

South Australian Perinatal Practice Guidelines

Massive blood transfusion

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Note

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with **consumers** in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

The Australian Red Cross Blood Service (ARCBS) national guideline on massive blood transfusion has been used with permission to inform this guideline

- > An organised approach with effective communication and the activation of the local Massive Transfusion Protocol or management plan for massive blood transfusion* will facilitate the rapid availability of blood products. This alerts the Transfusion Service, and enables the provision of blood products in a standardised manner
- > The different levels of service will have minor variations in the organisation of their local Massive Transfusion Protocol *. The basic principles, however, remain the same
- > Regular updating (through mock massive transfusion drills) is recommended

*For remainder of this guideline will be referred to as Massive Transfusion Protocol

Definition

- > Massive blood loss is usually defined as the loss of one blood volume (approximately 70 to 80 mL per kg body weight in pregnancy) within a 24 hours period. Alternative definitions include either 50 % blood volume loss within 3 hours or a rate of loss of 150 mL / minute

Causes of massive blood loss

Obstetric haemorrhage due to:

- > Early pregnancy e.g. ectopic pregnancy, cervical pregnancy
- > Antenatal and intrapartum conditions e.g. placental abruption, placenta praevia, coagulopathy secondary to amniotic fluid embolism
- > Postpartum e.g. uterine atonia, retained products of conception, genital tract laceration

ISBN number:
Endorsed by:
Last Revised:
Contact:

978-1-74243-307-3
South Australian Maternal & Neonatal Clinical Network
29/04/13
South Australian Perinatal Practice Guidelines workgroup at:
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Coincidental causes:

- > Ruptured splenic artery aneurysm, hepatic rupture or trauma

Activation

The trigger for activation of the Massive Transfusion Protocol* is any life-threatening haemorrhage. The criteria are varied and include:

- > Actual or anticipated requirement for 4 units of red cells in less than 4 hours
- > Actual or anticipated blood loss of 50% of blood volume in 3 hours
- > Clinical or laboratory evidence of coagulopathy or a clinical diagnosis associated with coagulopathy, e.g. suspected amniotic fluid embolism.
- > The Transfusion service can activate the Massive Transfusion Protocol* with a request for 4 or more emergency O negative red cells

Treatment priorities

Key elements of care in major obstetric haemorrhage include:

- > Prompt identification and treatment of the cause
- > Resuscitation and the administration of blood products
- > Collaboration between clinicians and laboratory staff to coordinate and optimise care, with escalation of care as required
- > An organisational massive transfusion protocol or management plan to facilitate communication and rapid and timely availability of blood components to optimise resuscitation where life-threatening haemorrhage has occurred
- > Proceeding to surgical measures as indicated
- > Prolonged oligoemic shock carries a high mortality rate because of organ failure and disseminated intravascular coagulation
- > Restore blood volume to maintain tissue perfusion and oxygenation
- > Hypothermia increases the risk of disseminated intravascular coagulation and other complications. This may be prevented by pre-warming resuscitation fluids, using warm air blankets, and temperature controlled blood warmers
- > Ongoing monitoring, reassessment and resuscitation
 - > Perform regular CBP, coagulation screen, ionised calcium and arterial blood gases

Aim for and maintain:

- > Temperature $>35^{\circ}\text{C}$ (pre-warm resuscitation fluids using temperature controlled blood warmers and use forced air warming blanket)
- > pH >7.2
- > Base excess < -6
- > Lactate $< 4 \text{ mmol / L}$
- > Ca $2+ >1.1 \text{ mmol / L}$
- > Platelets $> 50 \times 10^9 / \text{L}$
- > PT / APTT $<1.5 \times \text{normal}$
- > INR ≤ 1.5
- > Fibrinogen $>1.5 \text{ g / L}$

It is optimal to have a single person coordinating communication with the transfusion service, laboratory staff and the haematologist and / or MedSTAR

- > Phone the Transfusion Service and identify themselves (and how to be contacted) as the clinician making the notification
- > Provide the name, Unit Record (UR) number and location of the patient
- > Inform the Transfusion Scientist "Massive Transfusion Protocol* needs to be activated"
- > Arrange appropriate care post-event, e.g. care in HDU, adult ICU or inter-hospital transfer

Transfusion and laboratory services

- > Prepare massive transfusion packs as per the local protocol Massive Transfusion Pack regimen (or specific blood products issued from local Transfusion Service and/or designated regional service).
- > Contact the Duty Haematologist / MedSTAR
- > The Transfusion service will alert other site laboratories of the massive transfusion patient details to assist in prioritising pathology testing
- > Anticipate repeat testing and blood component requirements
- > Minimise test turnaround times
- > Consider staff resources

Haematologist / MedSTAR

- > Liaise regularly with laboratory, clinical team and Transfusion Service as required
- > Assist in interpretation of results, and advise on blood component support
- > Advise on recombinant Factor VIIa use

Request suitable red cells

- > In extreme emergency:
 - > Use uncross-matched group O Rh negative
 - > When blood group is known, use group specific blood
- > Use fully cross-matched blood when time permits
- > Use blood warmer and / or rapid infusion device
- > Further cross-match is not required after replacement of 1 blood volume (8 – 10 units)

Tranexamic acid

- > Tranexamic acid (TA) has been shown to improve survival in non-obstetric major trauma patients with or at risk of significant haemorrhage by reducing the risk of death from bleeding and all-cause mortality⁷
- > The 2009 WHO guidelines for the management of postpartum haemorrhage (PPH) and retained placenta⁸ recommend that tranexamic acid can be offered as a treatment for PPH if:
 1. Administration of oxytocin, followed by second line treatment options and prostaglandins has failed to stop the bleeding OR
 2. It is thought that the bleeding may be partly due to trauma
- > The World Maternity Anti fibrinolytic (WOMAN) trial is a large multicentre trial currently investigating the safety and efficiency of TA use in postpartum haemorrhage
- > Lower level research in obstetrics shows :
 - > Prophylactic use of TA reduces mean blood loss post vaginal and caesarean birth⁹
 - > High dose TA can reduce blood loss and maternal morbidity in ongoing PPH¹⁰
- > Until further evidence is available, the use of TA should follow the WHO guidelines, in consultation with a Haematologist or, when a retrieval is being arranged, in consultation with the MedSTAR retrieval service

Dosage⁷:

- > Loading dose: IV Tranexamic acid 1 g in 100 mL of 0.9% sodium chloride over 10 minutes (i.e. 600 mL / hr)
- > Maintenance dose: IV Tranexamic acid 1 g in 100 mL of 0.9% sodium chloride over 8 hours (at 12.5 mL / hr)

Recombinant FVIIa

- > Recombinant factor VIIa (FVIIa) has been used in the management of intractable microvascular bleeding after trauma or surgery, that has not been controlled by conventional transfusion replacement treatment using red cells, platelets, fresh frozen plasma and cryoprecipitate
- > The use of FVIIa may be considered when the woman's condition continues to deteriorate to imminent haemorrhagic death. Such use must be discussed by the consultant surgeon / obstetrician or trauma specialists, ICU consultant or anaesthetist involved with the laboratory haematologist and / or transfusion medical scientist
- > The current recommended dose is 90 micrograms / kg

References

3. Australian Red Cross Blood Service (ARCBS). Massive transfusion guidelines. Available at URL: <http://www.manual.transfusion.com.au/Transfusion-Clinical-Practice/Disease-Therapeutics/Massive-Transfusion.aspx>
4. McClelland DBL editor. Handbook of transfusion medicine. 3rd ed. London: The Stationery; 2001.
5. Scottish Obstetric Guidelines and Audit Project (SOGAP). The Management of Postpartum Haemorrhage – A clinical practice guideline for professionals involved in maternity care in Scotland. Pilot edition. SPCERH publication number 6; 1998.
6. National Blood Authority Critical Bleeding Massive Transfusion Protocol. Patient blood management guidelines: Module 1. Commonwealth of Australia; 2011. Available from URL: <http://www.nba.gov.au/guidelines/module1/index.html>
7. Shakur H, Roberts I, Bautista R. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial. *Lancet* 2010;376:23-32.
8. Women's Health Organisation. WHO guidelines for the management of postpartum haemorrhage (PPH) and retained placenta. 2009.
9. Novikova N, Hofmeyr GJ. Tranexamic acid for preventing postpartum haemorrhage. *Cochrane Database of Systematic Reviews* 2010, Issue 7. Art. No.: CD007872. DOI: 10.1002/14651858.CD007872.pub2. Available from URL: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD007872.pub2/pdf/standard>
10. Ducloy-Bouthers A, Jude B, Duhamel A, Broisin F, Huissoud C, Keita-Meyer H, et al. High-dose tranexamic acid reduces blood loss in postpartum haemorrhage. *Critical Care* 2011;15:R117.

Other useful sites

Australian Red Cross Blood Service. Available from URL: <http://www.transfusion.com.au/>

National Health and Medical Research Council. Available from URL: <http://www.nhmrc.gov.au>

Australian and New Zealand Society of blood transfusion. Available from URL: <http://www.anzsbt.org.au>

National Blood Authority. Patient blood management guidelines: Module 1. Critical bleeding / Massive transfusion. Available from URL: <http://www.nba.gov.au/guidelines/module1/index.html>

Abbreviations

APTT	activated partial thromboplastin time
CBP	Complete blood picture
FVIIa	Factor 7 a
FFP	Fresh frozen plasma
g	Gram(s)
INR	international normalised ratio
ICU	Intensive care unit
kg	Kilogram(s)
L	Litre(s)
LFT	Liver function test
mg	Milligram(s)
mL	Millilitre(s)
%	Percent
Rh	Rhesus
TA	Tranexamic acid
U & Es	Urea and electrolytes

Version control and change history

PDS reference: OCE use only

Version	Date from	Date to	Amendment
1.0	07 June 04	01 Sept 08	Original version
2.0	01 Sept 08	17 Jan 12	Review
3.0	17 Jan 12	20 Feb 12	Review
4.0	20 Feb 02	06 Aug 12	Review
5.0	06 Aug 12	29 Apr 13	Review
6.0	29 Apr 13	Current	

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