Safety in Anaesthesia

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Hradec Kralove 13th September 2012
Safety in Anaesthesia

• Human Factors
• Helsinki Declaration on Patient Safety
• WHO Safe Surgery Saves Lives Checklist
• NAP4 Audit of Major Airway Complications
• Capnography
• Safe Anaesthesia Liaison Group (SALG)
• Medication Safety
European background

- In 1950 mortality due to anaesthesia was 1 in 2,500
- Today (sicker patients, bigger surgery) mortality is reduced to 1 in 100,000
- This dramatic improvement in Patient Safety made by the Speciality of Anaesthesiology has involved **Standardisation, Technology, Training & Human Factors**
- As 75% of adverse events are due to Human Factors this is an area to particularly focus on now
Human Factors

- Effective communication (probably top one)
- Team working
- Leadership
- Decision making
- Situation awareness
- Stress management (not an exclusive list)
Human Factors

• Good practitioners employ these non-technical skills to achieve consistently high performance

• These non-technical skills can be taught, practised and assessed alongside technical skills training in the workplace

Clinical Human Factors Group  www.chfg.org
Human Factors

“It’s not you I don’t trust
Human Factors

“It’s not you I don’t trust - it is your species”
Reason’s Swiss Cheese Model

Some holes due to active failures

ADVERSE EVENT

Some holes due to latent conditions
Shaw’s Swiss Cheese Healthcare Model

Safe systems are not well-developed in healthcare

Too much reliance is placed on frontline staff
Surgical Safety is a public health issue

• 234m operations worldwide each year

• Known surgical complications of 3-16%

• Known death rates of 0.4-0.8%

• WHO think these can be halved

At least 7 million disabling complications – including 1 million deaths – worldwide each year
Surgical Safety in Europe

- 50m operations in Europe each year

- Known surgical complications of 3-16%

- Known death rates of 0.4-0.8%

\[=\] At least 1.4 million disabling complications – including 200,000 deaths – in Europe each year (1 in 250 patients)

\[=\] At least 26,000 disabling complications – including 3,700 deaths – in Czech Republic each year
HELSINKI DECLARATION ON PATIENT SAFETY IN ANAESTHESIOLOGY
Helsinki Declaration on Patient Safety in Anaesthesiology

• A consensus of what we should try to do to improve Patient Safety in Europe


• Patient Safety Task Force – EBA /ESA body to help implement the Helsinki Declaration. Resources, templates and links on PSTF website
The WHO Safe Surgery Saves Lives project

More info on WHO website
www.who.int/patientsafety
or www.safesurg.org
### Surgical Safety Checklist

#### Before induction of anaesthesia
(With at least nurse and anaesthetist)

- **Has the patient confirmed his/her identity, site, procedure, and consent?**
  - Yes  
  - No
- **Is the site marked?**
  - Yes  
  - Not applicable
- **Is the anaesthesia machine and medication check complete?**
  - Yes  
  - No
- **Is the pulse oximeter on the patient and functioning?**
  - Yes  
  - No

**Does the patient have a:**

- **Known allergy?**
  - Yes  
  - No
- **Difficult airway or aspiration risk?**
  - Yes  
  - No
- **Risk of >500ml blood loss (7ml/kg in children)?**
  - Yes  
  - No

#### Before skin incision
(With nurse, anaesthetist and surgeon)

- **Confirm all team members have introduced themselves by name and role.**
- **Confirm the patient’s name, procedure, and where the incision will be made.**
- **Has antibiotic prophylaxis been given within the last 60 minutes?**
  - Yes  
  - Not applicable

**Anticipated Critical Events**

**To Surgeon:**
- What are the critical or non-routine steps?
- How long will the case take?
- What is the anticipated blood loss?

**To Anaesthetist:**
- Are there any patient-specific concerns?

**To Nursing Team:**
- Has sterility (including indicator results) been confirmed?
- Are there equipment issues or any concerns?

**Is essential imaging displayed?**
- Yes  
- Not applicable

#### Before patient leaves operating room
(With nurse, anaesthetist and surgeon)

**Nurse Verbally Confirms:**
- The name of the procedure
- Completion of instrument, sponge and needle counts
- Specimen labelling (read specimen labels aloud, including patient name)
- Whether there are any equipment problems to be addressed

**To Surgeon, Anaesthetist and Nurse:**
- What are the key concerns for recovery and management of this patient?
The Checklist was piloted in 8 cities…

- Toronto, Canada (PAHO I)
- London, UK (EURO)
- Amman, Jordan (EMRO)
- Ifakara, Tanzania (AFRO)
- New Delhi, India (SEARO)
- Seattle, USA (PAHO II)
- Manila, Philippines (WPRO I)
- Auckland, NZ (WPRO II)
...and was found to reduce the rate of postoperative complications and death by more than one-third!

Haynes et al. A

Easy Maths

234 million people are operated on each year, and >1 million of these individuals die from complications

+ At least ½ are avoidable with the Checklist

500,000 lives on the line each year

1,850 in 🇨🇿 and 11,000 in 🇬🇧
Wall chart for structured Team Briefing
Team Briefing Wall Chart

Indicate symbol in use

- Issues to be addressed before starting
  - DO NOT START
- Aware of special circumstances
  - CAN START
- No issues
  - CAN START

List order
- Anaesthetic review
- Medication
- Allergies
- MRSA / CJD risk
- Antibiotic prophylaxis
- Equipment
- Blood loss
- Imaging
- Positioning
- Post-operative care
- Duration

Other issues or comments

- She on pump, 2 grafts, done
- She on pump, 3 grafts
- 2 units of blood for each patient in fridge
Safety in Airway management

• Airway management is the core competence of Anaesthesia and Intensive Care
• All deaths in 2008-09 from major airway complications in UK part of 4th National Audit Project (NAP)
• “NAP4” published March 2011
• Theatre, ICU & Emergency Dept

www.rcoa.ac.uk/index.asp?PageID=1089
### NAP4 Death Rates 2008/09

<table>
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<tr>
<th></th>
<th>Anaesthesia</th>
<th>ICU</th>
<th>Emergency Dept</th>
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<tbody>
<tr>
<td>Death</td>
<td>16</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>Denominator</td>
<td>2.9m*</td>
<td>48,000**</td>
<td>20,000***</td>
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</table>

<table>
<thead>
<tr>
<th>Incidence of Death</th>
<th>1:180,000</th>
<th>1:2,700</th>
<th>1:5,000</th>
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<table>
<thead>
<tr>
<th>Relative Death Rate</th>
<th>1</th>
<th>x 67</th>
<th>x 36</th>
</tr>
</thead>
</table>

*NAP4 Census  
**HES ICU data 2008/9  
*** Hopkinson/Benger EMJ 2010
Continuous Capnography in ICU

- NAP4 said 74% of deaths in ICU could have been avoided if capnography had been used
- In 2008 only 25% of UK ICUs used continuous capnography routinely on every patient
- NAP4 has virtually done the controlled trial of capnography that was never done in 1988
  - 2,9m pats in theatre - 100% capnography 16 deaths
  - 48,000 pats in ICU - 25% capnography 18 deaths

Continuous Capnography in ICU

• NAP4 recommends (and provides evidence for) **Continuous capnography** for all patients with tracheal tubes (including tracheostomy)

• Austria, Greece, Sweden and Netherlands Germany and Turkey have a > 50% use in ICU

• Only 6 out of 16 European countries have any National recommendation for continuous capnography in ICU

• EBA now recommends it [www.eba-uems](http://www.eba-uems)
Key findings of NAP4

– Need for continuous capnography on ICU
– Obese patients are at greater risk
– Attempting to use a Cricothyroidotomy kit was usually unsuccessful
– Only full surgical tracheostomy worked
  • ? Lack of anaesthetic training /experience in their use
  • ? Kits technology needs further improvement

www.rcoa.ac.uk/index.asp?PageID=1089
Capnography in Recovery (PACU)

• “Capnography has the potential to aid early detection of airway obstruction (in Recovery). It should be available and used in high risk cases.”

• NAP4 Recommendation
Capnography in Recovery (PACU)

- By keeping the patient’s own catheter mount and breathing filter the capnography connection can be reused for many patients (as in theatre)
Capnography in Recovery (PACU)

- 2010 Helsinki Declaration on Patient Safety in Anaesthesiology

- Survey of its implementation in the Berlin-Brandenburg area of Germany showed 62% had capnography in Recovery (28 hospitals)

Capnography in Sedation

• Sedation is a major growth area as new procedures are developed
• Emergency Departments
• Ophthalmology
• Dental
• Cardiology
• Radiology
• Gastroenterology
Capnography in Sedation

• Breathing pattern and respiratory rate are important safety assessments - particularly in darkened x-ray or catheter laboratories

• Capnography catches what oximetry can not show or shows too late

• Absolute F$\varepsilon$ CO2 values not important

• ASA and AAGBI have recommended capnography for all moderate and deep sedation

• European Board of Anaesthesiology have as well

Capnography in Gastroscopy
Capnography in Gastroscopy
Prof Zden Kalenda MD

• 1978 he proposed the use of capnography as a means to assess pulmonary, and thus systemic, blood flow during cardiac resuscitation
• Worked with Prof Smalhout, Utrecht Netherlands

Born 22-05-1927 Lutonina, Slovakia
Died 25-06-2010 Apeldoorn, Netherlands
Capnography in Resuscitation

• 32yrs later 2010 Guidelines emphasised use of capnography to confirm and continually monitor:
  – tracheal tube placement
  – quality of CPR
  – and to provide an early indication of Return Of Spontaneous Circulation (ROSC)

Capnography in Resuscitation

- Howard Snitzer had a cardiac arrest for 96 minutes and capnography gave the confidence to continue.
- Goldberger showed some patients need more than 30 minutes of resuscitation.
- Also prolonged resuscitation efforts can result in high-quality survival with good neurological outcome.

Time to Return of Spontaneous Circulation

Cumulative ROSC by initial presenting rhythm

- VT/VF (n=12,928)
- PEA/asystole (n=51,421)

Capnography in Resuscitation

- Never assume that failure to detect CO₂ is because of a Cardiac Arrest
- The tube is probably in the wrong place
- Always some CO₂ if massaging less than 30 mins

- Most manufacturers make defibrillators with capnography
Time for capnography everywhere

- Continuous capnography has been a standard in operating theatres for 30 years and is now being recommended for all intubated patients
  - Intensive care units – airway safety (74% incidents)
  - Cardiac arrest – airway safety and cardiac output
  - Sedation procedures – trends in breathing pattern

Safe Anaesthesia Liaison Group (SALG)

- 3,188 anaesthesia related incidents were reported
- 69% of these were reported as ‘near miss’
- 7.5% of these were reported at severe harm or death

Safe Anaesthesia Liaison Group
PATIENT SAFETY UPDATE
Including the summary of reported incidents relating to anaesthesia
1 JANUARY 2012 TO 30 MARCH 2012

THIS DOCUMENT AIMS TO ACHIEVE THE FOLLOWING:

- Outline the data received, the severity of reported patient harm and the timing and source of reports.
- Provide feedback to reporters and encourage further reports.
- Provide vignettes for clinicians to use to support learning in their own Trusts and Boards.
- Provide expert comments on reported issues.
- Encourage staff to contact SALG in order to share their own learning on any of the incidents mentioned below.

MORBIDITY AND MORTALITY MEETINGS

The SALG Patient Safety Updates contain important learning from incidents reported to the National Reporting and Learning System (NRLS). The Royal College of Anaesthetists (RCoA) and the Association of Anaesthetists of Great Britain and Ireland (AAGBI) would like to bring these Safety Updates to the attention of as many anaesthetists and their teams as possible. We would like to encourage you to add this Update to the agenda of your next morbidity and mortality meeting and we would also like to hear your feedback on learning points.

Feedback from M&M meetings on how the Patient Safety Update has informed action can be sent to the SALG administrator at salg@rcoa.ac.uk.

SUMMARY

A total of 3,188 anaesthesia-related incidents were reported during the specified time period. 69% of cases were reported as ‘near miss’ (harm was prevented from reaching the patient), and 7.5% resulted in moderate or
Figure 3 shows the type of incidents that occurred within the anaesthetic specialty that were reported using LRMS or the anaesthetic eForm for the period 1 January to 31 March 2012. The categories were determined at local level.
Helsinki Declaration: Principal Requirements

- **Syringe labelling**
  - Medication Safety is next frontier (after monitoring)
  - Significant medication error in 1 in 133 anaesthetics
  - 1 in 250 of these fatal, equivalent to 1000+ in US
  - EBA recommended (ISO 26825) labels in 2008
EBA Recommendation

• In the absence of pre-printed labels for syringes, hand-written ones should be prepared, or syringes labelled directly using permanent marker pens.

EBA Recommendations: www.eba-uems.eu/recommend/
EBA Recommendation

- Pre-filled syringes should be used if possible
- Hospital pharmacies and manufacturers should supply them particularly for high risk medicines prone to errors e.g. Insulin, Potassium, Noradrenaline, Heparin (esp in ICU)

APSF Medication Safety Video: www.apsf.org/resources_video_watch2.php
EBA Recommendation

• To minimise the risk of cross infection between patients the contents of any one ampoule should only be administered to one patient. The use of multidose ampoules is not recommended.
EBA Recommendation

• To prevent transmission of infections e.g. Hep C and Malaria, the use of saline bags with reusable administration ports to provide fluid for drug dilution and syringes for flushing IV lines for more than one patient should no longer take place

• Single ampoules of saline or preferably prefilled syringes should be used instead
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Thank you for listening

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