SAFE ANAESTHESIA LIAISON GROUP

PATIENT SAFETY UPDATE

March – 30 June, 2025

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SALG Patient Safety Conference: 21 October, 2026

The **SALG Patient Safety Conference** will be held virtually this year on **Wednesday, 21 October, 2026**.

The conference will focus on paediatric anaesthesia safety, with a programme developed in partnership with the Association of Paediatric Anaesthetists of Great Britain and Ireland.

Please book your place here

Resident anaesthetists are invited to submit abstracts describing projects or initiatives focusing on paediatric anaesthesia safety that measurably reduce harm, improve care processes and strengthen a culture of safety. The submissions will undergo review, and the highest scoring abstracts will be invited to present their work as either an oral presentation or an ePoster. Further details can be found on the conference booking page linked above.

Update on penicillamine/penicillin allergy recording

SALG identified this national patient safety risk after a member of our network reported an anomaly in their own trust's electronic prescribing system and uncovered a potential nationwide issue. SALG alerted NHS England who are working with colleagues in Scotland to address the problem.

The issue involves patients' penicillin allergy being incorrectly recorded as penicillamine allergy, that can and has led to administration of penicillin-type antibiotics to sensitive patients, resulting in anaphylactic reactions. A review of national incident data revealed 315 related reports over three years, including one fatality. This error can be propagated across care settings through shared records. An alert, issued by NHS England in December 2025 called for healthcare organisations to urgently review and correct allergy records, update training on EPS and work with system suppliers to implement safeguards.

HSSIB reports on safety of frontline digital systems

HSSIB have published a thematic review of patient safety issues related to electronic patient records (EPR), including electronic prescribing. The findings of this report are intended for those responsible for procuring, configuring, integrating and optimising EPR systems in healthcare at national, regional and local levels. HSSIB have also recently published a fourth investigation report on medication-related harm, which further highlights risks associated with digital systems and prescribing processes. Both reports are shared for the purposes of awareness.

Prevention of Future Deaths Reports

Paragraph 7 of Schedule 5, Coroners and Justice Act 2009, provides coroners with the duty to make reports to a person, organisation, local authority or government department or agency where the coroner believes that action should be taken to prevent future deaths. When a report is received by the Royal College of Anaesthetists or the Association of Anaesthetists, SALG submits a response and undertakes the appropriate patient safety initiatives.

We extend our deepest sympathy to the families of William King and Chloe Ulett, who are the subjects of the reports below.

Mr William (Billy) King

A prevention of future deaths report was received in September 2025 regarding the death of Mr William (Billy) King. The Coroner raised concerns about the process and documentation of consent discussions for nasogastric (NG) tube insertion prior to an emergency laparotomy for bowel obstruction. In response SALG highlights the following:

- The Association of Anaesthetists are in the process of updating their consent guidelines, endorsed by RCoA, and these will emphasise the need for discussions to occur *prior* to patients coming to the anaesthetic room. This is to ensure patients have the time and space to consider the risks and benefits of the options available and the anaesthetist's recommended course of action.[1]

- A discussion between the anaesthetist and a patient regarding the risks/benefits of the anaesthetic should take place as soon as practicable after the decision to list a patient for emergency surgery is made.
- Documentation of this discussion should include the risks, benefits and alternatives discussed. Discussions around treatments that the patient refuses should be documented in as much detail as those they consent to.

Reference:

1. Consent guidelines (In Press). *Anaesthesia*.

Miss Chloe Ulett

Following a coroner's investigations into the death of Miss Ulett, a prevention of future deaths report was circulated to a number of Royal Colleges, including the Faculty of Intensive Care Medicine (FICM) in February 2026.

Three days after giving birth, Miss Ulett became acutely drowsy and confused with a reduced GCS. Her condition progressed rapidly within 24 hours to the point where she was unable to speak or move her arms and legs. A wide range of acute neurological conditions were considered, including encephalitis, meningitis and cerebral venous sinus thrombosis. She was found to have raised ammonia levels 3 days after admission, secondary to n-acetyl glutamate synthase deficiency, a Urea Cycle Disorder. By this time, it was too late for ammonia scavenging medications and haemofiltration to be effective and she had developed terminal cerebral oedema.

The Coroner was concerned about the delays to diagnosis and lack of early ammonia testing. The original report is available here. FICM's response will be published in their next edition of their safety bulletin.

SALG considers it worth noting for all of those involved in the management of the obstetric population that any change in Glasgow Coma Scale (GCS) in a pregnant or recently pregnant patient should be considered a red flag. This principle is clearly stated in Royal College of Obstetricians and Gynaecologists (RCOG) guidelines on the management of the acutely ill pregnant woman,[1] and it is also emphasised in the Managing Medical and Obstetric Emergencies and Trauma (mMOET) course.[2] In such situations, the patient should be admitted for urgent assessment and prompt investigation to identify the underlying cause.

It is possible that symptoms such as those exhibited by Miss Ulett were thought to be 'normal for pregnancy', a not uncommon reason for red flag symptoms to be missed, especially in settings where pregnant women are rarely encountered.

References:

1. Royal College of Anaesthetists. Care of the critically ill woman in childbirth; enhanced maternal care, 2018.
2. Burns R, Dent K (eds.) Managing medical and obstetric emergencies and trauma: a practical approach. John Wiley & Sons; 2022.

Safe Drug Management in Anaesthetic Practice Guidance, 2026

The Royal College of Anaesthetists and Association of Anaesthetists have reviewed and updated the safe drug management in anaesthetic practice' guidance, and this was published on the SALG website in January.

The working party was chaired by Dr Naginder Singh, a former SALG scholar and current member of SALG. The guidance has been endorsed by the Royal Pharmaceutical Society and the College of Operating Department Practitioners.

Letter warning of fatal risks of wrong-route administration of tranexamic acid (TXA) published

The trade association, Medicines UK, published a letter on the 30 April, 2026 on behalf of marketing authorisation holders for TXA preparations, in agreement with the Medicines and Healthcare products Regulatory Agency. The letter highlights serious and fatal adverse reactions following inadvertent administration of tranexamic acid instead of local anaesthetics and advocates 'extreme caution' in storing, handling and administering intravenous formulations of tranexamic acid, including clearly labelling syringes containing tranexamic acid 'for intravenous use only' and storing tranexamic acid injectables separately from injectable local anaesthetics'.

In commenting on the letter, the Royal College of Anaesthetists' President, Claire Shannon, said: 'Our guidance on safe drug management is clear that all local anaesthetic solutions should be stored separately from IV infusion solutions, to reduce the risk of accidental IV or epidural administration. Prefilled syringes have also been shown to reduce medication errors, and our Safe Anaesthesia Liaison Group therefore advocates for more drugs to be made available in prefilled syringes, including tranexamic acid'.

SALG is continuing to work with manufacturers, both directly and via relevant trade association groups, to

advocate for wider availability of prefilled syringes. This is particularly important for medicines such as tranexamic acid and local anaesthetics, where prefilled products can provide a physical safeguard against wrong-route medication errors. Regarding tranexamic acid, the adoption of pre-filled luer connector syringes, coupled with wide adoption of NRFit connector systems would significantly reduce the potential for human error causing significant harm or death.

Increased risk of anaesthetic neurotoxicity in patients of Venezuelan ancestry

SALG has been made aware of a recent alert by the American Society of Anaesthesiologists: that people of Venezuelan heritage may be susceptible to anaesthetic neurotoxicity due to a mutation in their mitochondrial DNA (specifically, mtND4 m.11232T>C). This mutation is rare in this population, but it has resulted in unexpected catastrophic outcomes after routine anaesthesia in adult and paediatric patients reported by South American anaesthesia societies.

Whilst mitochondrial DNA is of maternal lineage, a negative family history of anaesthetic complications does not exclude this condition. The ASA recommends screening all patients with direct maternal Venezuelan lineage. This will necessitate directly questioning patients as Venezuelan lineage cannot be deduced from names, or routine ethnicity questionnaires. The number of people of Venezuelan descent living in the UK is unknown, as this is not recorded in official data as a separate category, but estimates range between 9,000 and 25,000 depending on the source.

There is no current point of care testing available for this specific mutation, and results can take up to 6 weeks to be returned. When ordering an EDTA test, anaesthetists should specify screening for the specific ND4 mutation when completing the form along with a 10ml blood sample.

Advice on clinical management, which is broadly relevant to UK settings, is included in the alert linked above, and replicated below for ease of reference:

The urgency of the procedure should inform the decision to proceed with the anaesthetic.

In the absence of definitive genetic testing, if the decision is made to proceed with anaesthesia and the patient is considered to be at risk, the anaesthetic plan should be developed considering the following:

The optimal and safest anaesthetic for patients with this ND4 mutation has not been established.

a. *Given the majority of affected patients are reported to have received sevoflurane, consider avoiding the use of all volatile anaesthetics until more information is available.*
b. *Regional anaesthesia should be considered for appropriate patients and procedures.*
c. *Based on verbal reports, patients who have had complications from sevoflurane-based anaesthetics have had uneventful propofol anaesthetics. It is not yet known whether prolonged use of propofol infusions is safe in this population.*
d. *Midazolam, dexmedetomidine, ketamine, and short/ultra-short-acting opioids have not been implicated.*

1. *Anaesthetic depth monitoring with processed EEG to avoid burst suppression may be advisable. Some patients with complex I gene mutations show a rapid change (decrease) in EEG activity with exposure to volatile anaesthetics. It is unknown, at this time, if this rapid change is seen in patients of Venezuelan ancestry with the mutation.*
2. *Patients at risk should be monitored after general anaesthesia for return to their neurocognitive baseline. Consider extended postoperative observation and monitoring of acid-base status if complications are suspected.*

If similar complications to those described in the alert are observed in any patient, they should be reported through local risk management systems.

Wrong drug error – Adrenaline and Ephedrine

SALG were contacted by one of our regional leads about two incidents in which pre-filled adrenaline and ephedrine syringes were mistaken for one another. The similarity of the labelling on the syringes, due to identical colour schemes, was raised as a concern. SALG raised this with the syringe manufacturer, who explained that adrenaline syringes are intended to be differentiated by an additional outer wrapper (a lilac foil), unlike ephedrine and other pre-filled vasoconstrictors, which are supplied in blisters only. In these incidents, the outer wrapper appears to have been removed before the syringes reached the anaesthetist.

The colour scheme used on both the outer packaging and the syringe labels complies with BS ISO 26825:2020, which assigns colours based on anaesthetic drug class. This approach reflects the (generally) greater risk of harm from errors involving different drug classes. Adrenaline is a recognised exception to this, which is why this manufacturer added a distinctive outer wrapper, and why SALG recommends (below) keeping pre-filled syringes in all their packaging until use.

Adrenaline and Ephedrine pre-filled products shown without their packaging.

Aguettant Adrenaline and Ephedrine pre-filled products shown in all outer packaging; Aguettant.

Aurum (Martindale Pharma) glass pre-filled adrenaline syringe (shown in outer packaging).

SALG considers the learning from these cases to include:

1. The outer packaging (foil wrapper, blister or plastic cases) should never be removed from pre-filled syringes until immediately before administration. In the event that the outer packaging is removed from a pre-filled adrenaline syringe, but the syringe is unused, the syringe should be disposed of and not replaced in the cupboard for later use.
2. All unused drugs (this includes ampoules, pre-filled syringes that are not in their original packaging and syringes that have been pre-drawn) should be removed from theatre/bench space and disposed of at an appropriate time. This should be either at the end of each case, or at the end of each theatre day, based on a risk assessment.
3. There should be designated space in a cupboard/ trolley/sealed container for drugs such as adrenaline that may be required in an emergency but are not routinely / frequently used.
4. All members of staff who may be required to find/ prepare/administer drugs such as adrenaline in an emergency should be familiar with:
   - The location of emergency drugs
   - The requirement to keep the drugs in their outer packaging until just before administration
   - How the different drugs are packaged, including outer wrapping, the need to twist the top off pre-filled syringes and the dosage/concentration.
5. It is an integral requirement to ensure patient safety that the labels on ampoules and syringes – whether these be pre-filled or pre-drawn - are actively checked before they are drawn up/administered to the patient. Syringes should be labelled, workspace should be organised and drugs checked by a second person where possible.[1,2]

References:

1. Royal College of Anaesthetists. Safe drug management in anaesthetic practice. January, 2026.
2. Association of Anaesthetists. Handling injectable medications in anaesthesia. Guidelines from the Association of Anaesthetists. June, 2023.

Misplaced CVC line

This case was reported directly to SALG by an anaesthetist at the hospital where the incident occurred.

A young adult admitted for orthopaedic surgery suddenly became unwell in theatre and was treated for suspected anaphylaxis to teicoplanin. Due to persistent hypotension, despite adrenaline via a peripheral line, an ultrasound guided right internal jugular central line was inserted, using a needle to identify the vein through which the guidewire was passed. The line was used for inotropes/vasopressors in theatre and ITU, and haemodynamic stability returned over a matter of hours.

Unfortunately, the patient didn't wake up when sedation was halted, and a CT head demonstrated widespread infarction. When the CVC inserted in theatre was transduced approximately 48 hours after insertion, there was an arterial

trace (carotid). The patient was subsequently confirmed dead by neurological criteria and went on to organ donation.

There several reports of such outcomes following inadvertent insertion and use of malpositioned CVCs, and FICM guidance emphasises the importance of transducing CVCs as soon as possible to exclude arterial placement. The key learning for our department is to 'transduce before use' and to re-establish continuous CVC monitoring despite its limited role in preload assessment.

Commentary:
The use of ultrasound does not guarantee correct placement of CVC. In haemodynamically compromised patients, arteries and veins may be hard to distinguish on ultrasound. The vein may be transfixed by the needle/guidewire which subsequently end up in the artery. Consideration should be given to using a cannula to facilitate transduction and exclude arterial placement before dilatation, which even in the absence of infusions/drugs can lead to catastrophic sequelae. The use of checklists is recommended, especially in emergency situations. Recent guidance has been published on Safe Vascular Access by the Association of Anaesthetists.[1]

The perioperative allergy network have also commented on the perioperative allergy aspect of this case:

Profound persistent hypotension with evidence of mast cell mobilisation is consistent with anaphylaxis, although differential diagnoses should be considered. Initial treatment with peripheral intravenous adrenaline, with placement of a central venous catheter (CVC) in the context of refractory anaphylaxis aligns with the RCUK perioperative anaphylaxis guidance.[2].

References:

1. Johnston AJ, Simpson MJ, McCormack V, Barton A, *et al.* Association of Anaesthetists guidelines: safe vascular access 2025. *Anaes* 2025; 80: 1381-1396.
2. Dodd et al. Emergency treatment of peri-operative anaphylaxis: Resuscitation Council UK algorithm for anaesthetist. *Anaesthesia* 2024, 79, 535–541.

Review of clinical incidents

Following are reviews of incidents reported to the NHS in England and Wales in the period from 1 March–30 June, 2025.

Airway management

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

A patient of short stature, with a history of vocal cord palsy (with no shortness of breath or stridor), was scheduled for a renal transplant. On laryngoscopy, the vocal cords were adducted. Two unsuccessful attempts were made to intubate the trachea using a size 6 tube. A third attempt using a size 5 tube was also unsuccessful. The patient became impossible to ventilate or oxygenate and began to desaturate. Attempts to gain front-of-neck access were also unsuccessful. Eventually, oral intubation using a size 6 tube was achieved. A tracheostomy was performed by ENT, and the transplant procedure was abandoned.

Commentary:
A history of known vocal cord palsy (VCP) should be regarded as a red flag for airway management. A difficult airway should be anticipated and there should be a multidisciplinary plan (including ENT) for airway management. When the case is elective there should almost always be sufficient time for this planning to occur.

Preoperative considerations

The airway history should include:

- Whether the palsy is unilateral or bilateral
- The underlying cause
- The degree of airway narrowing
- Associated symptoms

Fibreoptic nasendoscopy (FNE), to provide 'awake airway visualisation', should be performed preoperatively – either an ENT clinic or an anaesthetic airway clinic. Early review and planning allows for discussion around airway risks and the possible need for tracheostomy.

Intraoperative management

ENT colleagues should be present.

High-flow nasal oxygen (HFNO) should be considered for per-oxygenation. The equipment for front-of-neck access (eFONA) must be immediately available. The cricothyroid membrane (CTM) should be assessed, the incision technique and who the operator will be should be decided beforehand.

Ultrasound is recommended if the CTM is not palpable and can be used to assess vocal cord movement.

Awake techniques should be considered, including awake tracheal intubation or a surgical tracheostomy performed in theatre.

In this case, repeated attempts at intubation suggest obstruction at the level of the vocal cords. Smaller tubes

were used, but it is unclear whether videolaryngoscopy (VL) was attempted. VL should be used as first-line whenever available, in line with DAS 2025 guidelines. In this situation the issue is with passing the tube (more so than obtaining the view). VL should provide a more enhanced/magnified view of the larynx and also allow for more than one person to visualise what the issue with intubation is. Both are useful when difficulty is expected.

If one airway strategy fails there should be no delay in moving on to the next. Formal conversion to a surgical tracheostomy should be undertaken by ENT.

Postoperative care

Postoperative management should be in HDU/ICU, or on a specialist ward depending on local practice. Extubation will be high-risk, requiring careful planning and monitoring for airway obstruction.

Finally, it is important to acknowledge the considerable psychological impact associated with any eFONA event. Teams involved should be offered appropriate support.

References:

1. Ahmad I, El-Boghdadly K, Iliff H, Patel A, Rivett K, McNarry AF, et al. Difficult Airway Society 2025 guidelines for management of unanticipated difficult tracheal intubation in adults. *Br J Anaesth* 2026;136:283–307.
2. Lohse R, Teoh WH, Kristensen MS. Airway ultrasound. *BJA Educ* 2025;25:1–9.

Perioperative allergic reactions

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

CASE 1

The patient undergoing a kidney transplant was given co-amoxiclav approximately an hour after induction of anaesthesia. Within 2 to 4 minutes intra-arterial monitoring revealed profound hypotension. The patient had been haemodynamically stable without vasopressor support prior to this event. Anaphylaxis was suspected and treated with 100 mcg adrenaline administered IV peripherally, with the patient head-down. Initially, there was no rash or angioedema, but a sparse urticarial rash was later noted on the abdomen.

Following discussion between anaesthetic and surgical consultants, after 15–20 minutes of stability, surgery continued. A sample was obtained for serum tryptase, and the reaction was documented in the electronic record. The patient was monitored postoperatively in the critical care unit for less than 24 hours before stepping down.

CASE 2

The patient experienced severe anaphylactic reaction possibly related to teicoplanin (previously tolerated without incident) during general anaesthesia in a standalone treatment centre. Despite treatment with adrenaline, steroids, nebulisers, and oxygen, the patient suffered a period of hypoxia and hypotension. The patient was transferred to ICU, where fluid resuscitation, adrenaline, advanced ventilatory support, and nebulisers continued. Tryptase blood samples were taken.

CT brain later showed cerebral oedema due to hypoxic brain injury, which progressed to clinical evidence of brain stem death and formal brain stem testing.

CASE 3

During induction of anaesthesia for a knee arthroscopy, severe bronchospasm after administration of fentanyl, propofol, and rocuronium raised the suspicion of anaphylaxis. Despite administration of adrenaline, ketamine, aminophylline, salbutamol, and hydrocortisone, the patient remained in severe bronchospasm for several hours and required transfer to intensive care intubated. Extubation was achieved the following day.

CASE 4

The patient suffered a cardiac arrest shortly after induction of anaesthesia for elective subacromial decompression. A straightforward nerve block had been performed, followed 10 minutes later by general anaesthesia. Whilst in the anaesthetic room, the patient suddenly developed bronchospasm. Prolonged resuscitation followed, including CPR and use of a LUCAS device. Inotropic support was required, including adrenaline and dopamine. Intralipid was administered.

The patient was stabilised sufficiently for transfer to ICU. Despite maximal support over the next 24 hours the patient deteriorated, and life-sustaining treatment was withdrawn.

Differential diagnoses include anaphylaxis (serum tryptase later returned at 30.7), local anaesthetic toxicity, and tension pneumothorax (although chest drain insertion showed no evidence of tension). This case will be referred directly to the Coroner and a post-mortem is anticipated.

Commentary:

Case 1 illustrates early recognition and prompt management of anaphylaxis. The presenting feature of rapid onset profound hypotension after intravenous exposure, is typical of perioperative anaphylaxis. Bronchospasm as a presenting sign is more common in patients with underlying airway disease or obesity. Skin changes such as urticaria or generalised erythema, often

only appear once perfusion is restored or noted once the drapes are removed.[1] When physiological stability is achieved following treatment, it may be appropriate to continue with surgery, particularly if non-elective.

When signs and symptoms of anaphylaxis are refractory to boluses of adrenaline, a low dose adrenaline infusion should be initiated. This should be administered peripherally in the absence of central venous access. Large volume fluid boluses should be given alongside adrenaline. If clinical signs persist despite adrenaline infusion and appropriate fluid resuscitation, a second line vasopressor should be added.[2]

In patients with severe, persistent bronchospasm, nebulised or intravenous ß-2 agonists and ketamine may be effective. Volatile anaesthetics also have a bronchodilator effect. These agents must be used as an adjunct treatment and not as an alternative to an adrenaline infusion.[2]

Anaphylaxis should be considered whenever there is unexpected severe cardiac or respiratory compromise, however differential diagnoses must also be considered and managed, as described in case 4. Collection of timely serum samples for mast cell tryptase (MCT) can help to support a diagnosis of anaphylaxis and future management. Samples for MCT should also be taken in cases of fatal anaphylaxis.

Cardiac arrest secondary to anaphylaxis following intravenous exposure to a triggering agent typically occurs within 5-10 minutes, which is more rapid than other routes of exposure.[1] In cardiac arrest, intravenous adrenaline should be administered as per advanced life support protocols. Prolonged cardiopulmonary resuscitation (including extracorporeal life support) should be considered as this is a potentially reversible cause.[3]

Fatal anaphylaxis occurs in 1-4% of perioperative hypersensitivity reactions,[4] a higher mortality rate than for anaphylaxis in other settings. Fatal cases of anaphylaxis should be referred as soon as possible to the UK Fatal Anaphylaxis Registry. This can provide support and guidance on peri-mortem sample collection. Local laboratories should be advised to retain all peri-mortem samples to allow for post-mortem investigation.

SALG welcomes information about all cases of suspected perioperative anaphylaxis. In order to learn from such cases, a list of all drugs administered within the hour preceding the onset of anaphylaxis, MCT results and relevant patient comorbidities (eg obesity, respiratory disease, cardiac disease) are helpful.

References:

1. Harper NJN, Cook TM, Garcez T, *et al*. Anaesthesia, surgery, and life-threatening allergic reactions: epidemiology and clinical features of perioperative anaphylaxis in the 6th National Audit Project (NAP6). *BJA* 2018; 121: 159–71.
2. Dodd A, Turner PJ, Soar J *et al*. Emergency treatment of peri-operative anaphylaxis: Resuscitation Council UK algorithm for anaesthetists. *Anaes* 2024; 79:535–541.
3. Garvey LH, Dewachter P, Hepner DL, *et al*. Management of suspected immediate perioperative allergy reactions: an international overview and consensus recommendations. *BJA* 2019; 123: e50–64.
4. Mertes, PM; Ebo, DG; Garcez, T *etal*. Comparative epidemiology of suspected perioperative hypersensitivity reactions. *BJA* 2019; 123: e16–28.

Aspiration

CASE 1

A Patient scheduled for emergency surgery, aspirated on induction. The patient was turned to the lateral position, the airway was suctioned, cricoid pressure applied and the trachea was intubated followed by fibreoptic bronchoscopy and removal of vomit from airways. The patient was transferred to critical care intubated and ventilated.

CASE 2

A frail patient with gastric outflow obstruction due to metastatic gastric cancer was scheduled for duodenal stent placement under sedation in interventional radiology. The patient had been on a liquid diet, had not vomited recently, did not have a nasogastric tube, and had fasted overnight. The risk of aspiration had been discussed during the team brief and sign-in. The left lateral position and use of endoscopic suction were used to mitigate this risk, but a decision was made not to intubate. Sedation was induced uneventfully, with spontaneous ventilation maintained throughout. The endoscopy revealed cancer and an empty stomach. After five minutes, brown liquid with particulate matter was noted in the mouth and on the pillow, without active vomiting. Endoscopic suction was ineffective. The oropharynx was suctioned, and further brown fluid was observed. The procedure was abandoned, and the breathing circuit on the anaesthetic machine was used to deliver oxygen. Although respiratory effort was maintained, oxygen saturation fell and the CO_2 trace became obtunded. An anaesthetic emergency call was put out. Respirations were assisted with face mask and PEEP, but there was no improvement in oxygen saturations or CO_2. Cardiac arrest was confirmed. Spontaneous circulation returned after 2 cycles of CPR and intubation of the trachea. Bronchoscopy confirmed material in the left lung. It is suspected that passing the endoscope beyond

the cancer released unexpected distal fluid, which was then aspirated and caused a hypoxic arrest.

Commentary:
Aspiration continues to be a significant cause of airway related perioperative mortality and has recently featured in PFD notices reviewed by SALG.[1,2] In the second case, small bowel obstruction should have been anticipated making the patient very high risk for aspiration. Positioning and suctioning are not effective barriers to aspiration which can occur following either vomiting or regurgitation i.e. in sedated or anaesthetised patients.

References:

1. Royal College of Anaesthetists, Association of Anaesthetists and Difficult Airway Society. Response to Coroner's Regulation 28 report to prevent future deaths in the matter of Mrs Pamela Anne Marking. 16 April, 2025.
2. Royal College of Anaesthetists, Association of Anaesthetists. Response to Coroner's Regulation 28 report to prevent future deaths in the matter of Mr William King. 2 December, 2025.

DNAR orders and iatrogenic cardiac arrest

CASE 1

Whilst waiting for a spinal block to develop the patient began coughing but remained cardiovascularly stable. Treatment for anaphylaxis followed advanced life support guidelines, and assistance was sought via the emergency buzzer. The patient become unresponsive and cardiac arrest was confirmed. A decision was made to stop resuscitation after two cycles as the patient was not for cardiopulmonary resuscitation and no reversible causes were identified. Death was confirmed.

CASE 2

The patient passed away in theatre following surgery, still intubated. A Consultant Anaesthetist, another anaesthetist, and an anaesthetic nurse were present. A DNACPR was in place for the patient and had been discussed and agreed during the team brief. No CPR was performed, as the plan was to provide reversible treatment only.

CASE 3

A patient, in their late 90s, underwent a six-hour intramedullary nail procedure. They had extensive comorbidities including bowel cancer (elected not for intervention), a clinical frailty score of 7 and a DNACPR for ward-level care. The patient could only mobilise with a walking frame and required assistance for personal care.

On arrival in recovery, the patient had a Glasgow coma score of 14, and an infusion of metaraminol had to be increased to support the BP. A few moments after being given a 50mcg bolus of fentanyl the low oxygen saturation alarm sounded, the saturation trace was lost and arterial trace became obtunded. A central pulse was present. The patient became bradycardic, then transiently asystolic, before ROSC with persisting bradycardia. Despite DNACPR it was decided this was a reversible medication-related event. The patient received 400 mcg naloxone, 200 mcg adrenaline, and oxygen via a Waters circuit. The patient rapidly started self-ventilating with a heart rate of 70–90 bpm.

Commentary:
In the first case the presumed cause of cardiac arrest was anaphylaxis. ROSC is more likely after anaphylaxis-induced cardiac arrest than other causes. It occurred because the patient was anaesthetised. In the light of both, suspension of pre-existing DNAR order should have been considered, especially if the peri-operative situation had not been specifically addressed. Research from NAP 7 showed that very few patients who have a pre-existing DNAR in place have a perioperative cardiac arrest and when cardiac arrest did occur, ROSC was achieved in 57%.[1]

Reference

1. Nolan JP, Soar J, Kane AD, Moppett IK *et al*. Peri-operative decisions about cardiopulmonary resuscitation among adults as reported to the 7th National Audit Project of the Royal College of Anaesthetists. *Anaes*, 2024, 79: 186-192.

Communication between anaesthesia and other members of the multidisciplinary team

CASE 1

A patient had a persistently low systolic BP in Recovery despite fluid resuscitation. The patient required oxygen and eventually was transferred overnight to HDU. The Recovery nurse felt their concerns about the patient, expressed to several anaesthetists, had not been adequately responded to.

CASE 2

The patient arrived in Recovery from Theatre with a metaraminol infusion at a rate that exceeded the locally prescribed maximum.

Approximately an hour later, the patient deteriorated, with an unrecordable blood pressure and hypoxia. An anaesthetist reviewed the patient, increased the metaraminol infusion and gave a bolus of adrenaline. 2 units red cells were transfused. After further reviews, a CVP line was inserted, and noradrenaline infusion started. The Recovery staff felt that if a CVP line had been sited and

noradrenaline started earlier the collapse in Recovery could have been avoided.

Commentary:
Collapse in Recovery cannot always be anticipated or prevented. Recovery-trained nurses are experienced in care of post-operative patients, and their concerns should be taken seriously. The rationale for management decisions should be explained in detail. In the second case local guidelines had been breached and arguably care of the patient should not have been handed over until the need for vasopressor support had reduced.

Communication – anaesthetists and surgical team

An elderly patient was listed for laparoscopic sigmoid colectomy After spinal anaesthesia was administered, the patient became profoundly hypotensive, and CPR was undertaken for a short period before induction of general anaesthesia. The surgical team were not informed of this episode at the time, and it was felt that the opportunity to discuss whether to continue with surgery had been missed, given the potential complications of chest compressions in a frail elderly patient with co-morbidities.

Commentary:
Spinal anaesthesia has great value in improving pain management after major surgery and is now carried out routinely. There is an increased risk of cardiovascular collapse following spinal anaesthesia in patients with multiple co-morbidities. This may occur due to the synergistic effect of spinal and general anaesthesia or can occur prior to induction. Invasive monitoring and prophylactic infusion of vasopressors should be considered, as well as reducing the dose of local anaesthetic administered intrathecally. Where a major complication of anaesthesia has occurred, the theatre team should be informed so that a multi-disciplinary decision can be made as to whether it is in the patients' best interest to continue with the operation as planned.

Postoperative prescribing/ postoperative communication

CASE 1

Following surgery, several prescribed insulin doses were missed, resulting in the development of diabetic ketoacidosis. The patient subsequently suffered a cardiac arrest, was transferred to ITU and later died.

CASE 2

A patient suffering end stage liver failure underwent emergency gastroscopy for upper gastrointestinal bleeding in the early hours of the morning. At the time, the patient was significantly acidotic. Post-procedure, the patient was transferred to recovery as ICU-level care was deemed inappropriate.

Later that morning the patient began fitting and subsequently suffered a cardiac arrest. The recovery nurse reported shortly beforehand the patient had been speaking to family on the phone but had a low NEWS score, and had appeared mottled with a capillary refill time of 10 seconds. ABG taken at this time showed glucose <1 mmol/L and pH 6.5.

Lorazepam was administered for seizures. Return of spontaneous circulation was achieved after one cycle of CPR but the patient remained unconscious and apnoeic, requiring ongoing adrenaline infusion. After discussion with the gastroenterologist and the arrest team (including two ICU consultants), life support was discontinued.

There were questions over whose responsibility it was to monitor sick patients in Recovery overnight as failure to repeat ABG overnight and optimise postoperative care may have contributed to the timing of death.

Commentary
Clarifying responsibility for post-operative care is a key part of perioperative planning, especially for patients where there is a treatment escalation plan for end-stage liver failure. Acute GI haemorrhage may be associated with hepatic encephalopathy, hyponatraemia and changes in potassium and glucose concentration. Where patients undergo extended recovery overnight, the recovery team need to know how frequently observations should be made, who to contact if the patient deteriorates and criteria for discharging back to the medical wards.

References:

1. Gilbert-Kawai N, Hogan B, Milan Z. Perioperative management of patients with liver disease. In *BJA Education* 2022; **22**(3): 111–117
2. Angeli P, Bernardi M, Villanueva C, Francoz C, et al. EASL Clinical Practice Guidelines for the management of patients with decompensated cirrhosis. *J Hepatol*, 2018; **69**(2): 406–460.
3. https://doi.org/https://doi.org/10.1016/j.jhep.2018.03.024

Compartment syndrome

A patient suffered a post-partum haemorrhage in recovery following an elective caesarean section and was taken back to theatre for insertion of an intra-uterine balloon and vaginal pack. Post-operatively, the patient developed compartment syndrome in the left arm, requiring

fasciotomies. The blood pressure cuff, ID band, and cannula were removed from the affected arm, which was elevated. The patient was unable to care for newborn twins independently and reported high pain scores.

Commentary:
Compartment syndrome of the arm is a rare event but can arise if intravenous fluid extravasates during volume resuscitation, particularly when using a pressure bag[1]. This is a limb-threatening condition, causing nerve palsies that requires prompt treatment with fasciotomy.

Reference:

1. Willsey D, Peterfreund R. Compartment Syndrome of the Upper Arm after Pressurised Infiltration of Intravenous Fluid. *J Clin Anesth*.1997; 9:428-430.

Surgical centres

A frail elderly patient was scheduled for elective hip replacement at a surgical cold site. The intraoperative course was uneventful. In recovery, the patient developed suspected ST-elevation myocardial infarction and was transferred to a local hospital (approximately 20 minutes away). Coronary angiography revealed Takotsubo cardiomyopathy. The patient suffered a cardiac arrest en route to ICU, and CPR was unsuccessful.

Commentary:
Postoperative morbidity can occur unexpectedly, even with careful preoperative screening. In standalone surgical units there must be facilities for timely transfer of critically ill patients, especially if older and frail patients are operated on.

The Centre for Perioperative Care/British Geriatric Society guidance, and GIRFT guidance recommends that frailty scores be documented using the CFS at surgical referral, preoperative assessment and admission.[1,2] The CPOC guidance further recommends comprehensive multidisciplinary assessment for CFS ≥5 for all those aged over 65 years.

References:

1. Centre for Perioperative Care, British Geriatrics Society. Guideline for perioperative care for people living with frailty undergoing elective and emergency surgery. 2021.
2. Getting it Right First Time, British Geriatric Society. Six steps to better care for older people in acute hospitals: Guidance for managing the GIRFT overall frailty pathway- geriatric medicine. 2023.

Prolonged block

A woman underwent elective caesarean section under spinal anaesthesia. The spinal had been inserted easily on the first pass and 2.6 mL 0.5% heavy bupivacaine with 300 mcg prefilled diamorphine administered.

The patient was reviewed by a consultant anaesthetist postoperatively because of prolonged motor block, and an MRI of the lumbar spine was arranged to rule out cord compression. Further imaging over the weekend included CT head and MRI head, both reported as normal. A neurology review was requested but did not occur until the following day.

Over the weekend, lower limb movement remained restricted and there was decreased sensation in L4, L5, and S1 dermatomes. Plans were made for trial without catheter and attempts to mobilise.

Commentary:
Regression of neuraxial block can be extremely variable.[1] However, an early sign of a space occupying lesion in the neuraxis is prolonged or increasing motor block and there is only limited time before neurological deficit becomes permanent. Association of Anaesthetist guidelines suggest that inability to straight leg raise that persists beyond 4 hours should trigger review.[2] Rapid 24/7 access to MRI scanning should be available in all units where neuraxial blocks are undertaken.[3,4] SALG endorses the use of a local anaesthetic alert wrist band documenting a time by which the patient should be able to lift their legs and asking the patient to alert staff if they are unable to do so.

References:

1. Roderick E, Hoyle J, Yentis SM. A national survey of neurological monitoring practice after obstetric regional anaesthesia in the UK. *Anaes.* 2017; **72**(6): 755-759.
2. Yentis SM, Lucas DN, Brigante L, Collis, R et al. Safety guideline: neurological monitoring associated with obstetric neuraxial block. *Anaes.* 2020; **75**(7): 913-19.
3. Royal College of Anaesthetists. Guidelines for the Provision of Anaesthetic Services in the non-theatre environment. 2025.
4. Royal College of Anaesthetists. Anaesthesia Clinical Services Accreditation (ACSA) Standard 1.1.1.7.

Risk of stroke during major cancer surgery

A patient, in their 70s, was slow to wake in PACU after a 10-hour pelvic exenteration. On extubation, the patient was unable to open their eyes or speak and appeared to have left-sided weakness. The patient was immediately taken for a CT head scan, which confirmed a stroke. Risks of major complications, including stroke, had been explained during preoperative assessment as part of consent for anaesthesia and surgery.

Commentary:
Perioperative stroke is a rare but devastating complication of surgery with an incidence of 0.1 to 0.9% after non-cardiac, non-neurological surgery.[1] The risk of stroke varies by surgical procedure, with the highest risk seen in vascular,

thoracic and transplant operations whereas obstetric and gynaecological procedures have the lowest risk, although pelvic exenteration is not mentioned in this dataset.[2]

Patients should be screened for risk factors for perioperative stroke. These include advanced age (> 85 yrs), history of prior stroke (or TIA), atrial fibrillation, hypertension, valvular heart disease, renal disease or congestive heart failure. Elective surgery should be delayed for 9 months after a previous stroke but emergency surgery should not be delayed. The decision to delay surgery in cancer patients must be carefully considered and the increased risk of stroke balanced with the risk of delaying surgery.

The choice of anaesthetic modality should be based on clinical indications as there is little evidence that this influences the risk of stroke.[3]

References:

1. Lindberg A, Flexman A. Perioperative stroke after non-cardiac, non-neurological surgery. *BJA Education*, 2020; 21, 59-65.
2. Al-Hader R, Al-Robaidi K, Jovin T, Jadhav A, Wechsler LR, Thirumala PD. The incidence of perioperative stroke: Estimate using state and national databases and systematic review. J Stroke Korean Stroke Society; 2019; 21: 290–301.
3. Saied NN, Helwani MA, Weavind LM, Shi Y, Shotwell MS, Pandharipande PP. Effect of anaesthesia type on postoperative mortality and morbidities: A matched analysis of the NSQIP database. *Br J Anaesth*; 2017; 118: 105–11.

Underestimation of risk of high spinal based on patient characteristics

A patient was booked for elective caesarean section. Spinal anaesthesia was technically difficult due to severe obesity and resulted in a high block above T1, associated with refractory hypotension and difficulty breathing. The patient required significant doses of vasopressors, including phenylephrine, ephedrine, and metaraminol. This led to an overshoot in blood pressure, and the patient became hypertensive with a frontal headache intraoperatively. Both hypertension and headache resolved after stopping vasopressor medication.

After surgery, whilst on the ward, the patient suffered two seizures. A CT brain demonstrated a subarachnoid haemorrhage. The patient was transferred to another Hospital for further management.

Commentary:

The risk of high spinal block in parturients undergoing caesarean birth increases with BMI, with an odds ratio of 6.3 in BMI >= 50 compared to BMI < 30 kg/m2 in one cohort study.[1] Caval compression from the gravid uterus and abdominal panniculus are thought to reduce lumbar CSF volume via engorgement of epidural veins. Respiratory distress associated with high spinal block is exacerbated by increased work of breathing in severe obesity, particularly when supine. Non-invasive blood pressure measurement can also be challenging in severe obesity, which can lead to the late detection of hypotension and subsequent overshoot. Consideration should be given to invasive blood pressure monitoring where it is difficult to obtain accurate readings.

The haemodynamic effects of high spinal anaesthesia for caesarean delivery are exacerbated by aortocaval compression, even if some lateral tilt has been applied. A full left lateral position should be used if the woman has refractory hypotension.[3]

This case illustrates the importance of imaging for women who develop new acute neurological symptoms and are not known to be epileptic or eclamptic. The risk of subarachnoid haemorrhage following caesarean delivery is rare. The majority of cases are due to ruptured intracranial aneurysms. A sudden rise in blood pressure may be associated with hypertension-induced aneurysmal rupture or pial vessel rupture.[3]

References:

1. Lamon AM, Einhorn LM, Cooter M, Habib AS. The impact of body mass index on the risk of high spinal block in parturients undergoing cesarean delivery: a retrospective cohort study. *J Anesth*; 2017; 31: 552–8.
2. Bamber JH, Lucas DN; on behalf of the MBRRACE-UK anaesthesia chapter-writing group. Messages for anaesthetic care. In: Knight M, Nair M, Tuffnell D et al., eds. Saving Lives, Improving Mothers' Care: Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2013–15. Oxford: National Perinatal Epidemiology Unit, University of Oxford; 2017: 67–73.
3. Bateman BT, Olbrecht VA, Berman MF, Minehart RD, et al., Peripartum Subarachnoid Hemorrhage Nationwide Data and Institutional Experience. *Anesthesiol*;2012; 116(2):324-333. Porum as excersped quodit, que sunda sint omnimetur?

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