss risks versus benefits of reversal. Information can also be found on GG&C Sharepoint or in Therapeutics Handbook.

DOACs (direct oral anticoagulants) are now being used for certain patients. Discussion should take place with a Haematologist regarding specific agents for reversal of these drugs. Advice on management of haemorrhage in patients on one of these drugs (Apixaban, Dabigatran, Rivaroxaban) can be found on GG&C Sharepoint or Therapeutics Handbook.

3.10 Patients with special requirements:

There should be no delay in provision of blood products to patients with special requirements. If specific requirements cannot be met, the laboratory will provide the next best option.

4 De-activation of Major Haemorrhage response

It is **Essential** that Blood Bank is informed whenever the clinical emergency has ended, to minimise wastage of blood components and allow lab staff to prioritise work. Any unused products should be returned to the fridge (if maintained within the cold chain) or the local Blood Bank. This is the responsibility of the clinical lead / communication lead.

Blood Bank must also be informed if the patient requires to be transferred to another hospital with blood or blood components to ensure blood products are transported in appropriately validated transport containers.

5 Audit

Activation of the major haemorrhage response should be audited by the local Hospital Transfusion Committee and fed back to GG&C Overarching Transfusion Committee, so that defects in the process can be identified, rectified, and lessons learned fed back to all staff involved in the major haemorrhage response.

AUDIT, REVISE AND RETRAIN AS INDICATED

6 Appendices

6.1 Flowchart

6.2 Audit Proforma

GG&C ACUTE HOSPITALS
MAJOR HAEMORRHAGE PROTOCOL

Take samples for:
- FBC
- Emergency Crossmatch confirmatory Group & save sample (if required)
- Clotting Screen
- Biochemistry

Send to lab by most appropriate route for emergency samples and forms.

NOTE: For crossmatch a request form must also be completed and sent to lab.

MAJOR HAEMORRHAGE
PHONE SWITCHBOARD: 2222
ADVISE "MAJOR HAEMORRHAGE"
STATE: HOSPITAL, WARD, EXT NUMBER
This will NOT alert RESUS or any other specialist team

CALL FOR ANY ADDITIONAL SUPPORT AND NOMINATE:
- **CLINICAL LEAD** – OVERALL CHARGE
- **COMMUNICATION LEAD** – HANDLE ALL CALLS
- **HAEMORRHAGE MONITOR**- KEEP TRACK OF COMPONENTS GIVEN + ESTIMATED LOSSES
- Duty Haematologist can be contacted via Switchboard

USE EMERGENCY O NEG BLOOD
QEUH - Emergency O POS units also available –
If NO matched/group specific blood available
Emergency Group O units are located in designated blood fridges and/or Blood Bank. You must inform Blood Bank immediately if you remove emergency units from local blood fridge. (Telephone numbers below right in pink box)

SWITCHBOARD CONTACTS:
- **Transfusion BMS** who will contact clinical area to establish requirements
- **Portering Service** who will respond as locally agreed e.g. collect samples or go to Blood Bank for blood

MAJOR HAEMORRHAGE WITH TRAUMA/OBSTETRIC
WITH EARLY RISK OF DIC
Consider TRANEXAMIC ACID

MAJOR HAEMORRHAGE WITHOUT TRAUMA
e.g.GI Bleed, Surgical, (Inc Ectopic Pregnancy)
WITHOUT EARLY RISK OF DIC

REQUEST PACK A
- 6 Units of Red Cells
- 4 FFP
- 1 Platelets (only if requested)
- In obstetric major haemorrhage, **cryo** may be issued without discussion with a Haematologist

ONGOING BLEEDING
Notify Blood Bank using local contact numbers in pink box on far right

ONGOING BLEEDING
Notify Blood Bank using local contact telephone numbers, see pink box below on far right, and Duty Haematologist.

REQUEST
- Required Number of Red Cells

Transfusion BMS (Biomedical Scientist)
If further components requested after Trauma Pack A, please notify Duty Haematologist
Note: This should not delay the first issue of Pack B

BLOOD BANK Contact telephone numbers

South
QEUH: 89104

North
GRI: 29603/29604
GGH: 57728/57729

Clyde
IRH: 04323
RAH: 06159
VOL: 87502

REQUEST PACK B
- 4 Red Cells
- 4 FFP
- 1 Platelets
- 2 Pools of Cryoprecipitate

BMS will notify Duty Haematologist (if not already done) as soon as Trauma pack B is requested. Further requests should be tailored to requirements as blood results become available.

MAINTAIN
Hb > 70g/L
Platelets > $50x10^9$/l
PT < 18s 1.5 x normal
APTT < 45s 1.5 x normal
Fibrinogen > 1.5g/l (2g/l for obstetrics)

IF BLEEDING CONTROLLED COMMUNICATION LEAD MUST NOTIFY BLOOD BANK TO "STAND DOWN" USING CONTACT TELEPHONE NUMBERS IN PINK BOX ABOVE RIGHT

6.2 Audit Proforma

GG&C Major Haemorrhage Audit Proforma

MH Details:	**Was this communicated clearly? Please record any issues**
Patient Name:	
CHI/TJ Number:	
Date Of Birth:	
Ward/Theatre Involved:	
Clinical Details/Urgency:	
Components Requested:	
Medical Officer:	
Contact Details:	
Was 2222 alert activated:	

Date/Time of Major Haemorrhage Alert	____/____/____ ____:____
Date/Time Sample Received In Lab:	____/____/____ ____:____
Date/Time first units of Red Cells ready for collection	____/____/____ ____:____
Date/Time first units of Red Cells collected from lab	____/____/____ ____:____
Were there any portering/collection issues? (If yes please record details) **Yes/No**	
Was MH 'stood down? (If yes please state date/time) **Yes/No**	____/____/____ ____:____
Was there any wastage of blood/blood components? (If yes please record details) **Yes/No**	
Please record any other issues with this MH alert?	
BMS Print Name: Signature:	

Learning Action Points:	
Action Points Complete: **Yes/Not Required** Learning Shared: **Yes/Not Required** Fed back to HTT/HTC: **Yes/Not Required** Fed back to OTC: **Yes/Not Required**	Date: ____/____/____ Sign:_____ Date: ____/____/____ Sign:_____ Date: ____/____/____ Sign:_____ Date: ____/____/____ Sign:_____

References:

Transfusion Handbook 5th Edition 2014; 7.3: Transfusion management of major haemorrhage;
http://www.transfusionguidelines.org.uk/transfusion-handbook/7-effective-transfusion-in-surgery-and-critical-care/7-3-transfusion-management-of-major-haemorrhage

Scottish Major Haemorrhage Top Ten Tips: SNBTC short life working group

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British Journal of Haematology 2013 160;1:35-46