



## Complete Summary

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### GUIDELINE TITLE

Guidelines on the management of massive blood loss.

### BIBLIOGRAPHIC SOURCE(S)

British Committee for Standards in Haematology, Stainsby D, MacLennan S, Thomas D, Isaac J, Hamilton PJ. Guidelines on the management of massive blood loss. Br J Haematol 2006 Dec;135(5):634-41. [47 references] [PubMed](#)

### GUIDELINE STATUS

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

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## SCOPE

### DISEASE/CONDITION(S)

Massive blood loss

### GUIDELINE CATEGORY

Evaluation  
Management  
Treatment

### CLINICAL SPECIALTY

Anesthesiology  
Cardiology  
Critical Care

Emergency Medicine  
Hematology  
Obstetrics and Gynecology  
Pediatrics  
Surgery

## **INTENDED USERS**

Clinical Laboratory Personnel  
Hospitals  
Physicians

## **GUIDELINE OBJECTIVE(S)**

To provide healthcare professionals with clear guidance on the management of massive blood loss

## **TARGET POPULATION**

Patients in the United Kingdom with massive blood loss

**Note:** Women with major obstetric haemorrhage are not included.

## **INTERVENTIONS AND PRACTICES CONSIDERED**

### **Evaluation**

1. Blood levels of hemoglobin, platelets, and erythrocytes
2. Hematocrit levels
3. Blood levels of calcium and potassium
4. Coagulopathy: prothrombin time (PT), activated partial thromboplastin time (APTT), D dimer measurement

### **Management**

1. Interdisciplinary transfusion committee
2. Interdepartment communications
3. Referral of care
4. Blood typing
5. Blood component processing
6. Risk assessment

### **Treatment**

1. Volume resuscitation (crystalloid versus colloid; albumin versus saline; prewarming)
2. Erythrocyte transfusion
3. Platelet transfusion
4. Fresh frozen plasma (FFP) and cryoprecipitate
5. Antifibrinolytics (tranexamic acid, aprotinin)
6. Recombinant factor VIIa

## MAJOR OUTCOMES CONSIDERED

- Incidence of transfusion side effects
- Mortality

## METHODOLOGY

### METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Preparation of the guidelines included a review of key literature, including Cochrane Database and MEDLINE and consultation with representatives of relevant specialties.

### NUMBER OF SOURCE DOCUMENTS

Not stated

### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

#### Classification of Evidence Levels

**Ia** Evidence obtained from meta-analysis of randomised controlled trials.

**Ib** Evidence obtained from at least one randomised controlled trial.

**IIa** Evidence obtained from at least one well-designed controlled study without randomisation.

**IIb** Evidence obtained from at least one other type of well-designed quasi-experimental study (refers to a situation in which implementation of an intervention is without the control of the investigators, but an opportunity exists to evaluate its effect).

**III** Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.

**IV** Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

### METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

Not stated

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus

## **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Recommendations are based on appraisal of the relevant literature and expert consensus.

The guideline group was selected to be representative of United Kingdom (UK)-based medical experts and included the authors of previous recommendations.

The writing group produced the draft guideline, which was subsequently revised by consensus by members of the Transfusion Task Force of the British Committee for Standards in Haematology.

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

### **Classification of Grades of Recommendations**

**Grade A** Requires at least one randomised controlled trial as part of a body of literature of overall good quality and consistency addressing specific recommendation. (*Evidence levels Ia, Ib*).

**Grade B** Requires the availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation. (*Evidence levels IIa, IIb, III*).

**Grade C** Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates an absence of directly applicable clinical studies of good quality. (*Evidence level IV*).

## **COST ANALYSIS**

A formal cost analysis was not performed and published cost analyses were not reviewed.

## **METHOD OF GUIDELINE VALIDATION**

External Peer Review  
Internal Peer Review

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

The guideline was reviewed by a sounding board of approximately 100 United Kingdom haematologists, the British Committee for Standards in Haematology (BCSH) and the British Society for Haematology Committee and comments incorporated where appropriate.

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

A summary of key recommendations is presented as a template that can be modified to suit local circumstances, and then displayed in clinical areas. The left-hand column outlines the key steps or goals, the centre column adds procedural detail and the right-hand column provides additional advice and information (Table below).

**Table I. Summary of Key Recommendations**

Goal	Procedure	Comments
Restore circulating volume	Insert wide bore peripheral or central cannulae	14 gauge
	Give pre-warmed crystalloid or colloid as needed	Monitor central venous pressure
	Avoid hypotension or urine output <0.5 ml/kg/h	Keep patient warm Concealed blood loss is often underestimated
Contact key personnel	Clinician in charge	A named senior person must take responsibility for communication and documentation.
	Consultant anaesthetist	
	Blood transfusion Biomedical Scientist	Arrange Intensive Care Unit bed
	Haematologist	
Arrest bleeding	Early surgical or obstetric intervention	
	Interventional radiology	
Request laboratory investigations	FBC, PT, APTT, Thrombin time, Fibrinogen (Clauss method); blood bank sample, biochemical profile, blood gases and pulse oximetry	Results may be affected by colloid infusion
	Ensure correct sample identification	Ensure correct patient identification
	Repeat tests after blood component infusion	May need to give components before results available

Goal	Procedure	Comments
Maintain Hb >8 g/dl	Assess degree of urgency	
	Employ blood salvage to minimise allogeneic blood use	Collection of spilt blood can be set up in <10 min
	Give red cells	
	Group O Rh D negative	
	In extreme emergency	D positive is acceptable if patient is male or postmenopausal female
	Until ABO and Rh D groups known	
	ABO group specific when blood group known	
	Fully compatible blood	Further serological crossmatch not required after 1 blood volume replacement
	Time permitting	
	Use blood warmer and/or rapid infusion device if flow rate >50 ml/kg/h in adult	Transfusion laboratory will complete crossmatch after issue
Maintain platelet count >75 x 10 <sup>9</sup> /l	Allow for delivery time from blood centre	Allows margin of safety to ensure platelet count >50 x 10 <sup>9</sup> /l
	Anticipate platelet count <50 x 10 <sup>9</sup> /l. after 2 x blood volume replacement	Keep platelet count >100 x 10 <sup>9</sup> /l if multiple or CNS trauma or if platelet function abnormal
Maintain PT & APTT <1.5 x mean control	Give FFP 12 to 15 ml/kg (1 l or four units for an adult) guided by tests	PT/APTT >1.5 x mean normal value correlates with increased microvascular bleeding
	Anticipate need for FFP after 1 to 1.5 x blood volume replacement	
	Allow for 30 min thawing time	Keep ionised Ca <sup>2+</sup> >1.13 mmol/l
Maintain Fibrinogen >1.0 g/l	If not corrected by FFP give cryoprecipitate (Two packs of pooled cryoprecipitate for an adult)	Cryoprecipitate rarely needed except in DIC
	Should be available on-site. Allow for 30 min thawing time	
Avoid DIC	Treat underlying cause (shock,	Although rare, mortality

Goal	Procedure	Comments
	hypothermia, acidosis)	is high

FBC, full blood count; PT, prothrombin time; APTT, activated partial thromboplastin time; FFP, fresh frozen plasma; DIC, disseminated intravascular coagulation

### CLINICAL ALGORITHM(S)

None provided

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Recommendations are based on appraisal of the relevant literature and expert consensus.

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

- Reduced requirements for allogeneic blood transfusion
- Reduced non-haemolytic febrile transfusion reactions, transmission of leucocyte-associated viruses (i.e., cytomegalovirus), and immunosuppressive effects of transfusion and reduced cytokine-mediated organ damage with leucodepletion
- Early recognition of major blood loss and institution of effective actions may prevent shock and its consequences.
- Maintenance of tissue perfusion and oxygenation by restoration of blood volume and hemoglobin
- Arrest of bleeding by treating any traumatic, surgical or obstetric source and judicious use of blood component therapy to correct coagulopathy
- Improved survival

### POTENTIAL HARMS

- Giving of the wrong blood to the patient, which can result in a fatal haemolytic reaction
- Fatal hemolytic reaction
- Transfusion-related acute lung injury and other acute immunologically mediated transfusion reactions (i.e., graft versus host disease)
- Hypocalcemia, causing reduced myocardial contractility, vasodilation, further bleeding, and shock
- Hyperkalemia, causing metabolic acidosis and shock
- Hypothermia
- Transmission of infection

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

- In all cases individual patient circumstances may dictate an alternative approach.
- While the advice and information in these guidelines is believed to be true and accurate at the time of going to press, neither the authors, the British Society for Haematology nor the publishers accept any legal responsibility for the content of these guidelines.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

#### Suggested Topics for Audit

1. Initial resuscitation with crystalloids should be preceded by blood sampling for full blood count, coagulation screen, biochemistry, blood gases and blood grouping.
2. Documentation (using a designated checklist sheet and identified member of the resuscitation team) should consist of a minimum dataset that must record: type of blood component or replacement fluid, time given, amount (dosage), indication for replacement, effectiveness of the transfusion. Full traceability of blood components given.
3. Local protocols and algorithms must be available and displayed in high-risk units e.g., Accident and emergency, Intensive care units, Theatre and blood banks.
4. Regular practices of emergency management of massive transfusion should be held and learning points documented to inform protocol development.
5. Regular retrospective audit of management of massive transfusions – review by Transfusion Team and Hospital Transfusion Committee against the guidelines with learning points documented to inform protocol review.

### IMPLEMENTATION TOOLS

Audit Criteria/Indicators  
Quick Reference Guides/Physician Guides

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better  
Living with Illness

## **IOM DOMAIN**

Effectiveness  
Safety

### **IDENTIFYING INFORMATION AND AVAILABILITY**

#### **BIBLIOGRAPHIC SOURCE(S)**

British Committee for Standards in Haematology, Stainsby D, MacLennan S, Thomas D, Isaac J, Hamilton PJ. Guidelines on the management of massive blood loss. Br J Haematol 2006 Dec;135(5):634-41. [47 references] [PubMed](#)

#### **ADAPTATION**

Not applicable: The guideline was not adapted from another source.

#### **DATE RELEASED**

2006 Dec

#### **GUIDELINE DEVELOPER(S)**

British Committee for Standards in Haematology - Professional Association

#### **GUIDELINE DEVELOPER COMMENT**

Not applicable

#### **SOURCE(S) OF FUNDING**

British Committee for Standards in Haematology

#### **GUIDELINE COMMITTEE**

Writing Group

#### **COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE**

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#### **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

None of the authors has declared a conflict of interest.

### **GUIDELINE STATUS**

This is the current release of the guideline.

### **GUIDELINE AVAILABILITY**

Electronic copies: Available from the [British Committee for Standards in Haematology Web site](#).

Print copies: Available from the British Committee for Standards in Haematology;  
Email: [bcsh@b-s-h.org.uk](mailto:bcsh@b-s-h.org.uk).

### **AVAILABILITY OF COMPANION DOCUMENTS**

None available

### **PATIENT RESOURCES**

None available

### **NGC STATUS**

This NGC summary was completed by ECRI Institute on May 27, 2008. The information was verified by the guideline developer on June 30, 2008.

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Date Modified: 9/15/2008

