DRUG ERROR: EPHEDRINE BOLUS

<table>
<thead>
<tr>
<th>MODULE:</th>
<th>PATIENT SAFETY</th>
</tr>
</thead>
<tbody>
<tr>
<td>TARGET:</td>
<td>ALL ANAESTHETISTS</td>
</tr>
<tr>
<td>BACKGROUND:</td>
<td>Medication errors present a particular hazard to patients. Anaesthetists handle and administer numerous drugs with potentially significant adverse effects, often in a distraction-filled environment. There has been a relatively poor safety culture with regard to drug error prevention in anaesthesia although this is improving.</td>
</tr>
</tbody>
</table>
# RELEVANT AREAS OF THE ANAESTHETIC CURRICULUM

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IG_BS_04</td>
<td>Demonstrates safe practice in selecting, checking, drawing up, diluting, labelling and administering of drugs</td>
</tr>
</tbody>
</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_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] |
| ES_BS_03 | Manages rapid sequence induction in the high risk situation of emergency surgery for the acutely ill patient |
| CI_BK_09 | Unexpected hypertension                                                                      |
| CI_BK_11 | Arrhythmias:  
   - ST segment changes  
   - Sudden bradycardia  
   - Ventricular ectopics |
| CI_BK_22 | Adverse drug reactions                                                                       |
| 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 |
| 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 |
INFORMATION FOR FACULTY

LEARNING OBJECTIVES:

- Learn how to approach the management of unexpected hypertension under anaesthesia
- Understand the factors that can contribute to drug errors occurring
- Understand how systems can be put in place to reduce the risk of harm to patients from drug errors

SCENE INFORMATION:

- Location: Anaesthetic Room / Theatre
- Expected Duration of Scenario: 20 mins
- Expected Duration of Debrief: 40 mins

EQUIPMENT & CONSUMABLES

- Manikin
- Stocked airway trolley
- Simulated drugs for induction (thiopentone/propofol, suxamethonium, fentanyl, atracurium), anti-emesis (ondansetron, dexametasone), analgesia (paracetamol, diclofenac, tramadol), antibiotics (augmentin, gentamicin), emergency (suxamethonium, atropine, metaraminol, ephedrine)
- Empty Ephedrine vial (30mg in 1ml)
- Surgical drapes
- Simulated surgical equipment (e.g. instrument trolley, diathermy, suction etc)

PERSONS REQUIRED

- Anaesthetic Junior Trainee
- Anaesthetic Assistant
- Anaesthetic Senior Trainee
- Scrubs Nurse (Optional)
- Surgeon (Optional)
- Runner (Optional)

PARTICIPANT BRIEFING: (TO BE READ ALOUD TO PARTICIPANT)

You are coming on shift to start a night shift and are taking over the care of the anaesthetic.

Please take over the anaesthetic care of the patient for their extubation and transfer to the recovery area.

‘VOICE OF MANIKIN’ BRIEFING:

No speech. Anaestheised.

‘IN SCENARIO PERSONNEL’ BRIEFING:

OUT-GOING ANAESTHETIST

You have been the emergency list anaesthetist during daylight hours. You are tired and irritated as this case has gone on much longer than planned, and there are several cases now stacked up and are waiting to be done. You are keen to handover quickly – if asked why, say that you’ve needed the loo for the last hour and the case has gone on much longer than expected.

Handover the information in character as described below:
Thanks for taking over the anaesthetic for this patient. He is James Davidson, 42 year old patient who had an appendicectomy. They are usually fit and well, but have had 5 days of right iliac fossa pain, with vomiting and fevers. They had a raised white cell count and CRP.

The patient is fasted, but has had vomiting in the last 2 hours. There are no allergies known. He is a heavy smoker – admits to 20-30/day but looks like he may smoke more. Their airway examination is unremarkable. Chest examination had scattered creps throughout. He’s not previously been diagnosed as COPD.

His induction was an unremarkable RSI, but he was pyrexial and tachycardic preoperatively. He was given antibiotics on induction, but once they opened up and saw how much contamination there was from the perforation he was given additional gentamicin. He’s also required quite a few boluses of metaraminol through the case.

It’s been a very prolonged case. The operation started laparoscopically, but there was perforated and retrocaecal and due to technical difficulties was converted to open. There was some hypotension during the procedure and the patient has required several doses of metaraminol intraoperatively. In addition, an arterial line was inserted at the time of converting to open procedure.

The operation and the surgeon has just finishing suturing. You were planning to give some ondansetron and a further 5mg morphine before he wakes up and will likely need another 10mg in recovery. He’ll need reversal as some atracurium was given a short while ago as he coughed on the table.

SURGICAL TEAM

The laparoscopic appendicectomy has proceeded uneventfully and you are just finishing suturing and dressing the wounds. After finishing suturing, you can leave theatre. Announce that you will be writing the op note in the coffee room.

ANAESTHETIC ASSISTANT

The operation has finished and the patient needs to be extubated and transferred to recovery.

The patient is a bit slow to breathe and will require reversal of muscle relaxation. Hand them an unlabelled 2ml syringe with 1ml of clear fluid and tell them you’ve just drawn up the reversal – OR – this can be a labelled syringe that the outgoing anaesthetist drew up alongside some ondansetron and pain relief.

If administered, this leads to a drug error.
CONDUCT OF SCENARIO

INITIAL SETTINGS
A: ETT in situ
B: RR 14. SpO2 94%. Ventilated FiO2 50%
C: HR 95. BP 96/62
D: GCS 3. Eyes closed. etAgent 1.6.
E: Temp 36.6. Surgical drapes on, exposing abdomen.

EXPECTED ACTIONS
• Run through A-E checks in order to orientate self
• Turn off vapour increase FiO2
• Suction airway

ADDITIONAL INFO
If there are faculty members acting as theatre staff, they should be acting as distractions – causing noise, having conversations and distracting the ODP.

ADDITIONAL INFO 2
If necessary, a few minutes after the BP increases, the ODP enters the theatre from the anaesthetic room, and shows an empty 30mg Ephedrine vial that can’t be accounted for – it’s possible it was drawn up accidently.

BP RISE
B: SpO2 96%.
C: BP 240/130 over 1 min. HR 170 over 2 mins. ST depression develops 5 mins after BP surge, if appropriate management does not occur, ST elevation occurs after further 5 mins

EXPECTED ACTIONS
• Give analgesia e.g. fentanyl/alfentanyl
• Increase anaesthetic depth
• Call for help
• Check for drug errors (check with ODP also)
• Consider hypotensive agents: GTN, labetalol/propranolol, clonidine, phentolamine, hydralazine, or nifedipine.
• Consider invasive arterial BP monitoring

LOW DIFFICULTY
• Hypertension is transient and settles after 8 mins.
• ECG changes settle spontaneously

NORMAL DIFFICULTY
• With appropriate management, BP and HR settle but ECG changes persist.

HIGH DIFFICULTY
• Persistent high BP throughout scenario despite all treatments
• ST elevation pattern suggestive of acute MI

RESOLUTION
Once BP starts the settle or once appropriate post-operative plan is made
Anaesthetic Record Sheet

Patient Safety > Scenario 5 (BL)

Version 9 – May 2015

Editor: Dr Andrew Darby Smith
Original Author: Dr P Shanmuha

Fasted for 6 hrs
Hb 14
WCC 16
Plt 203
K 5.1
Ur 7
Cr 103
Blood Sugar: NAD

O/E
Pyrexial 38.5 Looks unwell.
Tachycardia 110
Chest – scattered creps
Airway Assessment
Mouth Opening:
MP Score: 1 2 3 4
Jaw: Good mouth opening
Neck: Neck ROM OK

TEETH

8 7 6 5 4 3 2 1
1 2 3 4 5 6 7 8
8 7 6 5 4 3 2 1
1 2 3 4 5 6 7 8
X = missing
C = caps / crowns
L = loose
D = damaged
B = bridge

Allergies
NKDA

Probable inflammatory mass in RIF

Notes / Discussion / Technique proposed:

Consented for GA with LMA + RHS femoral nerve block

Risks explained and consented

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.
### Anaesthetic Technique

**Vascular access:**

**Supervising Anaesthetist (S-AC)**
- Name: [Redacted]
- Location of S-AC: [Redacted]
- Discussed With S-AC: [Redacted]

**Anaesthetic Machine Check**
- Anaesthetic Technique:
  - [Redacted]

**Monitoring**
- SpO₂
- ECG
- NIBP
- E; CO₂
- F; O₂
- Anaest Vapour
- Disconnection
- Airway Pres.
- Nerve Stim.
- Temperature

**Drugs**
- Time → (units) → Total Dose

**Oxygen**
- F; O₂ L/min

**N₂O / Air / Total Gas Flow**
- % L/min

**Iso / Sevo / Des**
- E; % Mac

**Ventilation Mode**
- [Redacted]

**Freq**
- / min

**Tidal Volume**
- ml

**Paw**
- cm H₂O

**Peep**
- cm H₂O

**Position Of Patient**
- Supine
- Prone
- L-Lateral
- R-Lateral
- Lithotomy
- DHS Table

**Tourniquet (site / times)**
- Site:
- On:
- Off:

**DVT Prophylaxis**
- Heparin
- Rivaroxaban
- TEDS
- IC Boots

**Eyes Protected**
- Pressure areas padded
- Warming Blanket
- Fluid Warmer
- Warming Mattress

**Comments:**

**Post Op / recovery instructions:**

**Anaesthetic Record Entered By:**
- Name:
- Grade:
- Signature:
DEBRIEFING

POINTS FOR FURTHER DISCUSSION:

- Learn how to approach the management of unexpected hypertension under anaesthesia
- Understand the factors that can contribute to drug errors occurring
- Understand how systems can be put in place to reduce the risk of harm to patients from drug errors

DEBRIEFING RESOURCES

1. World Anaesthesia Tutorial of the Week: Hypertension in Anaesthesia

   [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1744002/pdf/v014p00e12.pdf](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1744002/pdf/v014p00e12.pdf)


INFORMATION FOR PARTICIPANTS

KEY POINTS:

- Learn how to approach the management of unexpected hypertension under anaesthesia
- Understand the factors that can contribute to drug errors occurring
- Understand how systems can be put in place to reduce the risk of harm to patients from drug errors

RELEVANCE TO AREAS OF THE ANAESTHETIC CURRICULUM:

<table>
<thead>
<tr>
<th>IG_BS_04</th>
<th>Demonstrates safe practice in selecting, checking, drawing up, diluting, labelling and administering of drugs</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_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] |
| ES_BS_03 | Manages rapid sequence induction in the high risk situation of emergency surgery for the acutely ill patient |
| CI_BK_09 | Unexpected hypertension |
| CI_BK_11 | Arrhythmias:  
\- ST segment changes  
\- Sudden bradycardia  
\- Ventricular ectopics |
| CI_BK_22 | Adverse drug reactions |
| 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 |
| 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 |
FURTHER RESOURCES:

1. World Anaesthesia Tutorial of the Week: Hypertension in Anaesthesia
   http://www.frca.co.uk/documents/hypertensioninanaesthesia.pdf

   http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1744002/pdf/v014p00e12.pdf


7. Webster CS, Merry AF, Larsson L et al. The frequency of drug administration error during anaesthesia. Anaesthesia and Intensive Care 2001. 25 (S) 494-500
### 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>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>
</tr>
<tr>
<td>I understand more about the scenario subject</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>
</tr>
<tr>
<td>The material covered was relevant to me</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)
FACULTY DEBRIEF – TO BE COMPLETED BY FACULTY TEAM

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?