Management of Major Obstetric Haemorrhage

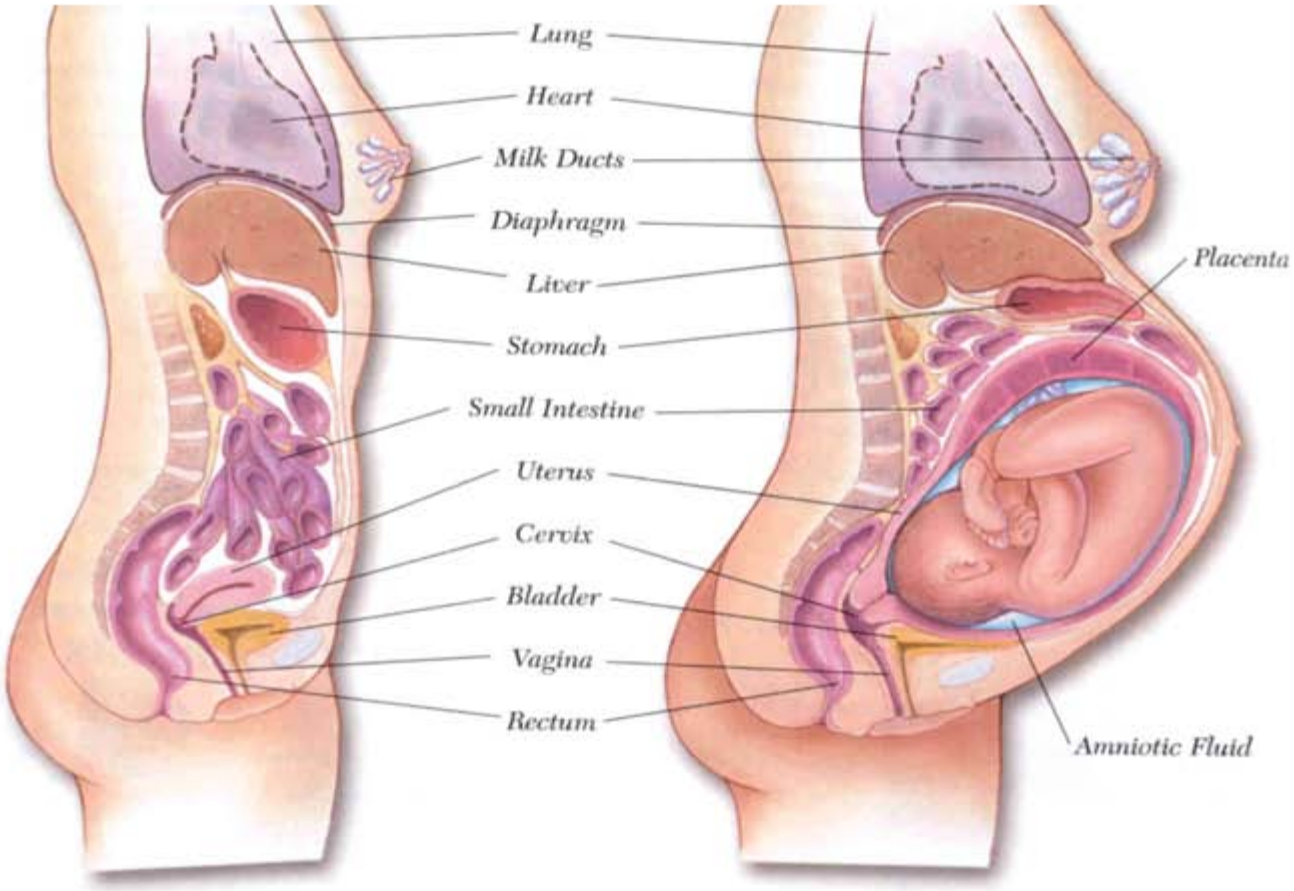
Dr Issie Gardner

St Michael's Hospital
Bristol

January 2015

University Hospitals Bristol NHS
NHS Foundation Trust

Fast and Furious



Life threatening haemorrhage

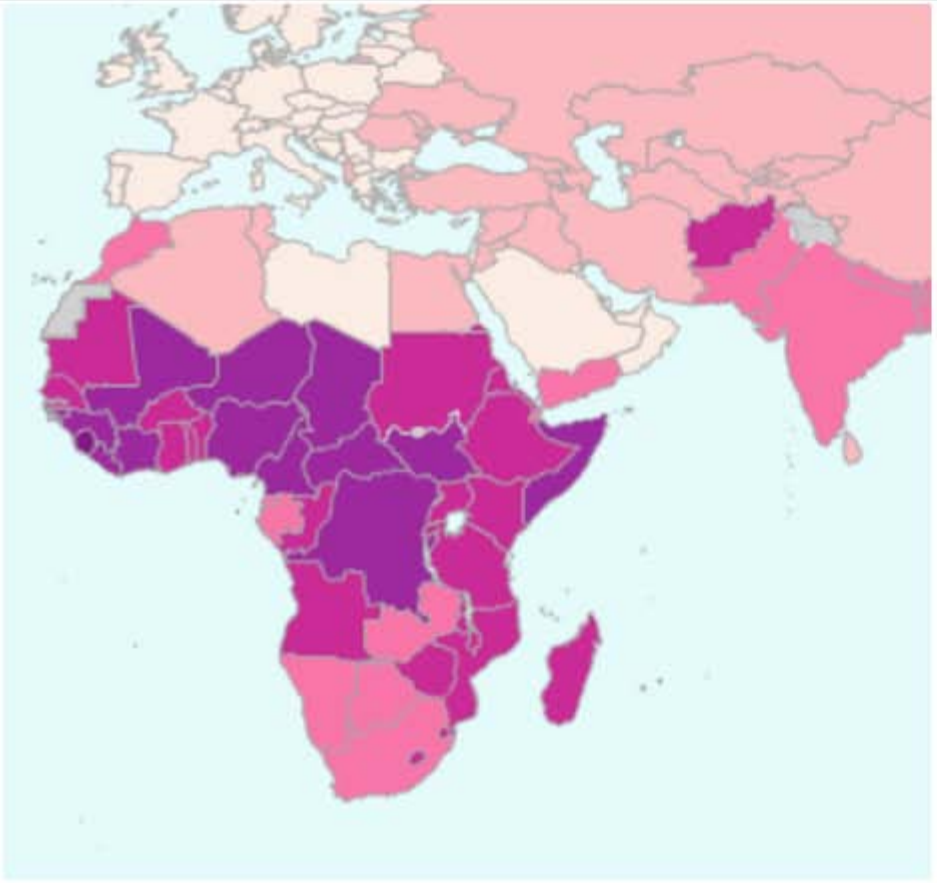
Table 4.2 Estimated blood volumes and proportionate losses according to body weight

Weight	Total blood volume*	15% blood volume loss	30% blood volume loss	40% blood volume loss
50kg	5000mls	750mls	1500mls	2000mls
55kg	5500mls	825mls	1650mls	2200mls
60kg	6000mls	900mls	1800mls	2400mls
65kg	6500mls	975mls	1950mls	2600mls
70kg	7000mls	1050mls	2100mls	2800mls

*Based on 100mls/kg blood volume in pregnancy (Royal College of Obstetricians and Gynaecologists 2011b) but may overestimate blood volume in obese women (Lemmens, Bernstein et al. 2006)

Maternal Mortality Rate 2013

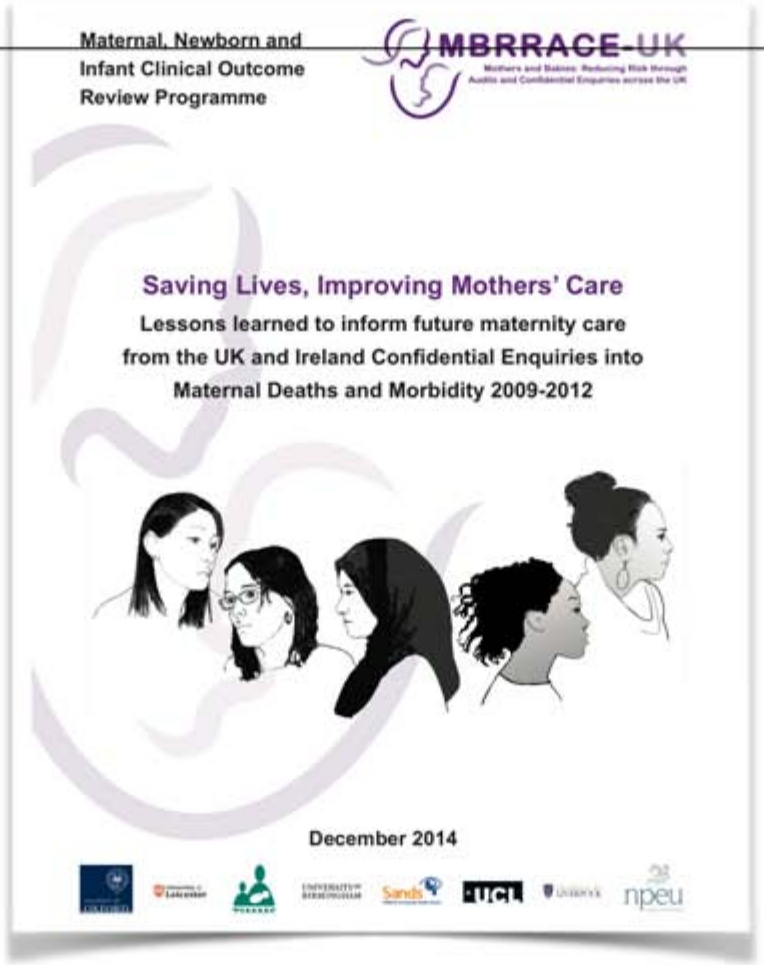
(per 100000 live births)



- <20
- 20–99
- 100–299
- 300–549
- 550–999
- ≥1000

World Health Organization

Causes Maternal Death UK



Haemorrhage deaths

Table 4.1 Direct deaths by type of obstetric haemorrhage 1994–2012

Time period	Placental Abruption	Placenta praevia	Postpartum haemorrhage		Total deaths from haemorrhage
			Atony	Genital Tract Trauma	
1994–06	4	3	5	5	17
1997–99	3	3	1	2	9
2000–02	3	4	10	1	18
2003–05	2	3	9	3	17
2006–08	2	2	3 +2	(0/2)	9
2009–12†	2	1*	7**	7***	17

17 direct maternal deaths haemorrhage 3rd leading cause

An anaemic woman had a caesarean section after a very prolonged labour. She was of small stature and lost almost 1000mls at surgery. No blood was ordered. Three hours later when she then bled 2500mls vaginally from an atonic uterus she was initially resuscitated with fluids, receiving 8 litres of crystalloid and 2 litres of colloid before blood was available for her. She developed pulmonary oedema and was intubated ventilated and transferred to ITU where she died from ARDS, sepsis and multi-organ failure a month later.

MBRRACE-UK
Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK

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"Avoid fluids that don't clot or carry oxygen !!"

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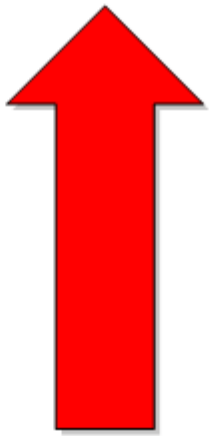
Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK

80% of near miss morbidity

6 per 1000 maternities

Preparation for delivery

red cell mass
plasma volume
clotting factors



Delivery

uterine contraction

arterioles constricting

clot formation

Haemorrhage causes

APH	placenta praevia abruption
Tone	uterine atony (75-90%)
Tissue	retained products
Trauma	vaginal/cervical lacerations, ruptured uterus, broad ligament haematoma
Thrombin	coagulopathies

Definitions

University Hospitals Bristol NHS
NHS Foundation Trust

Obstetric haemorrhage continuum

Minor	> 500 -1000ml
Moderate	> 1000 -1500ml
Major	> 1500 - 2000ml
Massive	> 2000ml

Intervene before life threatening

Massive obstetric haemorrhage

Blood loss of >2000mls or > 1500 ml with ongoing loss and/or signs of circulatory collapse:

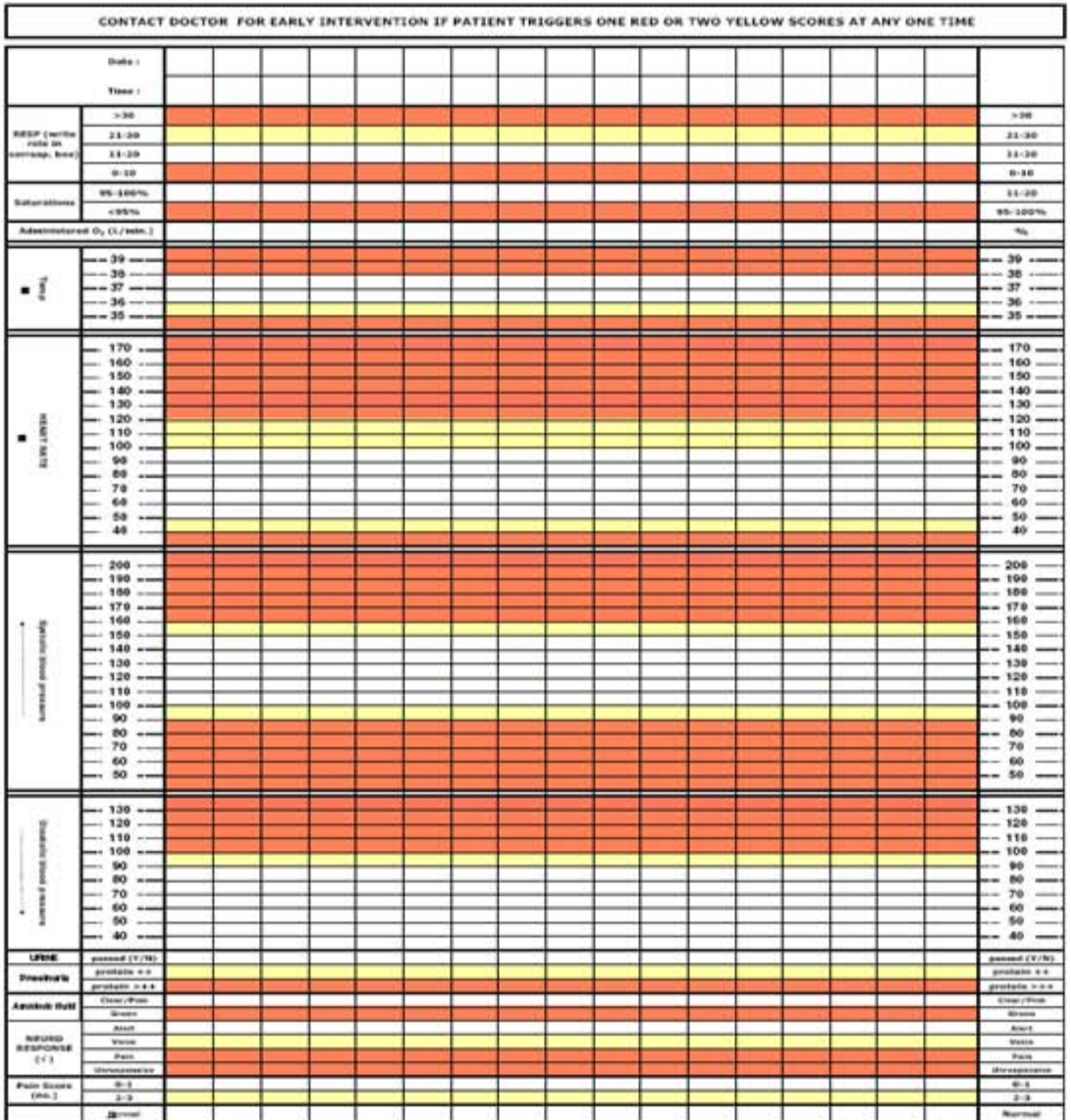
- Tachycardia (pulse>120)
- Hypotension (systolic bp<80mmhg)
- Tachypnoea (>30 breaths per minute)
- Confusion

If signs circulatory collapse present MOH irrespective of measured blood loss

Diagnosis

- **Assessing blood loss**
  - underestimation most likely
- **Compensation can lead to late diagnosis**
  - Tachycardia
  - Hypotension
  - Poor peripheral perfusion
  - Altered conscious state
  - Unexplained metabolic acidosis

Diagnosis



Modified

Obstetric

Early

Warning

Score

Management of Major Obstetric Haemorrhage

Multidisciplinary

midwives
obstetricians
anaesthetists
midwifery assistants
theatre staff
haematologist / BTS
porters
ITU

Management of Major Obstetric Haemorrhage

Communicate

Massive Obstetric Haemorrhage

Blood loss > 1500ml
with ongoing haemorrhage
and /or signs of circulatory collapse

Call for help

2222 call for Obstetric emergency team
2222 Major Haemorrhage call

Assess and monitor

Vital signs:
Pulse, bp, perfusion

Identify cause:
tone tissue, thrombin, trauma

Estimate blood loss

Order blood and blood products
(Obtaining Blood Urgently)

FBC, coagulation and fibrinogen ,U&Es, LFTs Cross match

Haemacue HB

HDU chart

Consider central/art line

Arrest bleeding

Bimanual compression

Empty bladder – insert foley

Syntocinon 5iu /Ergometrine 0.5mg Max 2 doses (PET synto 5iu slow iv)

Syntocinon infusion (30 iu in 500ml N Saline at 125ml/hr)

Misoprostol 400 mcg Sublingual/ rectal - repeat after 20 mins if necessary

Replace + Resuscitate

ABC

Oxygen mask 15litres

IV access 14g cannula x 2

Crystalloid/ colloid 2000ml

Blood (oneg/ electronic issue/ group specific /crossmatched)

Blood products (FFP, Plt, Cryo)

Keep warm (rapid infusor/ warming

THEATRE

NHS
National Patient Safety Agency

Rapid Response Report

NPSA/2010/RRR017

From reporting to learning

21 October 2010

The transfusion of blood and blood components in an emergency

Issue

The urgent provision of blood for life threatening haemorrhages requires a rapid, focused approach as excessive blood loss can jeopardise the survival of patients. Early recognition of major blood loss and immediate effective interventions are vital to avoid hypovolaemic shock and its consequences. One such action is the rapid provision of blood and blood components, for which effective communication between all personnel involved in the provision and transportation of blood is key.

OBTAINING BLOOD URGENTLY
MAJOR HAEMORRHAGE PROCEDURE
St Michael's Hospital

1. Call 2222

"I am activating the major haemorrhage procedure for - give exact location (eg theatre 2, St Michaels Hospital)

2. Blood bank will call back in response to 2222 call. Be ready to:-

Provide patient identification details

Shock Pack B will be issued automatically. State if additional specific products required eg cryoprecipitate (see below)

Give contact number

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THEATRE

Surgical interventions

consider early

EUA

Intra uterine balloon

B Lynch suture

Internal iliac ligation

Hysterectomy

Surgical interventions

Table 1: Use of haemostatic surgical procedures among 339 women with major obstetric haemorrhage, 2012

Procedure	Women undergoing procedure	Successful (hysterectomy avoided)
	Number (%)*	Number (%)
Intra-uterine balloon tamponade	82 (24.2)	75 (91)
Uterine artery embolisation (interventional radiology)	11 (3.2)	6 (60)
Bilateral ligation of uterine arteries	3 (0.9)	3 (100)
Bilateral ligation of internal iliac arteries	2 (0.6)	1 (50)
Haemostatic brace uterine suturing (e.g. B-Lynch)	21 (6.2)	16 (76)
Hysterectomy	20 (5.9)	

*Percentage is of all 339 women experiencing MOH

Healthcare Improvement Scotland

Management of Major Obstetric Haemorrhage

Replace

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Keep warm (rapid infusor warming blanket)

THEATRE

Lessons from the battlefield

early aggressive use blood components

haemostatic resuscitation

massive transfusion protocol

Transfusion for trauma: civilian lessons from the battlefield?
P. Moor , D. Rew , M. J. Midwinter and H. Doughty Anaesthesia 2009:64: 469-472

Shock Pack A	Shock Pack B (1st issued by lab to SMH)	Shock Pack C
4 units of O negative **Immediately available from CDS Fridge**	**4 units Red Cells*** **4 units FFP** ***O neg/grouped/electronic issue depending on samples in lab**	**4 units RBC** **4 units FFP** **1 adult dose platelets**

Additional clotting factors can be requested if required eg cryoprecipitate in obstetric haemorrhage especially if due to abruption, amniotic fluid embolism or sepsis.

Fibrinogen concentrate and Factor VIIa stored in drug fridge on Central Delivery Suite for use after discussion with Consultant Haematologist.

Coagulopathy

Dilutional

DIC*

Abruption
Sepsis
AFE

*DIC = Disseminated intravascular coagulopathy

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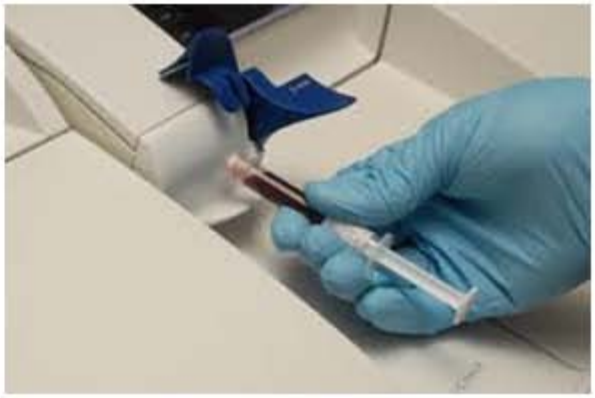
Assessment and monitoring

Lab tests

- FBC
- aPTT
- PT
- Fibrinogen

POC tests



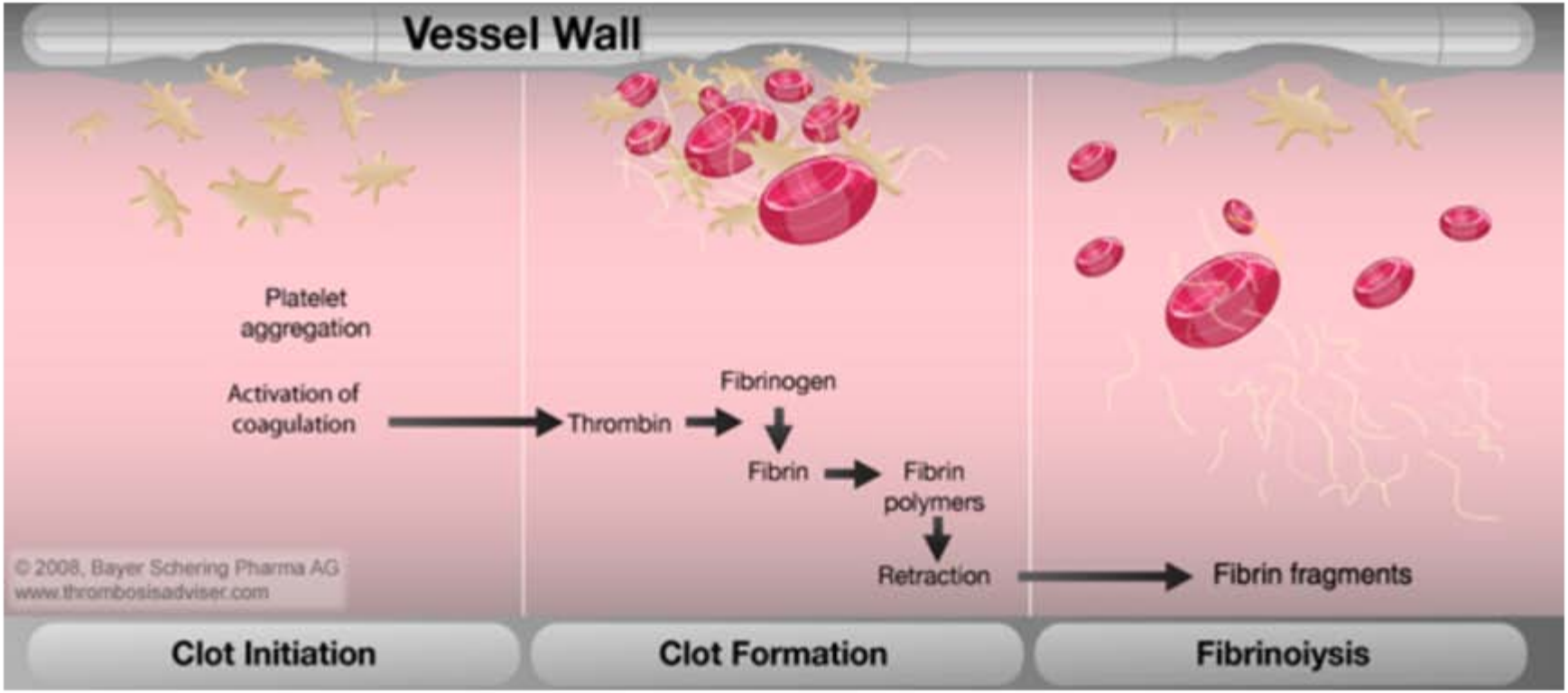
thromboelastometry

ROTEM®

The bleeding management system

What’s new

Clot formation



Shakur *et al. Trials* 2010, **11**:40
http://www.trialsjournal.com/content/11/1/40

TRIALS

STUDY PROTOCOL Open Access

The WOMAN Trial (World Maternal Antifibrinolytic Trial): tranexamic acid for the treatment of postpartum haemorrhage: an international randomised, double blind placebo controlled trial

Haleema Shakur*[1], Diana Elbourne[4], Metin Gülmezoglu[2], Zarko Alfirevic[3], Carine Ronsmans[5], Elizabeth Allen[4] and Ian Roberts[1]

Abstract

Background: Each year, worldwide about 530,000 women die from causes related to pregnancy and childbirth. Of the deaths 99% are in low and middle income countries. Obstetric haemorrhage is the leading cause of maternal mortality, most occurring in the postpartum period. Systemic antifibrinolytic agents are widely used in surgery to prevent clot breakdown (fibrinolysis) in order to reduce surgical blood loss. At present there is little reliable evidence from randomised trials on the effectiveness of tranexamic acid in the treatment of postpartum haemorrhage.

Fibrinogen

levels increase in pregnancy

low levels at presentation early predictor

aim to keep fibrinogen >/= 2g/l

Charbit B et al. The decrease of fibrinogen is an early predictor of the severity of postpartum hemorrhage.*J Thromb Haemost* 2007; 5: 266–73

de Lloyd L, Bovington R, Kaye A, et al. Standard haemostatic tests following major obstetric haemorrhage. Int J Obstet Anesth 2011;20:135-41.

International Journal of Obstetric Anesthesia (2010) 19, 218–234

ELSEVIER
www.obstetanesthesia.com

CASE REPORTS

The use of fibrinogen concentrate to correct hypofibrinogenaemia rapidly during obstetric haemorrhage

S.F. Bell, R. Rayment,* P.W. Collins* R.E. Collis
Department of Anaesthesia and *Department of Haematology, University Hospital of Wales, Cardiff, UK*

To raise fibrinogen by 1g for 70kg woman
1000ml FFP
260 ml cryoprecipitate
100ml fibrinogen concentrate

Anaesthesia 2015, 70, 166–175 doi:10.1111/anae.12859

Original Article

Introduction of an algorithm for ROTEM-guided fibrinogen concentrate administration in major obstetric haemorrhage

S. Mallaiah,[1] P. Barclay,[1] I. Harrod,[2] C. Chevannes[1] and A. Bhalla[2]

1 Consultant Anaesthetist, 2 Specialist Trainee in Anaesthesia, Liverpool Women's Hospital, Liverpool, UK

Four of 42 patients in the Shock Pack phase developed transfusion associated circulatory overload compared with none of 51 patients in the Fibrinogen phase (p = 0.038)

After the acute event

Risk of thrombosis

Level 2 care

After the acute event

Haemorrhage forum

Team training

Obstetric Haemorrhage Record

University Hospitals Bristol NHS
NHS Foundation Trust

Patient ID:

Date:

Initial EBL:- Time:
(update on white board if in theatre)

Major Haemorrhage Procedure activated? Y / N Time:

Time phone call received from lab (pack leaving lab):

Time of arrival of initial pack (shock pack B)[#] in theatre:

Request Additional Products if clinically indicated eg cryoprecipitate

Stand down time:

Final EBL (confirmed at sign out):

Role	Name	Time (in to room/ theatre)
Midwife		
Senior Midwife		
Obstetric F2/ ST1-2		
Obstetric ST3 - 5		
Obstetric ST6-7/ SST		
Obstetric Consultant		
Anaesthetic ST		
Anaesthetic Consultant		
Theatre Practitioner		
Other		

Initial Management	Time	
Oxygen 15 litres		
IV access - venflon 1 - venflon 2		
Bloods taken Use Haemorrhage profile on ICE always include fibrinogen		
Consider cause	tone	thrombin
	tissue	trauma
Attach monitoring	ECG	BP
	SPO2	HDU Chart
Placenta delivered	Yes	
	No	
Placenta complete	Yes	
	No	

Arrest Bleeding		
Action	Time	
Bimanual compression		
Catheter in		
Drug	**Dose**	**Time**
Syntometrine* or Syntocinon or Carbotecin	1 amp IM 10 u IM/ 5 u IV 100 mcg IV	
Rpt Syntometrine* or Rpt Syntocinon	1 amp IM 10 u IM/ 5 u IV	
Syntocinon 30 units in 500 ml N.Saline	125 mls/hr	
Misoprostol	400 mcg sl/pr	
Misoprostol (after 20 minutes)	400 mcg sl/pr	
**Carboprost	250 mcg im	
Carboprost (after 15 minutes)	250 mcg im	
Carboprost (after 15 minutes and up to 8 doses)	250 mcg im	
Other		

Surgical Management	Time
Into theatre	
EUA	
Laparotomy	
B-lynch	
Rusch Balloon	
Hysterectomy	
Other	

Fluid Resuscitation		
Type	Volume	Time
Crystalloid		
Colloid		
Blood / blood products		
O negative		
Group specific / cross matched		
FFP		
Cryoprecipitate/Fibrinogen concentrate		
Platelets		
Tranexamic acid		
Factor VIIa		
Other		
Cell salvage		

Additional Equipment	Time
Rapid Infusor	
Arterial blood pressure	
CVP	
Patient warming blanket	

*Max 2 doses ergometrine 500mcg IM either as syntometrine or ergometrine alone
**Leave 20 mins between last dose misoprostol & first dose Carboprost.
[#] Shock Pack B- first pack issued arrival time approx. 30mins with FFP, 4 units O neg immediately in CD3 Fridge)
Ensure bag numbers are recorded for all blood products given on anaesthetic chart/ maternity notes before bags returned to lab

Haemorrhage Top Tips

treat anaemia pre labour

avoid fluids that don't carry oxygen or clot

be aware IUD and abruption

avoid hypothermia

keep everyone up to speed

give tranexamic acid

get excited about fibrinogen

Haemorrhage References

MBRRACEUK Saving Mothers Lives Report

https://www.npeu.ox.ac.uk/mbrrace-uk/reports

SCASMM

http://www.healthcareimprovementscotland.org/our_work/reproduc
ve,_maternal__child/reproductive_health/scasmm.aspx

Anaesthesia Special Issue: Transfusion, Thrombosis and
Bleeding
Managementonlinelibrary.wiley.com/doi/10.1111/anae.20
4.70.issue-s1/issuetoc

– Issie.gardner@UHBristol.nhs.uk