MAJOR HAEMORRHAGE

MODULE: CRITICAL INCIDENTS

TARGET: ALL ANAESTHETISTS

BACKGROUND:

The risk of major haemorrhage is a risk that faces numerous groups of patients that require anaesthetic intervention including obstetrics, trauma and orthopaedics, neuro-, vascular, general, urological and gynaecological surgery. Definitions of major haemorrhage vary, but have included the need for 1-1.5 blood volume transfusion within a 24 hour period. These patients have a high mortality. Fifty percent of deaths in the first 24 hours after major trauma are due to massive haemorrhage, as are 80% of deaths on the table in these patients. Major haemorrhage is the sixth most common cause of maternal haemorrhage in the most recent triennium CMACE Saving Mother’s Lives report (2006-2008).

Management of these patients requires strong leadership and team management to co-ordinate the various services required in adequately resuscitating these patients. The risk of errors may increase, particularly when large volumes of blood products are being transfused.

(NB: This scenario is designed to be utilised in tandem with BL_CRIT_21 Blood Transfusion Reaction, as the initial management steps required in managing a massive bleed in an anaesthetised patient.)
## RELEVANT AREAS OF THE ANAESTHETIC CURRICULUM

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
</table>
| IG_BS_10 | In respect of airway management:  
  - Demonstrates optimal patient position for airway management  
  - Manages airway with mask and oral/nasopharyngeal airways  
  - Demonstrates hand ventilation with bag and mask  
  - Able to insert and confirm placement of a Laryngeal Mask Airway  
  - Demonstrates correct head positioning, direct laryngoscopy and successful nasal/oral intubation techniques and confirms correct tracheal tube placement  
  - Demonstrates proper use of bougies  
  - Demonstrates correct securing and protection of LMAs/tracheal tubes during movement, positioning and transfer  
  - Correctly conducts RSI sequence  
  - Correctly demonstrates the technique of cricoid pressure |
| IO_BS_07 | Demonstrates role as team player when appropriate leader in the intra-operative environment |
| IO_BS_08 | Communicates with the theatre team in a clear unambiguous style |
| IO_BS_09 | Able to respond in a timely and appropriate manner to events that may affect the safety of patients [e.g. hypotension, massive haemorrhage] |
| CI_BK_01 | Cardiac and/or respiratory arrest |
| CI_BK_02 | Unexpected fall in SpO2 with or without cyanosis |
| CI_BK_03 | Unexpected increase in peak airway pressure |
| CI_BK_08 | Unexpected hypotension |
| CI_BK_10 | Sinus tachycardia |
| CI_BK_19 | Bronchospasm |
| CI_BK_22 | Adverse drug reactions |
| CI_BK_23 | Anaphylaxis |
| CI_BK_24 | Transfusion reactions, transfusion of mis-matched blood or blood products |
| CI_BS_01 | Demonstrates good non-technical skills such as: [effective communication, team-working, leadership, decision-making and maintenance of high situation awareness] |
| CI_BS_02 | Demonstrates the ability to recognise early a deteriorating situation by careful monitoring |
| CI_BS_03 | Demonstrates the ability to respond appropriately to each incident listed above |
| CI_BS_04 | Shows how to initiate management of each incident listed above |
| CI_BS_05 | Demonstrates ability to recognise when a crisis is occurring |
| CI_BS_06 | Demonstrates how to obtain the attention of others and obtain appropriate help when a crisis is occurring |
| 4.3 | Administers blood and blood products safely |
| CI_IS_01 | Demonstrates leadership in resuscitation room/simulation when practicing response protocols with other healthcare professionals |
| CI_IS_02 | Demonstrates appropriate use of team resources when practicing response protocols with other healthcare professionals |
| GU_IS_03 | Demonstrates the ability to manage the effects of sudden major blood loss effectively |
INFORMATION FOR FACULTY

LEARNING OBJECTIVES:

- Safe commencement of blood product transfusion.
- Knowledge of local protocols for major haemorrhage management
- Appreciation of the multidisciplinary approach to management of this crisis

SCENE INFORMATION:

- Location: Anaesthetic Room / Theatre

EQUIPMENT & CONSUMABLES

<table>
<thead>
<tr>
<th>Equipment/Consumables</th>
<th>Persons Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Manikin – On trolley/bed</td>
<td>Anaesthetic/ACCS junior trainee</td>
</tr>
<tr>
<td>Checked anaesthetic machine with circle circuit</td>
<td>Anaesthetic assistant</td>
</tr>
<tr>
<td>Stocked Airway trolley</td>
<td>Anaesthetic Senior Trainee</td>
</tr>
<tr>
<td>- Laryngoscopes (2 x Macintosh)</td>
<td>Surgeon – aggressive and pushing to start surgery</td>
</tr>
<tr>
<td>- ET Tubes (Various Sizes)</td>
<td>Scrub nurse</td>
</tr>
<tr>
<td>- OP, NP and Advanced Supraglottic airways (iGels, LMAs)</td>
<td></td>
</tr>
<tr>
<td>Anaesthetic drugs drawn up</td>
<td></td>
</tr>
<tr>
<td>Simulated blood for transfusion</td>
<td></td>
</tr>
</tbody>
</table>

PARTICIPANT BRIEFING: (TO BE READ ALOUD TO PARTICIPANT)

Laura Westall is a 28 year old woman undergoing a laparoscopic salpingectomy for suspected ectopic pregnancy. She has a positive pregnancy test, and increasing abdominal pain. She has become mildly pyrexial and tachycardic (110bpm) in the last few hours. She has a mildly elevated white cell count, and otherwise normal bloods.

She has suffered from fairly frequent urinary tract infections and other minor infections, but has had no serious illnesses. There are no allergies of note.

‘VOICE OF MANIKIN’ BRIEFING:

You are anxious and in quite a lot of lower abdominal pain. The surgeons have told you that you probably have an ectopic pregnancy and that they need to investigate with a diagnostic laparoscopy.

You are a previously fit and well 28 year old. You have suffered from frequent urinary tract infections and sinusitis, but never any serious infections. No allergies. Last ate 2 hours ago.
OTHER IN-SCENARIO PERSONNEL BRIEFING:

Anaesthetic Assistant:
Assist the anaesthetist in inducing the patient and ‘transferring’ the patient to theatre. The patient is hypotensive post-induction which is only transiently responsive to fluids and vasopressors.

At some stage the anaesthetist should ask for blood to transfuse the patient – if this does not happen, then you should prompt the anaesthetist after they have obtained a blood gas, for example: ‘There are 2 units of cross-matched blood in the fridge. Do you want me to get them?’

Voice of Telephone Help:
Consultant anaesthetist will arrive in 20 mins.

Blood bank:
If the participant calls blood bank: they will require patient details, they will release red cells, but FFP and other clotting products will require discussion with the haematologist unless the participant activates the major haemorrhage protocol. Blood bank suggests sending further samples for FBC, clotting and fibrinogen levels.

If the blood transfusion reaction occurs in this scenario (see also BL_CRIT_21 Blood Transfusion Reaction), and if the participant calls blood bank for advice, they are advised to keep the bag of blood under suspicion, and take 2 group and save samples from the patient, and label the samples with ‘blood transfusion reaction’.

After the blood transfusion reaction, any further blood they provide will be red cells washed in saline.

Haematologist:
Will need patient details including weight, and will advise regarding the need for further clotting products: 2 packs of cryoprecipitate if fibrinogen is less than 100mg/dl, and a pool of platelets if the count is less than 50.
CONDUCT OF SCENARIO

INITIAL SETTINGS

A: Patent and Self-maintained
B: RR 28/min, SpO2 99% on O2, Equal air entry
C: HR 110, BP 110/85.
D: Anxious
E: Hospital gown

INDUCTION

A: Own until intubated
B: RR falls to 0 during induction until participant takes over ventilation.
C: HR 115, BP 70/40 over 2 mins. Only transiently responsive to fluids or vasopressors.
D: Eyes closed. Seizures start. Pupils equal.

EXPECTED ACTIONS

- Call for help & secure additional IV access if required
- Continue aggressive fluid resuscitation
- Contact blood bank, organise X-matched blood
- Consider O-ve blood, ODP informs of 2 units available immediately in the fridge
- Consider activating major haemorrhage protocol. If mentioned by participant, surgeon agrees with this. Consider Blood warmer, Bair hugger

MAJOR HAEMORRHAGE

A: Intubated
B: As per ventilator settings. SpO2 95%
C: If aggressively fluid resuscitated: HR 105, BP 85/45, if not: HR 125, BP 65/30

EXPECTED ACTIONS

Surgeon establishes haemostasis in 10 mins. Haemodynamics improve with appropriate resuscitation.

NORMAL DIFFICULTY

Haemostasis delayed. Coagulopathy requiring correction.
Consider ‘Blood Transfusion Reaction’ scenario

HIGH DIFFICULTY

Hypovolaemic cardiac arrest ensues despite resuscitation efforts
Participant must co-ordinate CPR with fluid resuscitation

RESOLUTION

At faculty discretion, but patient should survive if resuscitation efforts are adequate.
**ANAESTHETIC RECORD SHEET**

**PATIENT DETAILS / ADDRESSOGRAPH**

Hospital No: 

**SURNAME:** Laura Westall

(Block Letters)

**FORENAMES:** 

**Address:** 28 years old 

Ward/Hosp: 

**DOB:** Sex: M / F

**Version** 9 – May 2015

**Editor:** Dr Andrew Darby Smith

**Original Author:** Dr P Shanmuga

**Nil Known 2 hours ago**

Hb 10 NAD

INR 1.0

Pelvis USS: - Cystic collection on right adnexae? Ectopic

Frequent UTIs and sinus related infections

Nil of note

Airway Assessment

Mouth Opening:

MP Score: 1 2 3 4

Jaw:

Neck: MP1. Good neck and jaw

ROM TEETH

87654321 12345678

87654321 12345678

X = missing L = loose B = bridge

G = caps/crowns D = damaged

**ALLERGIES**

Nil Known

**Anaesthesia Critical Scenario 7 (BL)**

(Laparoscopic salpingectomy)

**CONSENT:**

GA Sedation Epidural

Spinal Regional Suppository

PC A E PCA Other

Notes / Discussion / Technique proposed:

Anaesthetic Information leaflet received by patient

For attention of ward staff: (further investigations, fasting, continue/omit current medication, etc.)

All orders / information regarding medication & fluids must be entered on patient's drug prescription & administration record.
DEBRIEFING

POINTS FOR FURTHER DISCUSSION:

Technical:
- Management of seizures in adults.
- Emergency induction in the potentially brain-injured patient
- Physiology of intracranial pressure – and limiting surges in ICP
- Principles of intra-hospital transfer

Non-technical:
- Situation awareness
- Prioritisation
- Leadership
- Team working and task management

DEBRIEFING RESOURCES

1. Local Major Haemorrhage Protocols – Each hospital should have one. If they don’t, consider writing one with the haematology department.

   http://www.aagbi.org/sites/default/files/massive_haemorrhage_2010_0.pdf

   http://www.aagbi.org/sites/default/files/bloodtransfusion06.pdf


   http://www.aagbi.org/sites/default/files/red_cell_08.pdf
INFORMATION FOR PARTICIPANTS

KEY POINTS:

- Safe commencement of blood product transfusion.
- Knowledge of local protocols for major haemorrhage management
- Appreciation of the multidisciplinary approach to management of this crisis

RELEVANCE TO AREAS OF THE ANAESTHETIC CURRICULUM

<table>
<thead>
<tr>
<th>IG_BS_10</th>
<th>In respect of airway management:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Demonstrates optimal patient position for airway management</td>
</tr>
<tr>
<td></td>
<td>• Manages airway with mask and oral/nasopharyngeal Airways</td>
</tr>
<tr>
<td></td>
<td>• Demonstrates hand ventilation with bag and mask</td>
</tr>
<tr>
<td></td>
<td>• Able to insert and confirm placement of a Laryngeal Mask Airway</td>
</tr>
<tr>
<td></td>
<td>• Demonstrates correct head positioning, direct laryngoscopy and successful nasal/oral intubation techniques and confirms correct tracheal tube placement</td>
</tr>
<tr>
<td></td>
<td>• Demonstrates proper use of bougies</td>
</tr>
<tr>
<td></td>
<td>• Demonstrates correct securing and protection of LMA/tracheal tubes during movement, positioning and transfer</td>
</tr>
<tr>
<td></td>
<td>• Correctly conducts RSI sequence</td>
</tr>
</tbody>
</table>

Correctly demonstrates the technique of cricoid pressure

| IO_BS_07 | Demonstrates role as team player and when appropriate leader in the intra-operative environment |
| IO_BS_08 | Communicates with the theatre team in a clear unambiguous style |
| IO_BS_09 | Able to respond in a timely and appropriate manner to events that may affect the safety of patients [e.g. hypotension, massive haemorrhage][5] |
| CI_BK_01 | Cardiac and/or respiratory arrest |
| CI_BK_02 | Unexpected fall in SpO2 with or without cyanosis |
| CI_BK_03 | Unexpected increase in peak airway pressure |
| CI_BK_08 | Unexpected hypotension |
| CI_BK_10 | Sinus tachycardia |
| CI_BK_19 | Bronchospasm |
| CI_BK_22 | Adverse drug reactions |
| CI_BK_23 | Anaphylaxis |
| CI_BK_24 | Transfusion reactions, transfusion of mis-matched blood or blood products |
| CI_BS_01 | Demonstrates good non-technical skills such as: [effective communication, team-working, leadership, decision-making and maintenance of high situation awareness] |
| CI_BS_02 | Demonstrates the ability to recognise early a deteriorating situation by careful monitoring |
| CI_BS_03 | Demonstrates the ability to respond appropriately to each incident listed above |
| CI_BS_04 | Shows how to initiate management of each incident listed above |
| CI_BS_05 | Demonstrates ability to recognise when a crisis is occurring |
| CI_BS_06 | Demonstrates how to obtain the attention of others and obtain appropriate help when a crisis is occurring |
| 4.3 | Administers blood and blood products safely |
| CI_IS_01 | Demonstrates leadership in resuscitation room/simulation when practicing response protocols with other healthcare professionals |
| CI_IS_02 | Demonstrates appropriate use of team resources when practicing response protocols with other healthcare professionals |
| GU_IS_03 | Demonstrates the ability to manage the effects of sudden major blood loss effectively |
FURTHER RESOURCES

1. Local Major Haemorrhage Protocols – Each hospital should have one. If they don’t, consider writing one with the haematology department.

   [link](http://www.aagbi.org/sites/default/files/massive_haemorrhage_2010_0.pdf)

   [link](http://www.aagbi.org/sites/default/files/bloodtransfusion06.pdf)

   [link](http://www.aagbi.org/sites/default/files/cell%20_salvage_2009_amended.pdf)

   [link](http://www.aagbi.org/sites/default/files/red_cell_08.pdf)
PARTICIPANT REFLECTION:

What have you learnt from this experience? (Please try to list 3 things)

How will your practice now change?

What other actions will you now take to meet any identified learning needs?
PARTICIPANT FEEDBACK

Date of training session: .............................................................................................................................................

Profession and grade: ....................................................................................................................................................

What role(s) did you play in the scenario? (Please tick)

- Primary/Initial Participant
- Secondary Participant (e.g. ‘Call for Help’ responder)
- Other health care professional (e.g. nurse/ODP)
- Other role (please specify):
- Observer

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I found this scenario useful</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I understand more about the scenario subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have more confidence to deal with this scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The material covered was relevant to me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please write down one thing you have learned today, and that you will use in your clinical practice.

How could this scenario be improved for future participants?
(This is especially important if you have ticked anything in the disagree/strongly disagree box)
What went particularly well during this scenario?

What did not go well, or as well as planned?

Why didn’t it go well?

How could the scenario be improved for future participants?