# Management of Major Obstetric Haemorrhage

Dr Issie Gardner

St Michael's Hospital
Bristol

March 2013

University Hospitals Bristol NHS
NHS Foundation Trust

# Obstetric Haemorrhage

- **Importance globally**
- **UK**
- Recognise the problem
- Involve appropriate staff
- Know your local guidelines
- New interventions

# Haemorrhage deaths

| Triennium | Cause of haemorrhage: Placental abruption *n* | Placenta praevia *n* | Postpartum haemorrhage *n* | Total *n* | Rate | 95% CI |
|---|---|---|---|---|---|---|
| 1985–87 | 4 | 0 | 6 | 10 | 0·44 | 0·24–0·81 |
| 1985–87 | 6 | 5 | 11 | 22 | 0·93 | 0·62–1·41 |
| 1991–93 | 3 | 4 | 8 | 15 | 0·65 | 0·39–1·07 |
| 1994–96 | 4 | 3 | 5 | 12 | 0·55 | 0·31–0·95 |
| 1997–99 | 3 | 3 | 1 | 7 | 0·33 | 0·16–0·68 |
| 2000–02 | 3 | 4 | 10 | 17 | 0·85 | 0·53–1·36 |
| 2003–05 | 2 | 3 | 9 | 14 | 0·66 | 0·39–1·11 |
| 2006–08 | 2** | 2*** | 5 | 9 | 0·39 | 0·20–0·75 |

9 direct maternal deaths  haemorrhage 6$^{th}$ leading cause

# Haemorrhage deaths

- **Substandard care** **66%**
  - **Lack of observations**
  - **Antenatal anaemia**

- **Women declining blood** **1**

**Remember Ethnic minorities**

# Morbidity

DOI: 10.1111/j.1471-0528.2007.01533.x
www.blackwellpublishing.com/bjog



## Learning from adverse clinical outcomes: major obstetric haemorrhage in Scotland, 2003–05

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*Accepted 20 August 2007.*

**2/3 of near miss morbidity**

**3.7 per 1000 maternities**

# Preparation for delivery

**Increase in red cell mass**
**Increase in clotting factors**
**Increase in plasma volume**

**Uterine Blood flow increases**

- **50ml/min to 500-800ml/min at term**

# Delivery

**Placental separation endometrial arteries torn**

**Blood loss prevented**

**uterine contraction**

**by arterioles constricting**

**platelet aggregation → clot formation**

# Haemorrhage causes

| | |
|---|---|
| APH | placenta praevia<br>abruption |
| **T**one | uterine atony (75-90%) |
| **T**issue | retained products |
| **T**rauma | vaginal/cervical lacerations, ruptured uterus, broad ligament haematoma |
| **T**hrombin | coagulopathies |

# APH: Praevia

**Table 2.** Link between number of previous caesarean sections and risk of placenta accreta, placenta praevia and hysterectomy[127]

| Number of previous caesarean section(s) | Number of women | Number of women with placenta accreta | Chance of placenta accreta if placenta praevia | Number of hysterectomies |
|---|---|---|---|---|
| 0 | 6201 | 15 (0.24%) | 3% | 40 (0.65%) |
| 1 | 15 808 | 49 (0.31%) | 11% | 67 (0.42%) |
| 2 | 6324 | 36 (0.57%) | 40% | 57 (0.9%) |
| 3 | 1452 | 31 (2.13%) | 61% | 35 (2.4%) |
| 4 | 258 | 6 (2.33%) | 67% | 9 (3.49%) |
| 5 | 89 | 6 (6.74%) | 67% | 8 (8.99%) |

RCOG Guideline 27 Placenta Praevia

# APH: Praevia

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RCOG Guideline 27 Placenta Praevia

# PPH: risk factors

↑ **parity**

↑ **uterine distension** **(multiple pregnancy, large babies)**

**prolonged labour**

**previous PPH**

**operative delivery** **(especially emergency LSCS)**

**maternal obesity**

**antepartum haemorrhage** **(abruption/ praevia)**

# Haemorrhage

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## Obstetric haemorrhage continuum

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

Intervene before life threatening

**The following table summarises the management of obstetric haemorrhage. The details of management follow the table**

| PPH | COMMUNICATE | ASSESSMENT and RESUSCITATION | MONITOR | ARREST BLEEDING |
|---|---|---|---|---|
| **MINOR**<br>500ml - 1000ml | -Inform midwife in-charge<br>-Pull emergency buzzer if brisk loss<br>-Alert the obstetric and anaesthetic ST3 or a competent ST1-2 | -Check pulse, blood pressure<br>-Assess cause of bleeding<br>-Gain IV access<br>-Take bloods for FBC, Group and save and coagulation screen | -Monitor pulse and BP every 15 min **Attach NIBP, pulse oximeter**<br>-If blood loss continues use the haemorrhage documentation chart | **Manage the source of bleeding**<br><br>**Placental abruption or placenta praevia:**<br>• Consider delivery<br><br>**Tone**<br>• Rub up contraction<br>• 2nd syntocinon or syntometrine<br>• syntocinon infusion<br>• Misoprostol<br><br>**Tissue**<br>• EUA and removal of placenta |
| **MODERATE**<br>1000ml-1500ml | -Pull emergency buzzer<br>-Call ST3 obstetrician and anaesthetist<br>-Alert ST6 or above obstetrician | As above plus<br>- Check airway and breathing<br>- Give oxygen by mask<br>-Evaluate circulation<br>- 2nd IV access<br>- IV fluids (Hartmann's)<br>- If bleeding continues request urgent blood<br>- Consider 2222 call to trigger major haemorrhage procedure | As above plus<br>- Start HDU chart<br>-Record minimum of 15 min vital signs<br>-Hourly urine output<br><br>- use the haemorrhage documentation chart | |
| **MAJOR** | -ST6 or above | As above | | |

# 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**

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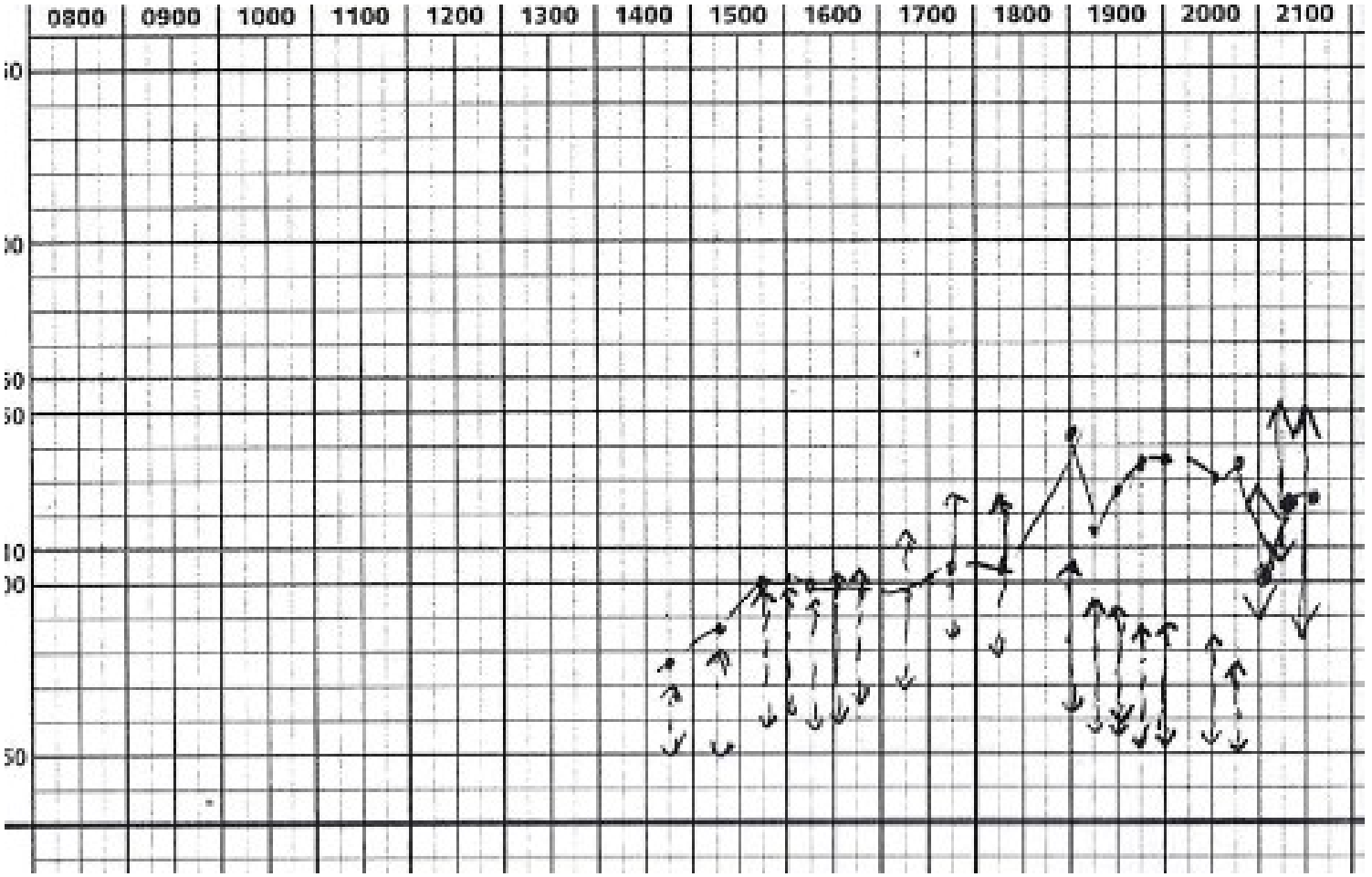
# Diagnosis

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

# Diagnosis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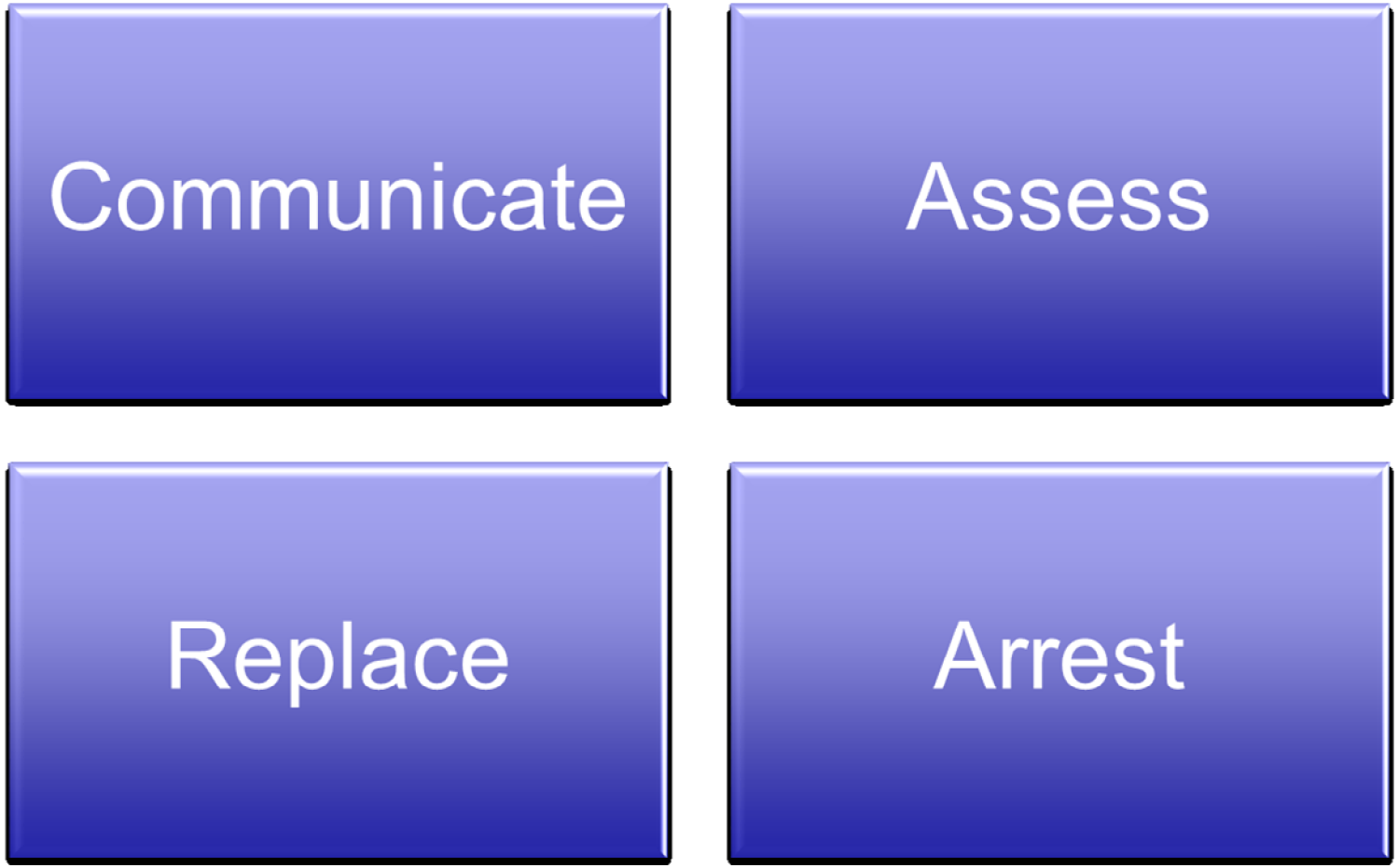
# Management of Major Obstetric Haemorrhage



# Management

**Multidisciplinary approach**

- **midwives**
- **obstetricians**
- **anaesthetists**
- **theatre staff**
- **haematologist / BTS**
- **porters**
- **ITU**

# Massive Obstetric Haemorrhage

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

Call for help
2222 call for Obstetric emergency team
Consultant anaesthetist and obstetrician to attend
Alert Haematology senior specialist trainee
Theatres on standby

## 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

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.

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Poster

# MAJOR HAEMORRHAGE PROCEDURE
## Central Delivery Suite

This procedure should be activated if immediate delivery of blood is required for a patient with rapid blood loss.

1. Call 2222

"I would like to trigger the major haemorrhage procedure in CENTRAL DELIVERY SUITE extension xxxxx"

2. Switchboard will connect you to blood bank:-

   Provide patient identification details

   Request shock pack and/or specific products if required

3. Phone St Michael's Porters Lodge (ext 25325) and tell them:-

   Either: taxi to wait for blood samples

   Or: taxi to go to BRI porters lodge and await blood box

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# Ergometrine

Side effects

- arterial vasoconstrictor
  - increases BP and CVP, fall HR
- nausea and vomiting

Cautions

- hypertensive disease
- coronary artery disease
  - can cause vasospasm

Only used in 46% near misses

# Surgical interventions

**consider early**

EUA

Intra uterine balloon

B Lynch suture

Internal iliac ligation

Hysterectomy

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# 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

# Remember clotting factors

Coagulopathy

- Dilution
  - primary cause in major bleeding

- Disseminated intravascular (DIC)
  - AFE, abruption, sepsis

Component therapy

FFP 12-15ml/kg to get PT < 1.5

Cryoprecipitate to get fibrinogen > 1g/dl

Platelets > 50 x $10^9$/l

| SHOCK PACK A:<br><br>Available immediately from CDS Fridge<br><br>4 units of O negative | SHOCK PACK B:<br>(1st issued by lab for SMH)<br><br>4 units RBC<br>4 units FFP | SHOCK PACK C:<br>(2nd issued by lab for SMH)<br><br>4 units RBC<br>4 units FFP<br>1 adult dose platelets |
|---|---|---|

Additional clotting factors eg cryoprecipitate must be requested separately if required eg abruption, amniotic fluid embolism or sepsis.

Fibrinogen concentrate and Factor VIIa stored on CDS for use after discussion with Consultant Haematologist

**Avoid use of the air tube system (chute) in major haemorrhage. A special emergency arrangement has been made with the taxi company for immediate dispatch**

Call blood bank to stand down when haemorrhage is under control

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# Obstetric Haemorrhage Record

Patient ID:

Date:

EBL:

| Role | Name | Time |
|---|---|---|
| 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<br>- venflon 2 | | |
| Bloods taken | | |
| Consider cause | [illegible] | [illegible] |
| | [illegible] | [illegible] |
| 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<br>10 u IM/IV<br>100 mcg IV | |
| Rpt Syntometrine or Rpt Syntocinon | 1 amp IM<br>10 u IM/IV | |
| Syntocinon 30 units in 500 ml N.Saline | 125 mls/hr | |
| *Ergometrine | 500mcg IM | |
| 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 | |

**Major Haemorrhage Procedure activated?**

Yes ☐ No ☐ Call time:

Request for: RCC FFP Platelets Cryo

(circle all ordered on initial call)

**Time of arrival** Red Cells (RCC):

FFP: Platelets: Cryo:

Stand down time:

| Fluid Resuscitation | | |
|---|---|---|
| Type | Volume | Time |
| Crystalloid | | |
| Colloid | | |
| **Blood / blood products** | | |
| O negative | | |
| Group specific / cross matched | | |
| FFP | | |
| Platelets | | |
| Cryoprecipitate | | |
| Tranexamic acid | | |
| Factor VIIa | | |
| Other | | |
| **Cell salvage Y/N** | | |

| Additional Equipment | Time |
|---|---|
| Fluid warmer | |
| Arterial blood pressure | |
| CVP | |

*Ergometrine to be given if specified by anaesthetist. **Leave 20 mins between last dose misoprostol & first dose Carboprost
Ensure bag numbers are recorded for all blood products given on anaesthetic chart/ maternity notes before bags returned to lab

# Interventional Radiology

Royal College of Obstetricians and Gynaecologists

Setting standards to improve women's health

Green-top Guideline
No. 52

May 2009

Minor revisions November 2009 and April 2011

**Available evidence on prophylactic occlusion or embolisation of pelvic arteries in the management of women with placenta accreta is equivocal. The outcomes of prophylactic arterial occlusion require further evaluation.**

B

# Tranexamic acid

## 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

*CRASH-2 trial collaborators**


### Summary

**Background** Tranexamic acid can reduce bleeding in patients undergoing elective surgery. We assessed the effects of early administration of a short course of tranexamic acid on death, vascular occlusive events, and the receipt of blood transfusion in trauma patients.

**Methods** This randomised controlled trial was undertaken in 274 hospitals in 40 countries. 20 211 adult trauma patients with, or at risk of, significant bleeding were randomly assigned within 8 h of injury to either tranexamic acid (loading dose 1 g over 10 min then infusion of 1 g over 8 h) or matching placebo. Randomisation was balanced by centre, with an allocation sequence based on a block size of eight, generated with a computer random number generator. Both participants and study staff (site investigators and trial coordinating centre staff) were masked to treatment allocation. The primary outcome was death in hospital within 4 weeks of injury, and was described with the following categories: bleeding, vascular occlusion (myocardial infarction, stroke and pulmonary embolism), multiorgan failure, head injury, and other. All analyses were by intention to treat. This study is registered as ISRCTN86750102, Clinicaltrials.gov NCT00375258, and South African Clinical Trial Register DOH-27-0607-1919.

**Findings** 10 096 patients were allocated to tranexamic acid and 10 115 to placebo, of whom 10 060 and 10 067, respectively, were analysed. All-cause mortality was significantly reduced with tranexamic acid (1463 [14·5%] tranexamic acid group *vs* 1613 [16·0%] placebo group; relative risk 0·91, 95% CI 0·85–0·97; p=0·0035). The risk of death due to bleeding was significantly reduced (489 [4·9%] *vs* 574 [5·7%]; relative risk 0·85, 95% CI 0·76–0·96; p=0·0077).


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See Online/Comment
DOI:10.1016/S0140-6736(10)60939-7

*Members listed at end of paper

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crash@lshtm.ac.uk

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.

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 man
1000ml FFP (6 standard UK units)
260 ml cryoprecipitate

# Drills and preparation

- Regular ward rounds
- Identify risk factors
- Be familiar with equipment and guidelines (fire drills)
- Senior staff
- Communication

# Haemorrhage

- Haemorrhage is the leading cause of maternal death globally and continues to cause maternal deaths in UK.
- Although the number of women who die from haemorrhage in UK is falling 66% associated with substandard care.
- Recognise the problem – regular observations and MOEWS charts.
- Involve appropriate staff – call for help, multidisciplinary care, senior staff.
- Know your local policies – Management of Haemorrhage and Obtaining Blood Urgently.
- New interventions – tranexamic acid, avoiding coagulopathy (shock packs), interventional radiology, cell salvage.

# Haemorrhage References

- CMACE 2006 -2008
- AAGBI Guideline Management of Massive Haemorrhage
- RCOG Green Top Guidelines
  - Ante Partum HaemorrhageNo. 63
  - Post Partum Haemorrhage No. 52
  - Placenta Praevia No. 27
  - Issie.gardner@UHBristol.nhs.uk