Safe Anaesthesia Liaison Group

PATIENT SAFETY UPDATE

Including the summary of reported incidents relating to anaesthesia

01 APRIL TO 30 JUNE 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 Board
➤ 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 3,838 anaesthesia-related incidents were reported during the specified time period. 61 incidents were reported using the anaesthetic eForm; 49% of these incidents were reported to the NRLS within 1 day of occurrence. 38% of incidents reported to eForm were reported as ‘near miss’ (harm was prevented from reaching the patient). 3,777 incidents were reported using Local Risk Management Systems (LRMS); 0.6% of these incidents were reported within one day and 57% were reported more than 30 days after they had occurred (Figure 2). Of the incidents reported via LRMS, 14% were reported as near miss.

All incidents graded as death or severe harm were reviewed by the Patient Safety Team, now part of the Patient Safety Function within the NHS Commissioning Board Special Health Authority, and if identified as having potential cause for concern, were reviewed by consultant anaesthetists from the RCoA or AAGBI (no information about the Trust was disclosed in this review; only information about the incident). Most incidents were reported by consultant anaesthetists, but the eForm is available to all members of the perioperative team.

As with any voluntary reporting system, interpretation of data should be undertaken with caution as the data are subject to bias. Many incidents are not reported, and those that are reported may be incomplete having been reported immediately and before the patient outcome is known. Clarity of ‘degree of harm’ to patients who experience a patient safety incident is an important aspect of data quality.
ANAESTHETIC eForm

The anaesthetic eForm was designed to allow specific clinical information relating to anaesthetic incidents to be reported by anaesthetists and other members of the anaesthetic team and can be found at: www.eforms.nrls.nhs.uk/asbreport.

The NPSA has now closed. Responsibility for the NRLS has moved to the NHS Commissioning Board (NHS CBA) and operational management of the NRLS has moved to Imperial College Healthcare Trust. The RCoA and AAGBI continue to work with the NRLS team at Imperial and the patient safety function of the NHS CBA. SALG would like to reinforce that processes for sharing and learning incidents remain firmly in place. Staff are urged to continue to use the eForm (or your local reporting systems) to report patient safety incidents so that trends and incidents can be acted upon and learning maximised. The eForm is particularly useful as it provides a mechanism by which high quality information can be rapidly reported by members of the anaesthesia team and disseminated nationally.

INCIDENT TYPE

Figure 1 shows the type of incidents that occurred within the anaesthetic specialty that were reported using LRMS or the anaesthetic eForm for the period 1 April to 30 June 2012. The categories were determined at local level.

![Incident Type Bar Chart](image-url)
TIMELINESS OF REPORTING

Figure 2 shows the time taken to report incidents via the anaesthetic eForm (directly received into the NRLS) and via LRMS (uploaded to the NRLS periodically via local systems) during the period 1 April to 30 June 2012.

DEGREE OF HARM (ACTUAL INCIDENTS)

Figure 3 shows the degree of harm incurred by patients within the anaesthetic specialty during the period 1 April to 30 June 2012. Sixteen deaths were reported though LRMS, and two via the anaesthetic eForm.
SUMMARY OF REPORTED INCIDENTS

Anaphylaxis may present in various ways

- Tachycardia, facial flushing and lip swelling immediately after induction of anaesthesia... (allergic to propofol).
- Widespread urticarial erythematous rash, hypotension and tachycardia, no bronchospasm... improved with steroids and antihistamines, adrenaline not required, recovered uneventfully, surgery abandoned... (allergic to rocuronium).
- Patient suddenly developed bronchospasm. Became difficult to ventilate. Redness of skin and rash noticed... (referred for allergy testing).
- Sudden onset of profound hypotension with ST elevation about 15 minutes into the start of the surgery... Associated with a fall in ETCO2. Adrenaline boluses needed to improve and maintain BP. Once drapes removed perioral and tongue swelling noticed... (allergic to rocuronium).
- Patient was sat up to site epidural... midazolam given... skin cleaned with chlorhexidine. Lignocaine infiltration to skin. Whilst attempting to site epidural patient began coughing... said his throat felt ‘tight’. Epidural abandoned. Patient was laid flat... sweaty, clammy and pale. Coughing continued. 6L oxygen given via Hudson mask. IV Hartmann’s solution. BP 85/39, then 77/45, HR 90-100 BPM. 50mcg IV adrenaline + 200mg IV hydrocortisone + 20mg IV chlorpheniramine given. Symptoms improved but coughing continued. Further 50mcg IV adrenaline given. Symptoms subsided completely after 20 minutes. Surgery did not proceed... transferred for monitoring... referred for allergy testing (allergic to lignocaine).
- Patient suffered cardiac arrest after induction of anaesthesia...
- Patient had reaction to chlorhexidine skin wipe on ward while taking bloods – communicated to all at safety brief. Betadine skin prep used in anaesthetic room and theatre. Patient catheterised... became hypotensive and did not respond to metaraminol. Skin flushed, bronchospasm – diagnosis of anaphylaxis, IV adrenaline started, called for help. BP 40/25. 100% O2, fluids given, responded to two rounds CPR and adrenaline. Ventilated overnight at the ITU and extubated next day. Chlorhexidine present in Instillagel and Travasept used for catheterisation... discussed in M&M meeting (tested positive for chlorhexidine allergy).
- Complex antibiotic problem – consulted micro team re antibiotics who suggested flucloxacillin. Followed recommendation but did not check allergy status. First dose given no adverse effects, I will check in future... (known penicillin allergy).

Suspected anaphylactic reactions associated with anaesthesia have an estimated incidence of 1:10,000 – 1:20,000 anaesthetics. Presentation is variable, typically involving cutaneous, respiratory and/or cardiovascular changes. Diagnosis may be delayed during surgery as other causes of cardiovascular instability or bronchospasm are more common, and cutaneous signs may be obscured by surgical drapes.

Anaphylaxis is more common when drugs are given intravenously, but may occur after exposure to drugs via other routes. Delayed reactions may occur after exposure to latex, antibiotics, intravenous colloids or Cidex. Neuromuscular blocking drugs and latex are the most common causes of anaesthesia-related anaphylaxis. Only a small proportion of patients with reported allergy to antibiotics have a true allergy, but the consequences of administering an antibiotic to an individual with a known allergy may be catastrophic.

Ideally, exposure to known allergens should always be prevented, but the chlorhexidine incident shows that a high level of shared awareness and good team working helps to deal with the unexpected.

The MHRA recently published a Drug Safety Update to remind healthcare professionals about possible hypersensitivity reactions in a range of products containing chlorhexidine. The UK Resuscitation Council published Guidelines for emergency treatment of anaphylactic reactions. Cardiac output may be impaired due to reduced coronary artery perfusion or impaired venous return. Adrenaline should be given to all those with life-threatening features; dilute adrenaline may be given intravenously by those familiar with its use. Case reports support the use of other vasoconstrictors such as metaraminol or noradrenaline if blood pressure does not respond to adrenaline bolus/infusion. Chlorpheniramine and hydrocortisone should be given after initial resuscitation.
NICE has recently updated guidance on Initial assessment and referral for emergency treatment for an anaphylactic episode. A blood sample (5-10ml clotted blood) should be taken for mast cell tryptase as soon as possible after emergency treatment has started, then at 1-2 hours later (peak level); a sample at 24 hours gives the baseline tryptase level. Patients who have received emergency treatment for anaphylaxis should be referred for specialist investigation.

The anaesthetist who administered the anaesthetic or the consultant anaesthetist in charge of the patient is responsible for ensuring that the reaction is investigated. The events should be clearly documented in the notes, and the GP informed. A list of allergy centres and standard referral form is available on the AAGBI website.

Adverse drug reactions are under-reported in the UK. They should all be reported to the MHRA via the Yellow Card Scheme.

**Medical device problems... spotlight on the anaesthetic machine**

➤ Soda lime canister changed on theatre machine in the morning. Put patient on in afternoon and discovered major leak. Could not identify source immediately so ventilated patient with bag-valve-mask and changed machine. When faulty machine examined, it was found to be missing a washer from the water trap port on the machine where the canister goes. It had fallen off when the soda lime was changed. It was found and replaced.

➤ The vaporiser on the anaesthetic machine in the theatre was not seated properly and unable to deliver anaesthetic. Patient kept anaesthetised with propofol.

➤ Datex Ohmeda SS ADU Carestation in use. Isoflurane turned off briefly during case to refill cassette. Would not then turn back on. Removed and reinserted several times – still would not work. Changed to sevoflurane cassette – recognised by machine, but still would not allow any volatile to be turned on. Therefore changed to propofol TCI.

➤ Datex Ohmeda anaesthetic machine with desflurane vaporiser cassette began to give a previously unseen error – vaporiser failure – and shutting off the vaporiser. Reset the vaporiser and it functioned properly for about 30 minutes and then began again. Vaporiser changed for another and this started giving the same error code after about 20 minutes. At this point, I decided that it was not a vaporiser failure but a machine failure and the machine was changed mid-anaesthetic.

The AAGBI published updated guidance on checking anaesthetic equipment, which includes checks to be done at the start of each list, and before each patient. The MHRA works with manufacturers and device users to make sure that medical devices work properly and are acceptably safe. The MHRA has recently published one liners warning of problems with vaporisers and other common problems with anaesthesia devices.

**MHRA guidance** is available on reporting adverse incidents relating to medical devices. Online reporting is encouraged for any adverse incident related to a device or its instructions for use, manufacturing supply problems, minor safety or quality problems or problems related to human error.

If a device has been involved in an incident it should be taken out of service. The incident should be reported to the MHRA and the manufacturer or supplier informed.

**Preoperative assessment**

➤ Morbidly obese patient (180kg) with undiagnosed sleep apnoea, poorly controlled hypertension and diabetes, not seen in preoperative assessment clinic. Problems with ventilation peri-op requiring frequent hand bagging to achieve \(\text{SpO}_2 > 95\%\) on 100% \(\text{O}_2\). Tube not long enough and kept being displaced above cords, requiring repositioning on several occasions. Extubation and post-op recovery uneventful. Patient admitted overnight...

➤ General anaesthesia administered for cranioplasty following decompressive craniectomy. \(\text{SpO}_2\) 95% on room air. \(\text{SpO}_2\) noted to be 85% immediately after intubation, probe re-positioned on patient’s finger but \(\text{SpO}_2\) remained 85% on 100% \(\text{O}_2\). Surgeon informed... surgery cancelled. Patient ventilated in ITU for 24 hours until oxygenation improved. This man was only admitted on the day of surgery so had limited assessment pre-operatively...
Tracheostomy change under GA on patient with severe learning difficulties, severe MS and severe epilepsy. Gas induction with 4% sevoflurane, air/O2, remifentanil TCI. Severe bradycardia (<30) followed by asystole, responded to atropine 600mcg plus brief cardiac massage. Spontaneous return of stable pulse, blood pressure. Tracheostomy changed without further problems, no further sequelae. Team debrief and reflection following event considered potentially severe autonomic dysfunction in MS sufferers and extreme sensitivity to anaesthetic drugs.

Severe COPD with PEFR 180-200. Pre-assessment not carried out because of staffing issues – notes refer to houseman not being available on presentation for pre-op assessment but document poor PEFRs, SOBOE and avoidance of stairs wherever possible. Underwent prolonged head down laparoscopic procedure with acute exacerbation of severe COPD...

Patients are increasingly admitted on the day of surgery, which allows little time for assessment and preoperative preparation of complex cases. The anaesthetist should only proceed with surgery if they are happy that the patient has been prepared adequately. In all but exceptional circumstances preoperative assessment should take place in a designated reception area, dedicated clinic room or in the ward, ensuring privacy and respecting patients’ dignity, and not in the anaesthetic room. Preoperative assessment is a key component of the management of risk for all patients.

The role of the anaesthetist in preoperative assessment is described in the AAGBI Safety Guideline Preoperative Assessment and Patient Preparation. Guidance entitled Peri-operative Management of the Morbidly Obese Patient is also available. A team debrief after an unusual or adverse event is good practice and facilitates shared learning.

Prone positioning – beware

The endotracheal tube became dislodged during surgery for posterior stabilisation of cervical spine with the patient prone. Profuse secretions caused the sleek securing the ETT to lose adhesiveness… and the ETT slid out under the weight of the tubing. The patient had to be turned supine rapidly and re-intubated…

Patient having spinal injection… opted for sedation, procedure performed in prone position. He positioned himself on the table, and was given midazolam 2mg intravenously… Airway became obstructed…

The patient developed onset of blindness diagnosed as ischaemic optic neuropathy (MRI and neurology review). Cause unknown – underlying injury, known occipital infarcts or physiological effects of injury and prone positioning for spinal fixation…

Meticulous care must be taken when positioning and monitoring patients in the prone position. Visual loss is more common after spinal surgery than other surgery (0.2% of patients), particularly after prolonged surgery or where there is substantial blood loss. The ASA has produced a Practice Advisory for Perioperative Visual Loss after Spinal Surgery.

Neuraxial connectors, Part B

Nursing staff realised epidural infusion connected to IV cannula when covers removed to turn patient. Infusion had been connected three hours earlier in recovery…

Part B of the NPSA Patient Safety Alert Safer spinal (intrathecal), epidural and regional devices will introduce new connectors to the NHS so that it will not be possible to connect epidural or regional block infusions to intravenous devices. In the meantime, The NPSA Patient Safety Alert 21 advises Trusts to use epidural administration sets and catheters that are clearly labelled and ideally colour coded, to distinguish them from those used for intravenous and other routes.

Transurethral Resection of the Prostate (TURP) syndrome – rare but not forgotten

Patient receiving GA for TURP developed asystolic cardiac arrest about 90 minutes into procedure. CPR commenced, patient intubated, adrenaline and atropine only achieved temporary return of sinus rhythm. Sodium noted to be 108 mmol/l. Temporary pacing wire inserted and patient transferred to ICU ventilated and cooled overnight. Made a good recovery. Most likely cause of arrest was TURP syndrome (glycine used for irrigation).
TURP syndrome is a rare complication following TURP surgery, commonly due to capsule perforation or damage to prostatic venous sinuses. This leads to absorption of irrigation fluid, which may lead to severe hyponatraemia and cerebral oedema. Cardiovascular collapse is seen in severe TURP syndrome. The incidence of TURP syndrome is reduced by low-pressure irrigation, or use of a bipolar resectoscope with normal saline for irrigation. Treatment is based on hypertonic saline and supportive therapies. Fluid absorption in endoscopic surgery is the topic of a recent review.

Awareness – be aware of NAP5

- Child undergoing elective congenital hand surgery, uneventful gas induction, transferred into theatre.
  
  Intubated and ventilated without incident and settled quietly on operating table with normal observations initially recorded in theatre. Attention of the anaesthetist diverted to problems with tourniquet. After 10 mins tourniquet inflated and child suddenly reached for ET tube and self-extubated. Gave IV propofol and reintubated. Uneventful surgery and recovery thereafter. Sevoflurane had not been commenced in theatre and levels had fallen so child had become light. No relaxants had been used only a small amount of propofol to facilitate placing ET. Cause of incident: attention slip due to equipment distraction error. Full explanation given to parents using the electronic printout from the anaesthetic. Child made an uneventful recovery with no recollection of incident. Parents grateful for full and open explanation and reassured this would not happen on any future visit with a full personal apology made. No complaint raised.

Accidental awareness during general anaesthesia is the topic of the 5th National Anaesthesia Audit Project; the aims of the audit are to describe the incidence and possible aetiologies of accidental awareness in adults and children.

Dental injury

- Routine GA in patient with a crowned tooth. Not loose. Patient warned during routine pre-op discussion.
  
  Unremarkable induction and LMA insertion. Crown dislodged at some point during anaesthesia and recovery, became apparent when the LMA was removed in recovery.

Dental trauma is a frequent cause of patient distress. The King’s Dental Institute in association with SALG has published a guide, Dental trauma during anaesthesia, to identify at-risk patients, actions that should be taken if a tooth is damaged, and a sample dental referral form.

Wrong site block

- Friday afternoon, last patient on the trauma list, for washout of LEFT hip... plan for GA and lateral cutaneous nerve of the thigh block asleep. Site of surgery checked before induction. After induction, right thigh accidentally exposed followed by wrong-sided block. Mistake realised on positioning patient in OR...

Distractions in the anaesthetic room are a common cause of wrong site blocks. Nottingham University Hospitals, in association with SALG and Regional Anaesthesia UK, have published a guide, Stop before you block, suggesting a STOP moment must take place immediately before inserting the block needle so that the anaesthetist AND the anaesthetic assistant double-check the surgical site marking and the site and side of the block.

There is no harm in double-checking equipment and drugs – in fact it can save lives

- Anaesthetic nurse had checked anaesthetic machine. Anaesthetist performed second check and found that oxygen pipeline had not been reconnected. Machine was running on reserve oxygen cylinder.

- Thiopentone mistaken for an antibiotic – unintended general anaesthetic administered. Usual precautions were taken to secure the airway and the patient woke a short time later. The anaesthetist had recently prepared emergency anaesthetic drugs in the same area.

- Two 20ml bottles of Monsel Solution (containing ferrous sulphate, sulphuric acid and nitric acid, used as a haemostatic agent after skin biopsy) delivered in place of two bottles of sodium citrate. One was found on the anaesthetic machine ready to be given and the second was in the drug cupboard. No patient administration occurred. We are currently investigating the chain of events leading to the substitution but one contributing factor is the similarity of the packaging.
0.25% bupivacaine vials without additional sterile packaging have recently been introduced. These vials are very similar in appearance to the vials containing 0.9% sodium chloride which are used in my hospital (figure 4 and figure 5). There is a very significant potential risk for inadvertent, intravenous injection of bupivacaine which could be catastrophic.

PATIENT SAFETY CONFERENCE, GLASGOW 2012

The SALG annual patient safety conference will take place on Tuesday, 23 October at the Royal College of Physicians and Surgeons of Glasgow. This year’s programme will include;

- Opening address by Dr Aileen Keel, Deputy CMO Scotland
- Interactive Crisis Management Scenarios
- Talks on drug safety, human factors, IT and patient safety in the workplace.

Should you wish to book a place, please visit the RCoA website, where you will also find a full programme.