Management of Major Obstetric Haemorrhage

Dr Issie Gardner
St Michael’s Hospital
Bristol

March 2013
Obstetric Haemorrhage

• Importance globally
• UK
  • Recognise the problem
  • Involve appropriate staff
  • Know your local guidelines
• New interventions
# Haemorrhage deaths

<table>
<thead>
<tr>
<th>Triennium</th>
<th>Placental abruption (n)</th>
<th>Placenta praevia (n)</th>
<th>Postpartum haemorrhage (n)</th>
<th>Total (n)</th>
<th>Rate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985–87</td>
<td>4</td>
<td>0</td>
<td>6</td>
<td>10</td>
<td>0.44</td>
<td>0.24–0.81</td>
</tr>
<tr>
<td>1985–87</td>
<td>6</td>
<td>5</td>
<td>11</td>
<td>22</td>
<td>0.93</td>
<td>0.62–1.41</td>
</tr>
<tr>
<td>1991–93</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>15</td>
<td>0.65</td>
<td>0.39–1.07</td>
</tr>
<tr>
<td>1994–96</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>12</td>
<td>0.55</td>
<td>0.31–0.95</td>
</tr>
<tr>
<td>1997–99</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>0.33</td>
<td>0.16–0.68</td>
</tr>
<tr>
<td>2000–02</td>
<td>3</td>
<td>4</td>
<td>10</td>
<td>17</td>
<td>0.85</td>
<td>0.53–1.36</td>
</tr>
<tr>
<td>2003–05</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>14</td>
<td>0.66</td>
<td>0.39–1.11</td>
</tr>
<tr>
<td>2006–08</td>
<td>2**</td>
<td>2***</td>
<td>5</td>
<td>9</td>
<td>0.39</td>
<td>0.20–0.75</td>
</tr>
</tbody>
</table>

9 direct maternal deaths   haemorrhage 6th leading cause
Haemorrhage deaths

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

- Women declining blood 1

Remember Ethnic minorities
Learning from adverse clinical outcomes: major obstetric haemorrhage in Scotland, 2003–05

V Brace, D Kernaghan, G Penney

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Scottish Programme for Clinical Effectiveness in Reproductive Health, Aberdeen Maternity Hospital, Aberdeen, UK

Correspondence Dr V Brace, Aberdeen Maternity Hospital, Cornhill Road, Aberdeen, AB25 2ZD, UK. Email v.brace@abdn.ac.uk

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 $\rightarrow$ clot formation
# Haemorrhage causes

<table>
<thead>
<tr>
<th>APH</th>
<th>placenta praevia abruption</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T</strong>one</td>
<td>uterine atony (75-90%)</td>
</tr>
<tr>
<td><strong>T</strong>issue</td>
<td>retained products</td>
</tr>
<tr>
<td><strong>T</strong>rauma</td>
<td>vaginal/cervical lacerations, ruptured uterus, broad ligament haematoma</td>
</tr>
<tr>
<td><strong>T</strong>hrombin</td>
<td>coagulopathies</td>
</tr>
</tbody>
</table>
### Table 2. Link between number of previous caesarean sections and risk of placenta accreta, placenta praevia and hysterectomy

<table>
<thead>
<tr>
<th>Number of previous caesarean section(s)</th>
<th>Number of women</th>
<th>Number of women with placenta accreta</th>
<th>Chance of placenta accreta if placenta praevia</th>
<th>Number of hysterectomies</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6201</td>
<td>15 (0.24%)</td>
<td>3%</td>
<td>40 (0.65%)</td>
</tr>
<tr>
<td>1</td>
<td>15808</td>
<td>49 (0.31%)</td>
<td>11%</td>
<td>67 (0.42%)</td>
</tr>
<tr>
<td>2</td>
<td>6324</td>
<td>36 (0.57%)</td>
<td>40%</td>
<td>57 (0.9%)</td>
</tr>
<tr>
<td>3</td>
<td>1452</td>
<td>31 (2.13%)</td>
<td>61%</td>
<td>35 (2.4%)</td>
</tr>
<tr>
<td>4</td>
<td>258</td>
<td>6 (2.33%)</td>
<td>67%</td>
<td>9 (3.49%)</td>
</tr>
<tr>
<td>5</td>
<td>89</td>
<td>6 (6.74%)</td>
<td>67%</td>
<td>8 (8.99%)</td>
</tr>
</tbody>
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**APH: Praevia**

RCOG Guideline 27  Placenta 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

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.

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

Tone
- Rub up contraction
- 2nd syntocinon or syntometrine
- syntocinon infusion
- Misoprostol

Tissue
- EUA and removal of placenta
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
Assessing blood loss
  - underestimation most likely

Compensation can lead to late diagnosis
  - Tachycardia
  - Hypotension
  - Poor peripheral perfusion
  - Altered conscious state
  - Unexplained metabolic acidosis
Diagnosis
Management of Major Obstetric Haemorrhage

Communicate
Assess
Replace
Arrest
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

Assess and monitor

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

Consider central/art line
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.
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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Blood products (FFP, Plt, Cryo)
Keep warm (rapid infusor/
warning)
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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Blood products ( FFP, Plt, Cryo)
Keep warm (rapid infusor/ warming)
Lessons from the battlefield

• early aggressive use blood components
• haemostatic resuscitation
• massive transfusion protocol

Transfusion for trauma: civilian lessons from the battlefield?
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
Additional clotting factors eg cryoprecipitate must be requested separately if required eg abruption, amniotic fluid embolism or sepsis.

Fibrinogen concentrate and Factor VIIIa 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
Massive Obstetric Haemorrhage

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## Obstetric Haemorrhage Record

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwife</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Midwife</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstetric F2/ ST1-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstetric ST3 - 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstetric ST6-7/ SST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstetric Consultant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaesthetic ST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaesthetic Consultant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theatre Practitioner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Initial Management

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oxygen 15 litres</td>
</tr>
<tr>
<td></td>
<td>IV access - venflon 1</td>
</tr>
<tr>
<td></td>
<td>- venflon 2</td>
</tr>
<tr>
<td></td>
<td>Bloods taken</td>
</tr>
<tr>
<td></td>
<td>Consider cause</td>
</tr>
<tr>
<td></td>
<td>Attach monitoring</td>
</tr>
<tr>
<td></td>
<td>ECG</td>
</tr>
<tr>
<td></td>
<td>BP</td>
</tr>
<tr>
<td></td>
<td>SPO2</td>
</tr>
<tr>
<td></td>
<td>HDU Chart</td>
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### Arrest Bleeding

<table>
<thead>
<tr>
<th>Action</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bimanual compression</td>
<td></td>
</tr>
<tr>
<td>Catheter in</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntometrine or Syntocin</td>
<td>1 amp IM</td>
<td>500 mcg IM</td>
</tr>
<tr>
<td>or Carbolutin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt Syntometrine or Rpt Syntocin</td>
<td>1 amp IM</td>
<td>500 mcg IM</td>
</tr>
<tr>
<td>or Carbolutin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syntocin 30 units in 500 ml N.Saline</td>
<td>125 mls/hr</td>
<td>500 mcg IM</td>
</tr>
<tr>
<td>Ergometrine</td>
<td>500 mcg IM</td>
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</tr>
<tr>
<td>Misoprostol</td>
<td>400 mcg sl/pr</td>
<td></td>
</tr>
<tr>
<td>Misoprostol (after 20 minutes)</td>
<td>400 mcg sl/pr</td>
<td></td>
</tr>
<tr>
<td>Carboprost</td>
<td>250 mcg im</td>
<td></td>
</tr>
<tr>
<td>Carboprost (after 15 minutes)</td>
<td>250 mcg im</td>
<td></td>
</tr>
<tr>
<td>Carboprost (after 15 minutes and up to 8 doses)</td>
<td>250 mcg im</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Surgical Management

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time into theatre</td>
</tr>
<tr>
<td></td>
<td>EUA</td>
</tr>
<tr>
<td></td>
<td>Laparotomy</td>
</tr>
<tr>
<td></td>
<td>B-lynch</td>
</tr>
<tr>
<td></td>
<td>Rusch Balloon</td>
</tr>
<tr>
<td></td>
<td>Hysterecotomy</td>
</tr>
<tr>
<td></td>
<td>Other</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Volume</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalloid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colloid</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Blood / Blood Products

- O negative

**Group specific / cross matched**

- FFP
- Platelets
- Cryoprecipitate
- Tranexamic acid
- Factor VIII
- Other

**Cell salvage Y/N**

### Additional Equipment

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
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<tbody>
<tr>
<td></td>
<td>Fluid warmer</td>
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<tr>
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<td>Arterial blood pressure</td>
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<td>CVP</td>
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</tbody>
</table>

*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.

UH Bristol Version 2 Jan 2012 Review Jan 13
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.
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 Trials 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).
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*, Diana Elbourne, Metin Gülmezoglu, Zarko Alfrevic, Carine Ronsmans, Elizabeth Allen and Ian Roberts

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.
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 Haemorrhage No. 63
  - Post Partum Haemorrhage No. 52
  - Placenta Praevia No. 27
- Issie.gardner@UHBristol.nhs.uk