SAFE ANAESTHESIA LIAISON GROUP

PATIENT SAFETY UPDATE

November 2024 – February 2025

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Based on data from 1 November 2024–February 2025

Prevention of Future Deaths Report: Central Venous Catheter (CVC) insertion

Paragraph 7 of Schedule 5 of the Coroners and Justice Act 2009 requires coroners to issue reports to individuals, organisations, local authorities, or government bodies when they believe action is needed to prevent future deaths.

When such a report is received by the Royal College of Anaesthetists or the Association of Anaesthetists, SALG (Safe Anaesthesia Liaison Group) generates a response and oversees implementation of any recommended actions.

This update outlines actions taken based on SALG's response to a coroner regarding the sad death of Mr Maxwell Frame, which raised concerns about the lack of a national policy on central venous catheter (CVC) placement. The original report and SALG's response are available on the SALG website.

In its response, SALG noted that the Association of Anaesthetists' guidance on 'Safe Vascular Access' was being updated to include clearer recommendations on CVC placement. The revised guidance was published last month in *Anaesthesia*.

Additionally, FICM and ICS have updated their Central Venous Catheter Insertion checklist, which can be used by organisations as the basis for their LocSSIP. This checklist is available on the FICM website.

Modified release opioids and treatment of post-operative pain

SALG was asked to justify support for the removal of postoperative pain as an indication for modified-release opioids, based on the Public Assessment Report published in March 2025, and highlighted in the previous edition of the Patient Safety Update (published May 2025). The correspondent requested evidence of patient harm when modified release opioid medications were used in enhanced recovery protocols following arthroplasty and caesarean section.

The response by the chairs of SALG, Dr Plaat and Dr Barclay is reproduced in abridged form here.

The letter explaining our position, including references for some of the evidence for the recommendation is available on the SALG website.

CPOC has also produced a position statement on MR opioid use.

Guidelines from the USA, UK and Australasia all now advise against use of MR opioids for acute pain, including this publication from the FDA and the revised CDC guidelines for prescribing opioids for pain.

Below are some additional references regarding the risk of persistent post-operative opioid use. following prescription of modified release opioids:

1. Lam T, Xia T, Biggs N et al. Effect of discharge opioid on persistent postoperative opioid use: a retrospective cohort study comparing tapentadol with oxycodone. *Anaesthesia* 2023; **78**(4): 420-31.
2. Gong J, Beyene K, Yan Chan AH et al. Persistent opioid use after hospital admission due to trauma: a population-based cohort study. *Pain*, 2025; **166**(1): e1-9.
3. Shah A, Hayes CJ, Martin BC. Factors Influencing Long-Term Opioid Use Among Opioid Naive Patients: An Examination of Initial Prescription Characteristics and Pain Etiologies. *J Pain* 2017; **18**(11): 1374-83:

In the context of enhanced recovery protocols, not only is there risk of dependence, but also a lack of evidence of benefit. You mention post operative LSCS and arthroplasty in your email, so we have focused on these two patient groups in our response.

As obstetric anaesthetists ourselves we were interested to read that some hospitals routinely prescribe modified release opioids to patients who have had a Caesarean section. The NICE guideline committee for Caesarean Birth[1] did not find evidence to support the use of modified release opiates. Current NICE guidelines published in 2021 recommend paracetamol, NSAIDs and dihydrocodeine. This was echoed by Roofhoft et al in the PROSPECT guideline for pain management after elective Caesarean section,[2] both NICE and PROSPECT encourage multimodal approaches to minimise post-operative opiate usage and enable it to be discontinued as soon as possible.

1. NICE. Caesarean birth NG192. 2021
2. Roofthooft E, Joshi GP, Rawal N, Van de Velde M. PROSPECT guideline for elective caesarean section: updated systematic review and procedure-specific postoperative pain management recommendations. *Anaesthesia*, 2021; **76**(5), 665–80.

Regarding arthroplasty, below are links to European guidelines about pain management after arthroplasty from the PROSPECT Group, which is the group that generates evidence-based guidelines for the European Society of Regional Anaesthesia

1. Lavand'homme, P. M., Kehlet, H., Rawal, N., & Joshi, G. P. . Pain management after total knee arthroplasty: PROcedure SPEcific Postoperative Pain ManagemenT recommendations. *EJA*, 2022; **39**(9): 743–57. Lippincott Williams and Wilkins.
2. Anger M, Valovski H, Beloeil P, et al. PROSPECT guideline for total hip arthroplasty: a systematic review and procedure-specific postoperative pain management recommendations. *Anaes*, 2021; **76**(8), 1082–97.

Neither of these guidelines recommends the use of modified-release opiates. Immediate release opiates are only recommended for rescue analgesia.

Fluid absorption during HoLEP (Holmium Laser Enucleation of the Prostate)

This case was reported directly to SALG by an anaesthetist involved in the case.

An elderly patient was referred for HoLEP. Apart from hypertension [the patient] was in reasonable health with a starting Hb of 14g/dl. [The patient] received sevoflurane/ N2O based general anaesthesia, the trachea was intubated and an arterial line sited. The resection lasted approximately 3hrs. 365g of tissue was resected and blood loss was unremarkable. Approximately 200L of 0.9% saline was used for irrigation. The patient remained cardioivascularly stable throughout apart from an episode towards the end of the case. Prominent scleral oedema noticed. There was no significant hypoxia.

Arterial Blood Gas (ABG) taken once resection complete revealed a Hb 7, Cl 117 with a mild acidaemia. 2 units packed red cells were infused. Frusemide 40mg given intravenously as it was considered that excess fluid absorption was likely.

The patient was confused at the time of extubation but settled after 30mins, on arrival in post-operative recovery they reported some hearing loss in the right ear which persisted to discharge. ENT follow-up identified impaired hearing that was considered likely to be permanent.

Commentary:
This case has been shared with SALG's partners at CORESS, to identify and publish the lessons in this case for surgery. Once this has taken place, we will include a link to their publication here.

As HoLEP is used to treat often very large prostates, resection times can be prolonged and there may be absorption of deleterious amounts of saline – the irrigation fluid used- although in this case, it seems that more than the usual amount of saline was used.

The patient was given gentamicin in a dose routinely used for surgical prophylaxis- 160mg in divided doses over 5 minutes at induction- which is not associated with toxic levels. Therefore, this was considered unlikely to be the cause of the persistent hearing loss. Fluid overload during HoLEP has been shown to cause temporary hearing loss, and in this case, the patient probably developed cerebral oedema. The considerable drop in haemoglobin concentration was almost certainly due primarily to haemodilution. It is also likely that the patient had some pre-existing hearing loss, which is common in their age group, with a prevalence of 60-75%.

In order to minimise saline absorption, resection time should be limited, and two stage procedures may be needed. Whenever possible venous sinuses should not be breached. During resection, plasma chloride concentrations could be used to monitor absorption.[1,2]

1. Slots C, Uvin P, Van Damme E. Irrigation fluid absorption syndrome during HoLEP: A case study. Urol Case Rep, 2022; **45**.
2. Dodd SE, Jankowski CJ, Krambeck AE, Gali B. Metabolic acidosis with hemodilution due to massive absorption of normal saline as bladder irrigation fluid following holmium laser enucleation of prostate. *J Anaesth*, 2016; **30**: 1060-2.

Oesophageal temperature probe

An oesophageal temperature probe that was being used during upper GI surgery, migrated intraoperatively into the stomach and was inadvertently trapped in a staple line/ anastomosis. There were no device issues, however there were also no alarms or disruption in monitoring to make the team aware of the issue.

This incident was reported to SALG and subsequently escalated for review by NHS England.

Commentary:
A data search across Learn from Patient Safety Events (LFPSE) and the National Reporting and Learning System (NRLS) identified only one similar incident. Additional cases were identified through a literature search and anecdotally via clinical contacts, bringing the total number of similar reports to four.

All cases occurred during Nissen fundoplication or sleeve gastrectomy procedures. Both involve the use

of an oesophageal bougie. It was hypothesised that the temperature probe might have been dragged down into the stomach during bougie placement, where it subsequently became caught in the surgical staple line. A contributing factor is the lack of visual markings on some temperature probes, making it difficult for the team to monitor their position intraoperatively.

While the frequency of such events appears low the consequences were significant. One of the patients required prolonged ICU care postoperatively.

Recommendations from the review include:

- Engagement with surgical bodies, for example the Association of Upper Gastrointestinal Surgery of Great Britain and Ireland (AUGIS) and the British Obesity and Metabolic Specialist Society (BOMSS) to develop guidance regarding probe management during such procedures.
- Exploration of collaboration with MHRA on probe design, specifically regarding the addition of visible depth marking

Other forms of invasive temperature monitoring could be considered for patients undergoing upper GI surgery, for example rectal temperature probes.

Extra-tracheal migration of an endotracheal tube during emergency tracheostomy management – an under recognised complication

This content has been generated for SALG by the anaesthetist involved in the case, with editorial assistance from Dr Sandeep Sudan on behalf of the Difficult Airway Society.

A patient of BMI 40+ underwent surgical tracheostomy to facilitate weaning from mechanical ventilation. On the third day after tracheostomy, the patient suffered a cardiac arrest due to suspected obstruction of the tracheostomy tube. The tracheostomy tube was removed, and the trachea reintubated via the oral route using a video laryngoscope and bougie. A sustained, square-wave end tidal carbon dioxide trace was obtained, followed by return of spontaneous circulation. As there was a large leak of air from the tracheostoma, the endotracheal tube tip was presumed to be lying above this section of the trachea, so was advanced further in line with NTSP guidance.]

Shortly after advancing the endotracheal tube, subcutaneous emphysema of the chest and neck developed and the patient sustained a further cardiac arrest. An attenuated, intermittent, CO_2 trace was present during this time, which was interpreted as indicating an appropriate position of the endotracheal tube in the context of an ongoing cardiac arrest. Tension pneumothorax was postulated as a cause for the second arrest and bilateral needle decompressions were undertaken, without improvement in the patient's condition.

Subsequent flexible endoscopic examination via the endotracheal tube failed to reveal tracheobronchial anatomy. The tracheostoma was explored at the bedside by an ENT surgeon who found that the oral endotracheal tube had exited the trachea, via the tracheostoma, into the adjacent soft tissues of the neck – a finding that was not evident on external examination due to the raised BMI. The endotracheal tube was removed from the mouth and an Igel placed, with reoxygenation, sustained $ETCO_2$ and return of circulation occurring shortly afterwards.

Commentary:
During oral reintubation of a patient with a recently removed tracheostomy, an oral tube will normally follow the lumen of the trachea and pass safety into the distal trachea, beyond the tracheostoma. In this case though, the tube tip passed through the anterior deficit in the tracheal wall, which resulted in it coming to lie outside of the trachea. While infrequent, this sequence has been observed in other patients.[2,3] It also re-occurred in this same patient during later, elective, intubation attempts. The occurrence of subcutaneous emphysema after oral intubation in a patient with a tracheostoma should raise suspicion of extra tracheal passage, particularly in a patient with a raised BMI where the tracheostoma is deep and an aberrant (oral) tube position may not be visible in the neck.

As the extra-tracheal plane created by the endotracheal tube tip was in communication with the airway, intermittent CO_2 was obtained, despite the tip lying outside of the trachea.

This case highlights potential issues that can occur when performing airway management in a patient with disrupted or abnormal tracheal anatomy. Where feasible, intubation with the assistance of a fibreoptic scope should be considered to improve the likelihood of safe passage beyond any area of anatomical abnormality. Alternatively, an early endoscopic check of tube placement may be prudent to allow prompt recognition of inadvertent extra-tracheal tip placement.[4]

References

1. National Tracheostomy Safety Project. Comprehensive Tracheostomy Care. NTSP Manual, 2013.
2. Safe Anaesthesia Liaison Group. Patient Safety Update (April 2021 – June 2021):**2**.
3. Personal Communication, Prof B McGrath.
4. Baumgartner FJ, Ayres B, Theuer C. Danger of False Intubation After Traumatic Tracheal Transection. *Ann Thorac Surg* 1997; **63**:227-8.

Awareness under anaesthesia

Following discharge after an uneventful surgical procedure, a patient contacted the hospital reporting an episode of accidental awareness during general anaesthesia. The anaesthetist and the ODP identified that the vaporiser although turned on, was empty. An episode of tachycardia had alerted the anaesthetic team and the error was identified and rectified perioperatively.

Commentary:

There is not a lot of detail in this case report around what happened when the problem was identified perioperatively, and whether the duty of candour was fulfilled at the time of the incident, ensuring that the patient was informed and supported appropriately. However this case serves as a useful reminder of the recommendations in the National Audit Project 5: Accidental Awareness under General Anaesthesia (AAGA), which are distilled in the NAP 5 handbook,[1,2] the implementation pack accompanying these two documents includes a framework for managing patients reporting AAGA.[3] This case also highlights the importance of conducting a structured postoperative review, for example using the BRICE questionnaire, to identify any awareness events.

This case demonstrates the importance of checking that vaporisers are fitted correctly, filled, and leak-free at the start of every case, and using volatile agent monitoring systems to ensure adequate end-tidal concentration of volatile agent in accordance with Association of Anaesthetists Safety Guidelines.[4,5]

References

1. Royal College of Anaesthetists and the Association of Anaesthetists. NAP 5: Accidental Awareness during General Anaesthesia in the UK and Ireland, 2014.
2. Royal College of Anaesthetists and the Association of Anaesthetists. The NAP 5 Handbook: Concise practice guidance on the prevention and management of accidental awareness during general anaesthesia, 2019.
3. Royal College of Anaesthetists and the Association of Anaesthetists of Great Britain and Ireland. NAP5 Anaesthesia Awareness Support Pack, 2014.
4. Association of Anaesthetists of Great Britain and Ireland. Checking Anaesthetic Equipment 2012. *Anaes* 2012; **67**:660-8.
5. Klein AA, Meek T, Allcock E, Mincher N, et al. (2021). Recommendations for standards of monitoring during anaesthesia and recovery 2021 (Guideline from the Association of Anaesthetists). Anaes 2021; **76**(9): 1212-23.

Airway complications

This content has been generated for SALG by Dr Sandeep Sudan on behalf of the Difficult Airway Society.

CASE 1

A patient presented to Accident and Emergency with a post operative bleed 3 days after a hemithyroidectomy. Nasendoscopy showed a patent upper airway. The senior anaesthetic resident discussed the case with their consultant. The patient's airway assessment was favourable (MP1) and they agreed that the resident would use videolaryngoscopy for intubation, using a supraglottic airway as Plan B, with fibreoptic available. The consultant surgeon was also happy to let their registrar continue in their absence.

The resident was unable to intubate or ventilate through a SGA. Both the resident and an on-site ITU consultant were unable to get emergency front of neck access [eFONA] via the open neck wound. After a second failed attempt at eFONA the ICU consultant managed to intubate orally using laryngoscopy and a bougie passed blindly.

The patient was swiftly re-oxygenated and vital signs returned to acceptable levels (5 mins of inability to ventilate, sats dropped to 11%) There was no cardiac arrest.

After a suitable period of stability, the patient was moved to the operating theatre and surgery took place.

Commentary:

This case highlights the need for careful planning for patients with an anticipated difficult airway, even when time is against you. This includes having the correct team, expertise and kit present.

On a technical note of best practice:

- We are moving from pre- to per-oxygenation to prolong the apnoeic window, especially when intubation is predicted to be difficult. Use of high flow nasal oxygen is therefore encouraged
- Evaluate for airway compromise and evacuate haematoma if needed
- For intubation: small tubes with introducers may offer more success

- Sustained exhaled CO_2 (alongside visualisation) is to be used to confirm tube placement in all circumstances.

Awake techniques maybe preferable in such cases. Please see references to the Difficult Airway Society's guidelines for awake tracheal intubation[1] and the checklist[2] that highlights which team members should be on site and identifies who should perform eFONA should the need arise.

For full airway management of haematoma after thyroid surgery readers are referred to the multidisciplinary consensus guidelines from the Difficult Airway Society, British Association of Endocrine and Thyroid Surgeons and the British Association of Otorhinolaryngology, Head and Neck Surgery.[3]

References

1. Ahmad I, El-Boghdadly K, Bhagrath R, et al. Difficult Airway Society guidelines for awake tracheal intubation (ATI) in adults. *Anaes*. 2020; **75**(4): 509-28.
2. Difficult Airway Society Checklist for Awake Tracheal Intubation. *Anaes*. 2020; **75**(4), Supplement.
3. Iliff, HA, El-Boghadadly K, Ahmad I, et al. Management of haematoma after thyroid surgery: systematic review and multidisciplinary consensus guidelines from the Difficult Airway Society, the British Association of Endocrine and Thyroid Surgeons and the British Association of Otorhinolaryngology, Head and Neck Surgery. *Anaes*. 2020; **77**(1): 82-95.

CASE 2

A surgical tracheostomy was performed (adjustable flange) on an ITU patient. Back in ITU a post operative chest x-ray showed the tip of tube to be at the carina. When the flange of tracheostomy was withdrawn 2 cm, ventilation became impossible and could not be restored when the tube was returned to its original position.

The inner cannula was removed but a suction catheter could not be passed, the patient still could not be ventilated and the oxygen saturations dropped to 40%. Bronchoscopy via the tracheostomy showed the tube against tracheal wall but attempts to reposition it in the trachea caused further desaturation. The ICU consultant inserted a bougie and tube orally using a videolaryngoscope but could not pass either beyond the vocal cords, even after the tracheostomy tube was removed.

Another trial of intubation was unsuccessful, and ventilation was impossible with either a 2nd gen supraglottic airway or a face mask. Jet ventilation via a cannula through the tracheostomy stoma also failed. The duty anaesthetist from theatres was called. In total the patient experienced around 10 minutes with minimal or no ventilation. There was loss of cardiac output and chest compressions were started. After several further attempts the trachea was intubated with a size 8 tube using a videolaryngoscope. The patient received 14 minutes CPR before return of spontaneous circulation.

Commentary:

This case highlights how tracheostomy emergencies can rapidly become life threatening. The National Tracheostomy Safety Project website[1,2] contains resources/information that all staff should be aware of (for both patients with tracheostomies and laryngectomies).

Waveform capnography should always be used to access a patent/partially not patent airway.

Unfamiliarity with different types of tracheostomy tubes can lead to morbidity and mortality; standardization is key. With respect to adjustable flange or variable length tracheostomy tubes, SALG has previously commented on the issues that can arise (PSU, April-June 2021: page 3). We are again reminded that correct positioning should always be confirmed before any withdrawal, by bronchoscopy and direct vision rather than imaging/CXR.

References

1. National Tracheostomy Safety Project website [Accessed, September 2025].
2. McGrath, BA, Bates, L., Atkinson, D., Moore, JA. Multidisciplinary guidelines for the management of tracheostomy and laryngectomy airway emergencies. *Anaes*. 2012; **67**(9): 1025-41.

CASE 3

A frail patient with small bowel obstruction required emergency laparotomy. Previous difficult intubation was noted, and it was decided to induce anaesthesia in theatre preoxygenated. Plan for RSI: Mac-VL, bougie, cricoid. After careful positioning the patient was pre-oxygenated. First attempt at laryngoscopy was by the resident anaesthetist who found copious gastric contents obscuring the view; the airway was suctioned and the patient positioned head down. During a second attempt at laryngoscopy further copious gastric secretions were suctioned. SpO2 started to decline slowly (92%). The consultant inserted an igel to restore oxygenation with good effect. Assistance was requested from second consultant anaesthetist and ENT consultant in adjacent theatre. The trachea was intubated with Mac –VL and stylet. The ENT consultant performed immediate bronchoscopy and lavage. However, oxygenation became increasingly challenging despite recruitment manoeuvres. CXR showed a collapsed right upper lobe. The ICU consultant performed repeat bronchoscopy and lavage with some improvement in oxygenation.

Commentary:
As with our first case, all patients require a full airway strategy. Awake techniques maybe preferable and should always be considered.

The use of cricoid pressure as a component of rapid sequence intubation (RSI) is a matter for debate but when bowel obstruction is suspected, cricoid pressure is recommended.[1,2] Furthermore, the insertion of the NG tube should be considered pre-operatively.

The Difficult Airway Society is currently updating its 2015 guidelines for management of unanticipated difficult intubation in adults, including the section on rapid sequence induction (RSI). In addition to this update, SALG is developing a best practice statement specifically focussed on RSI, which will be included in the revised guidelines. This work is one of the actions identified in SALG's response to a Prevention of Future Deaths notice issued in December 2024, following the coroner's inquest into the death of Mrs Pamela Anne Marking.

Project for Universal Management of the Airway (PUMA)[4] also discusses the different components of RSI.

References

1. Coroner for Surrey Pamela Marking: Prevention of Future Deaths Report. Dec. 2024.
2. Safe Anaesthesia Liaison Group, Difficult Airway Society. Joint response to Regulation 28: Report to prevent future deaths in the matter of Mrs Pamela Anne Marking, 2025.
3. Difficult Airway Society. DAS guidelines for management of unanticipated difficult intubation in adults, 2015.
4. Project of Universal Management of Airways. Guidelines for Rapid Sequence Intubation, 2025.

Transfer issue

This content has been generated for SALG by Dr Scott Grier, Clinical Director, Retrieve Adult Critical Care Transfer Service and chair of the working party updating the ICS guidance on transfer of the critically ill adult.

A cardiac patient required transfer from one hospital to another. Upon arrival of the ambulance, there were delays both in locating the patient, and identifying which staff were to accompany the patient. The crew were waiting for over 30 mins while wider team decided. The doctor accompanying the patient did not have an assistant with them. It was unclear if the hospital staff were aware of the crew's SOPs for the type of transfer.

The crew- assisted by nursing staff- transferred the patient onto the ambulance trolley. There was then a further 30-minute delay establishing IABP monitoring.

Multiple road closures near the destination caused a delay of approximately 5 minutes on normal journey time. The doctor accompanying the patient did not seem to be aware of the process for handover of the patient at the receiving hospital. Once inside the hospital, after handover to the appropriate hospital staff the patient suffered a cardiac arrest.

Commentary:
Standards for inter-hospital transfer of critically ill patients have existed for over 25 years. An update of the Intensive Care Society's guidance on transfer of the critically ill adult is due to be published before the end of 2025.[1]

Existing guidelines describe the need for two clinical escorts from the referring hospital to accompany the patient in order to continue to deliver critical care during transfer. Typically these individuals are doctors/ACCPs from anaesthesia/critical care backgrounds, accompanied by nurse or ODP colleagues. The new guidelines emphasise the need for these individuals to be appropriately trained and experienced in the management of the condition the patient is suffering with as well as any anticipated deterioration/complication that may occur during transfer.

Paramedic colleagues have a defined scope of practice (JRCALC)[2] which is typically commensurate with ward levels of care plus administration of fluids, opiate analgesia and delivery of advanced life support. They should not be asked or expected to care for patients outside this scope who require inter-hospital transfer.

Inter-facility transfers are prioritised by ambulance services based on national criteria[3] and Hospital Trusts/ Departments should integrate the principles of these into their transfer guidelines.

In this case there are several areas for improvement:

- There was uncertainty regarding scope of practice and competence.
- The referring hospital was unable to rapidly provide two clinical escorts to accompany the patient.
- The doctor undertaking the transfer appears unfamiliar and inexperienced with the transfer environment, the exact destination and its access in the receiving hospital.
- Many areas of the United Kingdom have access to dedicated critical care transfer services and where this is the case, they should be considered for time-critical transfers such as this one.

Emergency driving is an inherently risky undertaking and is highly governed and controlled. Ambulance crews will ask the clinical escorts about the urgency of the transfer and use this to determine the use of emergency driving conditions. The responsibility for such decisions lies with the crew and should be justifiable in court and clearly documented in medical and ambulance service records.

References

1. Faculty of Intensive Care Medicine and Intensive Care Society. Guidance on: Transfer of the critically ill adult, London, 2019
2. Joint Royal Colleges Ambulance Liaison Committee. JRCALC Guidelines. (accessed 25/9/2025)
3. NHS England. National framework for inter-facility transfers. (accessed 25/9/2025)

Perioperative allergy

This content has been generated for SALG by Dr Amy Dodd and Dr Linda Nel on behalf of the Perioperative Allergy Network.

CASE 1

A patient with a penicillin allergy label presented for transcatheter aortic valve implantation (TAVI) under conscious sedation. A dose of gentamicin was administered slowly and tolerated. This was followed by a test dose of teicoplanin, after which they were given an 800mg dose of teicoplanin. The patient immediately complained of feeling hot and nauseated. Their skin was noted to be erythematous and non-invasive blood pressure reading was low with a systolic reading of ~ 50mmHg.

Anaphylaxis was declared and the patient was given intravenous (IV) adrenaline in small incremental doses due to tachycardia on a background of aortic stenosis. Hydrocortisone 100mg, chlorphenamine 10mg and an IV fluid bolus of 250mls Hartmann's were also administered. The duty anaesthetist arrived and a dose of metaraminol 1.5mg was administered with good effect. A radial arterial line and a femoral line were quickly sited by the cardiology team to facilitate monitoring and medication. Blood samples for mast cell tryptase (MCT) were taken. Once stabilised, a decision was made to proceed with the TAVI under anaesthesia. The patient remained stable throughout the procedure on a low metaraminol infusion and was transferred post-operatively to ICU. The patient subsequently died.

CASE 2

A patient presented for bilateral gynaecomastia surgery. Following induction of anaesthesia with midazolam, remifentanil and propofol, 1.2g of co-amoxiclav was administered followed by rocuronium. Within 60 seconds of administering rocuronium redness of the arms, chest and face was noted as well as a tachycardia and a systolic blood pressure of 80mmHg. At this point an allergic reaction was suspected. IV metaraminol was administered and an endotracheal tube sited. There was no evident airway swelling or bronchospasm and oxygen saturations remained stable.

The rash spread to cover the rest of the patient's body and a further dose of metaraminol was required. IV chlorpheniramine hydrocortisone and dexamethasone were administered with 1000mls Hartmann's solution. An arterial line and central venous catheter were sited and samples for MCT were taken. Due to the ongoing need for metaraminol, boluses of IV adrenaline were administered prior to starting an adrenaline infusion. The decision was made to wake the patient. Following extubation the patient's adrenaline requirements reduced and the infusion was stopped. The patient was admitted overnight for observation on a short-term medical ward.

CASE 3

Ten minutes post induction of anaesthesia for breast surgery, the patient had a drop in blood pressure and end tidal carbon dioxide ($EtCO_2$). Anaphylaxis was suspected and vasopressors were administered. Blood pressure initially improved however the $EtCO_2$ remained low. An emergency was declared. Following A-C assessment, the endotracheal tube was removed, the patient was re-intubated and tube position confirmed. Further vasopressors were required to treat hypotension and ongoing low $EtCO_2$. An adrenaline infusion was commenced via a central line to maintain haemodynamics stability. The patient was transferred to ICU.

CASE 4

Following the administration of IV antibiotics at the start of surgery, the patient suddenly deteriorated. Clinical features included: hypotension, tachycardia, raised airwave pressures and a red rash over the patient's whole body. Anaphylaxis to teicoplanin or gentamicin was suspected, and the emergency buzzer was pulled. IV adrenaline was administered which resolved the symptoms. IV chlorphenamine and hydrocortisone were administered with 3L IV crystalloid. An adrenaline infusion started before the patient was transferred to critical care intubated and ventilated. The patient was extubated the same day and discharged the next day.

Commentary:
Anaphylaxis should be considered whenever unexpected and significant cardiovascular or respiratory compromise occurs and treated promptly[1] The Perioperative Allergy Network (PAN) in collaboration with the Resuscitation Council UK (RCUK) have published an algorithm for the emergency management of peri-operative anaphylaxis[1] which aligns with the Quick reference handbook.[2] Emergency guidance should be used to improve outcomes in the management of infrequent challenging scenarios.[3]

A delay in the appropriate treatment of anaphylaxis is associated with poorer outcomes.[4,5] First-line treatment of peri-operative anaphylaxis is intravenous adrenaline (epinephrine). An initial dose of 50 micrograms (0.5 ml of 1 mg/ 10 ml [1:10,000]) is recommended in adults and children aged 12 years and over.[1] Adrenaline must be supported by intravenous crystalloid fluid. Multiple large volume fluid boluses may be required (up to 3-5L in adults)[1]

Adrenaline is the first line treatment for anaphylaxis due to its ability to counteract the effects of anaphylaxis through its vasoconstrictor, bronchodilator, inotropic and mast cell stabilising effects, suppressing histamine and leukotriene release. Antihistamines and corticosteroids are not recommended in the immediate treatment of anaphylaxis. Do not prioritise these or other vasopressors (eg metaraminol) over adrenaline and fluid resuscitation.[1]

If signs of anaphylaxis persist despite boluses of adrenaline, an adrenaline infusion should be initiated. A low-dose adrenaline infusion, given via a peripheral venous line, is an effective alternative if central venous access is not immediately available. If there is a poor clinical response to an adrenaline infusion and appropriate fluid resuscitation, a second-line vasopressor should be given, in addition to adrenaline.[1]

Where there are signs of severe or persistent bronchospasm, patency of the airway and anaesthetic circuit must be checked and oesophageal intubation excluded.

NAP 6 identified antibiotics as the most common cause of perioperative anaphylaxis and as such recommended that antibiotics are given prior to induction of anaesthesia.[6] If antibiotics are given after induction of anaesthesia, then it is sensible to leave a 15 minute gap before administering antibiotics where possible, so that in the event of anaphylaxis it is easier to investigate the reaction and identify the culprit agent.

Teicoplanin, which is commonly used as first line prophylaxis in patients with a penicillin allergy label, is 17 times more likely to cause anaphylaxis than alternative antimicrobials.[7] If Teicoplanin is the antibiotic of choice, then it should be given by infusion or a slow bolus over 3-5 minutes. There is cross reactivity with vancomycin. Both can cause 'red man'-type reactions that may mimic anaphylaxis, if given rapidly. It is important to note, however, that where teicoplanin is suspected to have caused anaphylaxis previously in a patient, that it should not be given again. There appears to be more than one pathophysiological mechanism for anaphylaxis in the case of teicoplanin. This means that just adjusting the dosage speed may not prevent a subsequent anaphylaxis.

NAP 6 identified several cases of anaphylaxis related to antibiotic 'test doses'. Typically in the perioperative setting, test doses are not administered in doses consistent with allergy-clinic challenge testing, and there is no evidence that a test dose reduces the severity of anaphylaxis when it occurred.

We encourage anaesthetists to continue to report incidents of suspected or confirmed perioperative allergy and to ensure that the results of investigations are added to the report when available, to enable better understanding of these incidents.

References

1. Dodd A, Turner PJ, Soar J, Savic L; representing the UK Perioperative Allergy Network. Emergency treatment of peri-operative anaphylaxis: Resuscitation Council UK algorithm for anaesthetists. *Anaes* 2024;**79**(5):535-41.
2. Association of Anaesthetists. Section 3.1 Anaphylaxis (v5). Quick Reference Handbook. 2022 (Accessed 10/4/25).
3. Simmons WR, Huang J. Operating Room Emergency Manuals Improve Patient Safety: A Systemic Review. Cureus 2019;**11**(6):e4888.
4. de Silva D, Singh C, Muraro A, et al. European Academy of Allergy and Clinical Immunology Food Allergy and Anaphylaxis Guidelines Group. Diagnosing, managing and preventing anaphylaxis: systematic review. *Allergy* 2020; **76**(5): 1493-506.
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Severe morbidity/mortality associated with abdominal aortic aneurysm (AAA) surgery

CASE 1

The patient was brought to theatre for emergency endovascular repair of a ruptured AAA. This was performed under local anaesthetic with titrated sedation. General anaesthesia was induced towards the end of procedure to allow surgical cut down in groin to close the femoral artery and because the patient was becoming agitated. Following surgery, the patient became increasingly unstable with difficult to manage hypotension. A central line was inserted and noradrenaline infused. The patient continued to deteriorate with worsening acidosis.

CASE 2

Patient passed away following elective repair of an AAA.

CASE 3

During repair of an AAA the patient suffered myocardial infarction and developed pulmonary oedema. Oxygen saturations dropped to 70% and arterial blood gas analysis showed profound acidaemia and hypoxaemia. The patient was unresponsive to resuscitation, and a decision was made to withdraw treatment.

CASE 4

During emergency repair of a ruptured abdominal aortic aneurysm, the patient arrested, and CPR commenced. Resuscitation was unsuccessful and the patient died in theatre.

CASE 5

A Patient requiring emergency open AAA repair was unstable during transfer from ED to theatre. Relative stability was achieved during induction up to the point of cross clamping. 8 minutes after the X-clamp was applied, the patient deteriorated and suffered a cardiac arrest. CPR was attempted for 40 minutes but was unsuccessful.

Commentary

Although 30-day mortality rates following AAA surgery have fallen, both elective and emergency repair of ruptured AAAs remain high risk procedures. Mortality rates of up to 50% following emergency repairs are reported, with deaths accounting for a major proportion of in-hospital deaths in the surgical population. Although surgical techniques, peri-operative care and anaesthetic protocols have been refined, the patient population is increasingly old and frail. Although deaths immediately after surgery are largely due to haemorrhage, deaths after this are mainly due to patients' comorbidities.[1] Several models are available to predict mortality and should be used for any patient undergoing this type of surgery.[2] Anaesthetists should be involved as early as possible in pre-operative discussion with patients. In the UK this type of surgery is restricted to designated centres. Anaesthetic care should be consultant-delivered by anaesthetists who regularly undertake such cases.

References

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2. Won Lee C, Bae M, Han C et al. Review of scoring systems for predicting 30-day mortality in ruptured aortic aneurysm. *Ann Vasc Surg* 2024; **109**: 77-82.

Epidural complications

A patient was given an epidural infusion of bupivacaine for analgesia following elective abdominoplasty. During the morning ward round, the sensory block was noted to be at T4. During the course of the day, the bupivacaine infusion was titrated according to block, based on the telephoned instructions of the ICU Consultant. At the evening nurse handover, it was noted that the patient was increasingly bradycardic. During assessment - by the only doctor on the unit- the patient became unresponsive, with an audibly obstructed airway. They were profoundly hypotensive with flattened arterial and ECG traces. Extra nursing staff were called over and the ICU consultant was contacted. Following administration of atropine the heart rate immediately increased to 66 but the BP remained labile. The epidural infusion was stopped. At the time the sensory block was noted to be at T4. A jaw thrust was used to establish a patient airway and oxygen 15L/min administered via a waters circuit. On arrival of the consultant a noradrenaline infusion was requested.

Commentary:

The Faculty of Pain medicine in conjunction with the RCoA has produced best practice guidelines for the management of epidural analgesia in the hospital setting.[1] They state that there must be designated personnel and clear protocol the responsibility for which lies with the multidisciplinary inpatient acute pain team. Patients with epidural analgesia should be cared only by nurses with specific training and skills and there must be a resuscitation team with a resident doctor with the requisite competencies immediately available. There should be 24/7 senior anaesthetic advice and availability.

In order to induce profound hypotension and bradycardia, an epidural block needs to extend to the upper thoracic dermatomes. However, measuring the sensory block is inherently unreliable and frequently poorly performed. When infusions are used, changes in position can produce acute changes in block height leading to haemodynamic instability as in this case.

Perhaps because of the potentially serious risks associated with epidurals, lack of evidence for superior efficacy compared with other forms of post-operative analgesia and development of alternative regional techniques, use in the postoperative setting is decreasing.[2] It is essential that alternative forms of analgesia are discussed with the patient pre-operatively. Even with optimum resources and staffing, when the surgery is cosmetic, less invasive, inherently safer forms of analgesia may be preferable.

References

1. Faculty of Pain Medicine, Association of Anaesthetists, Association of Paediatric Anaesthetists, Pain Nurse Network, RCoA. Best practice in the management of epidural analgesia in the hospital setting (3rd Ed), 2025.
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Clinical/ethical responsibilities following iatrogenic events in populations with DNAR in place

CASE 1

A patient in their 80s was admitted for Hemiarthroplasty on the trauma list. Spinal anaesthesia and sedation were administered. After bone marrow cementing the patient suffered a cardiac arrest. CPR followed the advanced life support guidelines. Within a minute the patient showed signs of life but required pharmacological support to maintain their blood pressure. The lead anaesthetist was present throughout and the intensivist team were consulted about ICU/HDU admission. A decision was made not to offer Level 2 or 3 critical care due to the presence of multiple co-morbidities and reduced functional capacity. The patient recovered full consciousness and was transferred to recovery.

The patient's family were subsequently contacted and following discussion a ReSPECT (Recommended Summary Plan for Emergency Care and Treatment) form and DNCPR were documented. The family were allowed to join the patient for few hours in recovery. Shortly after weaning IV vasoactive medication the patient passed away.

CASE 2

A patient in their 90s underwent surgical stabilisation of a hip fracture during which they suffered a 2000ml blood loss. A metaraminol infusion was required to support their blood pressure, which had to be increased on admission to recovery. Despite this, the patient deteriorated and died. The anaesthetic team were present throughout.

Commentary

Authors of the NAP7 report on Perioperative cardiac arrest[1] suggest that a discussion about management of cardiac arrest during surgery should be had with any patient with a clinical frailty score of 5 or more; ASA score of 5 or objective risk scoring for early mortality of more than 5%. This would almost certainly include these two cases. The national audit data however showed that there was a DNACPR recommendation in only 25% of older, frail patients who suffered perioperative cardiac arrest.

The Association of Anaesthetist's recommend that anaesthetists should have an early pre-operative discussion about peri-operative management including CPR.[2] Because survival rates from peri-operative cardiac arrest are higher than in other settings, it is recommended that DNACPR orders are suspended peri-operatively in most cases. The Resuscitation Council devotes a chapter to decisions about CPR in their Advanced Life Support Manual,[3] including suggestions for how to undertake discussion based on shared decision making, and when it is appropriate not to attempt CPR.

Any discussion should be documented in detail, including the understanding, values and fears of the patient. Such records (or DNACPR forms) are not legally binding instructions but instead have the status of recommendations to guide decision making.

References

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Perioperative hyperkalaemia in known haemodialysis patient

CASE 1

A patient suffered cardiac arrest in theatre due to hyperkalaemia and it was noted that the patient was known to be a haemodialysis patient. Bloods were not checked immediately pre-theatre.

CASE 2

Dialysis patient was admitted for cataract surgery which was performed under general anaesthesia (GA). No blood tests taken post op. Patient discharged and readmitted later that day with life-threatening hyperkalaemia of 8.8, likely due to GA requiring ITU admission for continuous veno-venous haemofiltration (CVVH).

Commentary:
Preoperative preparation of patients requiring haemodialysis involves coordination with the dialysis team to ensure that the patients fluid status and electrolyte balance is optimised and uraemic toxins are cleared, to minimise the impact of fluid shifts. This usually involves scheduling dialysis the day before surgery so that heparin used for haemodialysis does not cause perioperative bleeding.[1]

These cases are a reminder that anaesthetists need to confirm that pre-operative haemodialysis has occurred as planned and to check post-dialysis full blood count and electrolyte results.

Reference

1. Kanda H, Hirasaki Y, Iida T, et al. Perioperative Management of Patients With End-Stage Renal Disease. *J Cardiothorac Vasc Anesth* 2017; **31**: 2251–67.

Post-extubation hypoxia

A patient underwent a haemorrhoidectomy procedure under general anaesthesia, receiving atracurium prior to intubation. At the end of the procedure, the patient was breathing spontaneously and had 2 twitches measured using a qualitative peripheral nerve stimulator. Neostigmine/glycopyrrolate was given and the patient was extubated 5 minutes later when they responded to verbal command. The patient was placed in a sitting position on the trolley and noted to have a lot of secretions in their airway. The patient appeared to be stable, so the anaesthetist turned their attention away momentarily and turned back to the deteriorating patient who rapidly became cyanosed despite being on supplemental oxygen, developing a severe bradycardia that was unresponsive to atropine and progressed to asystole. A cardiac arrest was declared and cardiopulmonary resuscitation commenced. Return of spontaneous circulation occurred after re-intubation and the patient was transferred to the intensive care unit for post-resuscitation care.

Commentary:
This case illustrates the importance of continuous patient monitoring in the immediate post-operative period.

A recent meta-analysis showed that one-third of patients evaluated using clinical signs such as spontaneous respiration and movements to command or qualitative peripheral nerve stimulation experienced residual neuromuscular block.[1] Current Association of Anaesthetists guidelines state that quantitative neuromuscular monitoring must always be used whenever non-depolarising neuromuscular blocking drugs are administered to ensure that the Train of Four ratio is greater than 90% prior to extubation.[2]

Clinical practice has not yet changed, as quantitative neuromuscular monitoring was only used for 24% of cases in NAP7.[3] As this editorial states: it is time to consign residual neuromuscular block to history.[4]

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Inappropriate pressure to begin high-risk case with inadequate IV access

A critically unwell patient was transferred from ICU to theatre for emergency laparotomy. They had already been intubated and an arterial line sited. Due to urgency of the procedure, the anaesthetic team, including a consultant, made the decision to allow the operation to start with 22G and 18G cannulae for access and site a central line during the procedure. On opening the abdomen, the patient had a cardiac arrest. CPR commenced. 2x ICU consultants attended. EZ-IO sited to aid access but all drugs given via

peripheral cannula. Chest compressions made it difficult to site a central line but the left internal jugular was eventually cannulated. The results from bloods sent including venous blood gas, were incompatible with life. CPR stopped after 25 minutes after discussion with multidisciplinary team.

Commentary

Even in the most time-critical situation it is essential that adequate intravenous access is obtained prior to surgery. This basic requirement for safe anaesthesia can temporarily be forgotten when the sense of urgency is overwhelming. The use of a safety checklist can help mitigate such a situation. In this case it is unlikely that lack of appropriate IV access was responsible for the outcome.

Recovery Issues

CASE 1

Following major debulking laparotomy under GA with an epidural, the patient was admitted to Recovery displaying signs of haemodynamic instability and without an immediately available management plan. A second anaesthetist arranged transfer to HDU but the reasons for this were not explained to the patient and transfer was delayed due to bed availability issues.

CASE 2

A patient with a complex medical history underwent renal transplantation. They were haemodynamically stable intraoperatively, on extubation, and at the time when the monitoring was disconnected prior to leaving theatre. Transfer monitors were unavailable in the hospital. On arrival in recovery the patient had unrecordable oxygen saturations, blood pressure or heart rate. CPR was commenced.

Commentary

These cases highlight the need for effective planning for post-anaesthetic care during complex surgery, ensuring the plan is clearly communicated to Recovery staff. In the first case, the patient has undergone complex surgery with invasive monitoring and epidural analgesia. The requirement for ITU/HDU care post-op should have been arranged prior to surgery, with a clear management plan agreed before the patient was transferred to recovery, to avoid any subsequent delays.

The second case illustrates why it is essential to ensure that minimum standards of monitoring are in place for safe transfer, even when this is only a short distance from the operating theatre to recovery.[1, 2, 3]

1. Klein AA, Meek T, Allcock E, et al. Recommendations for standards of monitoring during anaesthesia and recovery: Guideline from the Association of Anaesthetists. *Anaes* 2021; **76**(9): 1212-23.
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Challenges of remote site anaesthesia

The Anaesthetic resident was called to the Coronary Care Unit (CCU) for a patient with cardiogenic shock receiving continuous positive airway pressure (CPAP) and metaraminol infusion initiated overnight. Electrocardiograms were highly suggestive of left main stem coronary artery disease. The patient required urgent intubation and transfer to the cardiac catheter lab for percutaneous coronary intervention. The cardiac catheter lab was put on hold whilst waiting for the patient to be intubated.

However, 30 minutes later, the patient had not been intubated as a transfer ventilator was unavailable, and the anaesthetist was unwilling to proceed without appropriate equipment. The CCU Nurse-in-charge and cardiologist requested assistance via the designated anaesthetic contact number, to which the Anaesthetic resident responded that he was the contact and no additional support was available. The urgency of the situation was explained, including the fact that a catheterisation laboratory was being held for the patient. The cardiologist escalated a request to the cardiothoracic intensive care unit to borrow their transfer ventilator. In the meantime, the catheter labs resumed their list of work.

The patient became increasingly fatigued and urgent escalation was made to the Anaesthetic Consultant. A recommendation was made to transfer the patient to the Cardio-Thoracic Intensive Care Unit (CTICU) but the anaesthetic team maintained the plan to intubate only when the catheterisation laboratory was available. Whilst awaiting further action, the patient experienced a pulseless electrical activity cardiac arrest and was transferred to the catheter lab with ongoing cardiopulmonary resuscitation. The patient was subsequently transferred to the CTICU.

Commentary

Creating a safe environment to intubate an emergency patient in a remote site is a challenge, particularly in patients who are at high risk of peri-intubation cardiac arrest. This is compounded when working across different specialities such as cardiology, cardiac surgery and intensive care. Interprofessional, in situ simulation team training can be a helpful way to examine barriers to patient safety including the logistics of ensuring that all the

essential drugs, equipment and personnel are available in a timely fashion.[1]

Reference

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Cardiovascular collapse after inter-hospital transfer

This content has been reviewed for SALG by Dr Alistair Baxter and Dr Mark Barley on behalf of The Society for Intravenous Anaesthesia

A patient was transferred from [Hospital 1] to [Hospital 2] for an emergency interventional radiology procedure. The patient was intubated prior to transfer and sedated with a propofol infusion. They were received by anaesthetic consultant and ODP, transferred to an anaesthetic machine and moved to an interventional radiology table. Whilst monitoring was being transferred from transfer monitoring, it was noted that the transfer propofol infusion pump had been switched to a TCI pump by [Hospital 2] team. Asked to confirm what infusion rate of 1% propofol was running (was at 15ml/hr during transfer), it transpired that the patient had commenced propofol TCI and had been given an induction dose of propofol (rate of propofol being administered was 126ml/hr) - unclear amount but possibly would have been between roughly between ??60-100mg taking into account amount remaining in syringe and estimated amount used on transfer. Propofol infusion immediately stopped. No blood pressure reading as local intra-arterial blood pressure monitor was not set up yet at this stage. No palpable carotid/femoral pulse was felt. CPR commenced - brief (<1 min of CPR) until central pulse felt again, and then improved with metaraminol administration. Once IBP trace back, SBP 70 on metaraminol infusion 20ml/hr and with subsequent improvement.

Commentary:

This case illustrates the need for clear handover of the concentrations and infusion rates of all drugs from a transfer team to the recipients.

It is also essential to ensure that infusions are initially maintained at the same rate (ml/hr) during transfer until all telemetry is transferred to the recipient's monitoring system.

If transferring from manual Total Intravenous Anaesthesia (TIVA) in ml/hr to a Target Controlled Infusion (TCI), a low target should be set initially and titrated upwards. This will avoid the risk of a "second bolus" causing hypotension.

Processed EEG monitoring is recommended in any patient receiving TIVA + neuromuscular blockade at all stages of the transfer process to ensure adequacy of anaesthetic dosing and to aid identification of EEG suppression from overdose, hypotension or raised ICP (amongst other causes).

Challenges involved in a shared airway

An elderly patient underwent general anaesthesia for endoscopic retrograde cholangiopancreatography (ERCP). About 30 minutes into surgery, it was noted that the ventilatory parameters were showing reduced tidal volume [245-390ml] compared to the setting of 475ml tidal volume with increased airway pressure of 32cm H2O. This was attributed to endotracheal tube compression by the endoscope manipulation by the surgeon. As a result of this, the endotracheal tube position was re-adjusted with transient resolution of the problem.

A few minutes later, the same episode recurred and a gurgling sound was heard around the oro-pharynx. This was attributed to partial dislodgement of the endotracheal tube and onset of oxygen desaturation on the monitor. As a result of this, it was decided that surgery should stop and the trachea was rapidly re-intubated uneventfully. It was after this that it was noticed that the patient had suffered a ventricular fibrillation cardiac arrest and cardio-pulmonary resuscitation (CPR) was commenced immediately with chest compression and ventilation without interruption with the cardiac arrest team joining in the CPR. As soon as the crash trolley was brought in a DC shock with 150J was delivered. After two cycles, there was a return of spontaneous circulation for less than 2 minutes followed by a PEA arrest with recommencement of CPR including administration of Intravenous Adrenaline x 6 doses [total dose]. CPR continued for over 30 minutes with no return of spontaneous circulation. It was at this point that the team agreed to discontinue CPR and patient was pronounced dead.

Commentary:

General anaesthesia with tracheal intubation accounts for 7-10% of ERCP cases in tertiary centres in the UK. [1] General anaesthesia is indicated where sedation has failed or for patients at high risk of sedation-related adverse events. Whilst general anaesthesia reduces the risk of sedation-related adverse events, hypoxic events are still frequent, occurring in 18.9% and persisting for more than 3 minutes in 8.5% of cases in one cohort study.[2] Patients undergoing prone positioning during ERCP are at higher risk of endotracheal tube dislocation with neck extension.[3] Whilst cardiac arrest due to endotracheal tube dislocation

is rare, with no cases reported in NAP 7,[4] this case highlights the need for vigilance.

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Potential misdiagnosis and treatment of anaphylaxis

CASE 1

A patient was scheduled for a laparoscopic sterilisation procedure. On insufflation of the abdomen the patient became profoundly bradycardic and cardiac output was lost. CPR was commenced and the cardiac arrest team attended. An ultrasound scan by the surgeon ruled out haemorrhage and the consensus was that anaphylaxis was the cause of the cardiac arrest and treatment instituted accordingly. A bedside ECHO showed diminished function. The patient was transferred to ITU.

CASE 2

At the end of a procedure after sugammadex had been given, the patient began coughing and biting on the ETT and suddenly became bradycardic. Atropine was administered after which a short episode of left bundle branch block (LBBB) or ventricular tachycardia (VT) was followed by a supraventricular tachycardia associated Hypotension was resistant to metaraminol and ephedrine and required adrenaline and a phenylephrine infusion. An ECHO showed a collapsed RV and a poorly contracting left ventricle. the patient was treated for anaphylaxis and transferred to ITU.

Commentary

These two cases illustrate how challenging making a diagnosis in an emergency situation can be. In case one although bradycardia can be a feature of anaphylaxis (reported in NAP6),[1] a reflex bradycardia leading to cardiac arrest in this situation was highlighted in NAP7.[2] In the second case either sensitivity to sugammadex or rapid reversal/ negative pressure pulmonary oedema may have been the cause.

One of the messages from NAP6 was to include anaphylaxis in the differential diagnosis of perioperative collapse and refer patients to specialist clinics. However, the assessors of NAP7 disagreed with the diagnosis of anaphylaxis in 50% cases implying over-diagnosis.

Anaphylaxis should always be included in the differential diagnosis of peri-operative collapse, but other causes should also be considered

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