



PATIENT SAFETY UPDATE

1 October 2021 – 31 March 2022



LEARNING POINTS FROM REPORTED INCIDENTS

This issue of PSU contains an important statement about non-Luer (NRFit™) devices, which readers may already have seen elsewhere, followed by a selection of incidents reported to the National Reporting and Learning System between 1 October 2021 and 31 March 2022.

This is a joint statement from the Royal College of Anaesthetists, Association of Anaesthetists and Safe Anaesthesia Liaison Group on transition to non-Luer (NRFit™) devices for neuraxial and regional block equipment.

The requirement for the NHS to transition to the use of non-Luer connectors for neuraxial applications (spinal needles, epidural needles, catheters, and administration sets and other intrathecal devices) and for regional anaesthetic equipment (needles and administration sets) is well recognised across the UK. The original NHS England alert¹ was issued in 2011, and the latest alert Resources to support transition from the Luer connector to NRRFit for intrathecal and epidural procedures, and delivery of regional blocks was published by NHS Improvement in August 2017.² Wales, Scotland, and Northern Ireland have issued similar communications.

The ability for organisations to transition has been delayed for a variety of reasons including ongoing challenges in procuring the necessary items of equipment, most commonly relating to epidural procedures. The Covid pandemic has undoubtedly shifted focus from completing this transition and may have interrupted plans in some units. Despite these challenges, we are aware that some units have achieved 100% conversion to NRRFit. In Wales, the Welsh Government has determined that the range and quality of NRRFit compatible devices available is sufficient for Welsh healthcare organisations to start deploying NRRFit compatible devices, and it is expected that most Welsh NHS organisations will have completed the changeover by the end of 2022. Some hospitals have already completed the transition to NRRFit for both spinal and epidurals.

Recent supply issues from some of the established manufacturers have probably made NHS organisations cautious about NRRFit deployment. This reduction in demand may subsequently have reduced the impetus for manufacturers to increase production. Nevertheless, supply problems are often temporary, NHS Supply Chain work with manufacturers to understand supply problems, and these should not distract UK healthcare organisations from planning a full transition to NRRFit.

We anticipate NHS England will issue a National Patient Safety Alert to mandate final and full transition to NRRFit in due course, with an anticipatory target within the next

twelve months. As per previous alerts with this issue, we understand that this alert will be considered by each of the devolved administrations for their adoption of a similar approach and communication in their region.

We encourage all UK organisations to reinvigorate trust-wide working groups to develop an action plan to transition fully to NRRFit as safely as possible, in anticipation of the alert being published. An FAQ guide from the Welsh group³ is available which contains useful guidance. We encourage local clinicians and organisations to liaise closely with their suppliers and make their individual requirements very clear; this will help manufacturers understand demand and plan accordingly. Some of the key manufacturers (especially in the epidural domain) are asking their customers to tell them anticipated volumes and which product lines are required before deployment, to ensure they can meet the demand.

Organisations should expect the requirement to transition to NRRFit to be reflected in the future criteria of the Royal College of Anaesthetists' Guidelines for the Provision of Anaesthetic Services⁴ and ACSA standards⁵ and in the future guidelines of the Association of Anaesthetists.

References

1. [Patient Safety Alert. Safer spinal \(intrathecal\), epidural and regional devices](#). National Patient Safety Agency. January 2011.
2. [Resources to support safe transition from the Luer connector to NRRFit™ for intrathecal and epidural procedures, and delivery of regional blocks](#). Patient Safety Alert. NHS Improvement August 2017.
3. [FAQ for NHS Wales Neuraxial \(ISO 80369-6/NRRFit\) connectors changeover](#). Surgical Materials Testing Lab, Wales, August 2021.
4. [Guidelines for the provision of anaesthetic services](#), Royal College of Anaesthetists.
5. [The ACSA standards](#), Royal College of Anaesthetists.

Tracheostomy

Case 1

"Attempt for percutaneous tracheostomy. US check of the neck structures - no major vessel or goitre. Full asepsis. Checklist done. Patient positioned, sedated and paralysed as per protocol. ETT withdrawn under videolaryngoscope direct view. LA 1% lidocaine with adrenaline. Perpendicular incision with blunt tissues dissection. Minor bleeding. Needle to trachea inserted under direct vision with Ambuscope. Guidewire, minor dilator, major dilator (green one) and trachea tube inserted over the guidewire easily and under direct Ambuscope vision. Green stylet removed from the tube with the guidewire and the inner trachea tube inserted. Patient connected to the ventilator - no ventilation, no chest movements, no EtCO₂. Very quick desaturation. Trial of Water's circuit ventilation - no success. Trachea tube removed. Top ETT dislodged. Patient severely desaturating, bradycardiac but cardiac output preserved. Several attempts of intubation from the top. Eventually intubated by ITU Consultant colleague with tube 7.0. Reduced R side AE. Good chest expansion. EtCO₂ present. ENT called.

LEARNING POINTS FROM REPORTED INCIDENTS

Discussion re management - 3 ITU Consultants and ENT Consultant - decision to manage it surgically. Pt stable for transfer to theatre". The post-event discussions noted: "...The procedure was carried out by an ITU consultant, the most senior member of the medical team, the airway person was an ITU clinical fellow. Two other ITU consultants were on site looking after other patients. NOK was informed prior to procedure and the risks and benefits were discussed. ICS checklist and consent form completed. The procedure followed the recommended guidelines: ultrasound scan prior to procedure, bronchoscopy guided insertion, full AAGBI monitoring including capnography. After an uneventful insertion of the tracheostomy tube no effective ventilation was achieved likely due to the tube lying against the tracheal wall. The orotracheal tube slipped out causing a complete loss of airways. Several intubation attempts by the team resulted in hypoxia for several minutes and eventually the patient was successfully intubated by another ITU consultant. No loss of cardiac output, but hypoxia lasted for several minutes before airways were secured again. Later the patient received a surgical tracheostomy during which the tracheostomy incision looked off the midline. The patient's next of kin was informed according to the Duty of Candour policy. Hypoxic brain injury and death are recognised complications of this procedure and well documented in NAP4 (National Audit Project 4). A local agreement was taken that the airway person at the top must be a senior, experienced airway competent doctor. Tracheostomy trainings were searched online, but due to the pandemic no face to face/on-site trainings were possible or offered. No national guideline is available, local guideline is being worked on by one of the ITU consultants."

The reporters describe a well-prepared process with pre-procedural ultrasound, checklist and a hospital protocol, including confirmation of consent/assent. They describe use of videolaryngoscope, fiberoptic bronchoscope (FOB) and capnography. There is no comment on seniority of operator and airway manager. The latter should be senior and/or experienced and should confirm that re-intubation was possible prior to the procedure (difficult intubation is a contraindication to percutaneous dilational tracheostomy). It is not stated whether the bronchoscope was passed down the tracheostomy tube to confirm correct position before connecting to the ventilator – this could have helped diagnose the problem. The person managing the FOB and the airway requires a second person to hold the tracheal tube and maintain position (FOB use is a two-handed procedure). As well as mitigating against oesophageal perforation, FOB is required to ensure an anterior position of the stoma and cannulation under vision – this is not commented on. Visualization of the tracheal wall can be challenging again indicating the need for a senior clinician for airway/FOB.

Case 2

"COVID patient, intubated and ventilated on ICU. Previous failed percutaneous tracheostomy. Transferred to theatre for surgical tracheostomy (ENT)... Surgically challenging to access trachea. Initial failure to insert tracheostomy/ETT following opening of tracheal window by surgeon. Loss of ability to ventilate/oxygenate via oral ETT in trachea. Cardiac arrest - immediate management by theatre team at point of loss of ability to oxygenate/ventilate. ENT successfully inserted ETT into trachea through front of neck, followed quickly by ROSC. Team decision between theatre team with ICU consultants to exchange for tracheostomy tube. Planned and successfully inserted." The investigation provided the following plan: "1) review tracheostomy kit with an aim to standardise tracheostomy tubes... 2) review and signpost the emergency tracheostomy tray... 3) anaesthetic team to make ready fiberoptic equipment for use in surgical tracheostomy - presented at M&M and will be reinforced with airway and emergency teams during theatre training... 4) anaesthetists to consider employing fiberoptic control during surgical tracheostomy especially where there are concerns about a difficult airway, or surgical approach is known or considered to be difficult - presented at M&M and will be reinforced at airway 'tea trolley' training."

Following a failed percutaneous dilational tracheostomy, surgical tracheostomy should mitigate risk because theoretically the endotracheal tube can be identified by the surgeon and withdrawn or advanced beyond the stoma as needed to maintain or re-establish the airway. This requires precise and continuous visualization of the operative site and good communication. High levels of oxygen are required during the procedure in case of airway interruption/loss. As demonstrated here the surgical procedure has risk. There is no comment regarding the seniority and experience of the surgeon- but notably the ICU consultant was selected to exchange the stomal tracheal tube. In many hospitals the number of surgical tracheostomies has fallen over the last 20 years and ENT surgeons at all levels may have much less experience than historically.

Case 3

"Prolonged ICU stay (6/52) for severe covid pneumonitis and ARDS. Percutaneous tracheostomy performed on [day 0] without incident. Documented cuff leak from 0000hr on [day 4] requiring high inflation pressures. This was appropriately escalated to senior medical staff but no action was taken. No bronchoscopy to check position of trache tube performed despite severe ongoing red flag of cuff leak. Cuff pressures up to 80 (over 3x normal) required in 12 hr prior to incident. Tracheostomy exchange attempted [on day 6 afternoon]... During exchange there was loss of ability to ventilate and oxygenate patient. This resulted in a prolonged cardiac arrest. Precise events surrounding the airway exchange require

LEARNING POINTS FROM REPORTED INCIDENTS

further clarification. Definitive airway was secured with an ETT during the resuscitation. Unfortunately the patient was not able to be resuscitated."

When a cuff leak occurs, this may be because of a tube size that is small relative to the trachea, damage to the cuff, pilot tubing or stop valve or the leak may occur with inflation pressures exceeding the tracheal wall pressure due to tracheal dilation or injury or more commonly malposition of the tracheostomy. As a tracheostomy cuff begins to pull into the stoma, a cuff leak is often heard and may be intermittent if the tube is moving in and out of position. As suggested, higher intramural pressures will mitigate, but it is essential to then investigate the cause, and correct in a timely manner. This emphasizes the need for a well-fastened or tied tube, fastidious nursing care and attention and avoidance of any traction on the tube from the weight of the circuit. In this case it would appear that a false passage was created anterior or lateral to the trachea. Endotracheal intubation was correctly performed when this was not immediately correctable. Presence of capnography was not commented on. When undertaking tracheostomy tube exchange following percutaneous tracheostomy there is high risk of failure or misplacement if there is not a well-established tract. If the tracheostomy is recent, say less than seven days old, it may be advisable to re-intubate with an oral tube first and then reinsert tracheostomy using a full percutaneous tracheostomy kit.

Case 4

"Tracheostomy became displaced on turning the patient. Patient became hypoxic and went into cardiac arrest. CPR unsuccessful."

Again, the need for scrupulous fixation is emphasized by this story as is the need to have a dedicated person supporting the tube at the neck at high-risk times such as patient positioning. Brief, planned disconnection should also be considered on a case-by-case basis to reduce risk of traction during turning.

Comprehensive UK FICM/ICS guidance can be found [here](#).

Recent other guidelines/review can be found [here](#).

The National Tracheostomy Safety Project is [here](#).

Capnography at intubation

This incident took place on a ward. "Acute deterioration with agitation whilst being treated with CPAP for COVID-19. Patient pulled off mask and rapidly desaturated. Agitated and being held down. Emergency RSI performed as SpO₂ 34%. Peri-intubation cardiac arrest so after ETT inserted during which propofol, rocuronium and bougie used, CPR

commenced. EtCO₂ not present at time due emergent nature of situation. Attached after approximately 10 minutes (not documented in notes but estimated on phone by SpR). ETT changed later on following ABG as PO₂ zero on gas. Original ETT found to be oesophageal. As no improvement following this CPR ceased."

It is not clear why capnography was not present at the time of intubation. Association guidelines demand it be present during intubations as part of anaesthesia and there does not seem to be a good reason why this should not be the case in situations such as this, where intubation is taking place during a ward emergency. Portable capnography is available. The PUMA (preventing unrecognised oesophageal intubation) guideline¹, published since this case was reported is clear: "Exhaled carbon dioxide monitoring and pulse oximetry should be available and used for all episodes of airway management". This is also a good opportunity to point readers to the work that the College has been leading² on the importance of capnography following the Report to Prevent Future Deaths issued after the death of Mrs Glenda Logsdail.

1. [Preventing unrecognised oesophageal intubation: a consensus guideline from the Project for Universal Management of Airways and international airway societies](#), Association of Anaesthetists.
2. [Patient safety: unrecognised oesophageal intubation](#), Royal College of Anaesthetists

Central venous cannulae

Case 1

"Patient found in respiratory distress, sat in the chair. Initially GCS 15/15 which rapidly dropped to 3/15 within seconds and clutching the left side of his chest/abdomen. Noticed one lumen on the CVC bleeding and open to air without bionector which later was found on the floor."

Case 2

"Informed help was required because "line had been left open". On arrival at bedside pt desaturating. Requested pt to be put on 100%. Concerned re potential air embolism. Sats improved and pt quickly back down to 40% FiO₂. Unit doctors already at bedside. Large amount of blood in bed."

This complication has appeared in previous issues of PSU. Whilst there is a message about the operator ensuring security of the connector or cap used, perhaps there is also a message about product design. This is an ongoing problem requiring care and attention from all staff managing central venous catheters. There have been attempts to design engineered solutions, for example a [built in stop valve](#) which cannot be disconnected.

LEARNING POINTS FROM REPORTED INCIDENTS

Case 3

"A central line was misplaced at insertion into the right brachiocephalic artery. The person involved was being supervised, but has done several independently. The situation was identified soon after placement before its use."

Case 4

"... noted lots of bruising around CVC site in R jugular vein, trace looked more like arterial than venous, stopped all infusions via line. Was transduced and looked more arterial again. Patient with complex pre-morbid status, underwent major surgery... Central vein access for vasopressor support was required. CVC inserted in Right IJ vein, by senior anaesthetic clinician, under US guidance, with no particular incidents documented. Blood gas check performed. At the end of the surgery, when awake, patient showed signs of left upper and lower limb weakness, left-sided droop and dysarthria. CT Brain performed: NAD. Thrombolysis not given. 40mg Clexane given."

Arterial placement remains a risk with all insertion sites and techniques and as in this case should be routinely excluded immediately following insertion with blood gas analysis and/or transducing. In case 4 it would appear that the neurological signs were likely secondary to infusion of vasoconstrictors or other medication into the right carotid artery. It is not clear if this was transient or permanent and whether a follow up CT scan was performed.

Central pontine myelinolysis

Case 1

"Admitted via A&E [to critical care] with severe acute on chronic hyponatraemia and agitated confusion; no fits. Sodium 101 on [day zero evening]. Patient was confused and restless. They had severe AKI with creatinine 600 and urea around 24. Catheterised - 3 litres of urine recovered. Given 1 litre normal saline in A&E then a bolus of hypertonic saline. CT brain NAD. Given 1 litre normal saline/8 hours in ITU. Sodium went up to 109 [at approximately six hours]. Sodium increased to 129 [at approximately another nine hours]. Hyponatraemia was corrected rapidly (28 mmol/l over 15 hours). Sodium gradually normalised afterwards as well as renal function. Patient discharged to ward on [day 3]. Patient developed acute dysphasia and dysphagia on 30 July (after 5 days) requiring NG feeding. Unable to communicate; confused and agitated. No limb weakness. Central pontine myelinolysis (CPM) suspected in view of rapid correction of sodium. MRI on [day 9] showed changes of metabolic encephalopathy but not CPM."

Case 2

"[Septuagenarian patient]. New onset seizures... and brought into ED. Hyperglycaemic (blood sugar 55+). Most likely hyperosmolar hyperglycaemic state. CT head normal

at the time. Sodium 133. Intubated and ventilated due to ongoing seizures. On-call medical team not involved in care. Blood sugar rapidly corrected over 24 hours (episode of hypoglycaemia the next afternoon of 3.5) and sodium peaks at 153 in about 24 hours. Underlying pneumonia most likely cause of medical deterioration. Patient extubated on [day 5] and remained confused. MRI head on [day 12] demonstrates central pontine myelinolysis, subacute infarct and subtle signs of Wernicke's encephalopathy."

This is not an infrequent complication seen in ICU. Most guidance suggests limiting sodium increases to <8-10 mmol/24hr with frequent measurement. Hypertonic saline should only be used with extreme caution under senior guidance and very close plasma monitoring as "overshooting" as in this case is a high risk. Hypertonic saline should only be used to increase sodium by 3-5 mmol for serious neurological complication from hyponatraemia (ie coma or seizures). Rapid increase in sodium usually occurs due to polyuria following initial saline loading and can be managed by use of DDAVP to limit urine output.

Awake fibreoptic intubation

"Elective case, difficult patient with multiple comorbidities and risks. Unexpected loss of airway during AFOI, all attempts to re-establish airway failed." Post-event review stated: "Pt extremely complex with multiple medical problems: ... syndrome with myotonic myopathy; chondrodystrophy; dwarfism; hyperplasia of left choanae (causing difficulty accessing nose); scoliosis of lumbar spine; cervical scoliosis. Known to gynaecological services for several years and surgery previously declined due to increased risks. In terms of anaesthetic issues, ... syndrome is associated with malignant hyperpyrexia and also with a difficult airway. Pt known to have difficult airway with failed intubation in 2004 (documentation reviewed pre-operatively). Pt has extensive investigations in 2016 showing normal echo and also normal spirometry. Imaging of the airway in 2016 revealed cervical scoliosis and some dysmorphic features of the airway with essentially normal images of the airway structures themselves. Pt reviewed in high-risk anaesthetic clinic twice to discuss increased risks of surgery an anaesthesia... explained to patient that difficult airway was of concern. Detailed explanation given of awake fibreoptic intubation and the possibility of complete failure to intubate necessitating abandonment of procedure. This was re-iterated [at subsequent clinic]. Due to symptoms and suffering, patient decided to go ahead with procedure. All appropriate measures taken when listed: only patient on the list; anaesthetist informed ahead of time of patient so appropriate preparations could be made; registrar subsequently assigned to the list to support. Appropriate planning made on the day. Experience anaesthetic staff and ODP staff. All appropriate equipment gathered and available." A verbal report of events on the day was as follows:

LEARNING POINTS FROM REPORTED INCIDENTS

“Initial plan was for an awake fiberoptic intubation. The patient was kept breathing on 4ng/ml/kg (target-controlled infusion) of remifentanyl; nasal intubation attempted but unable to get through nose; oral intubation with fiberoptic scope attempted but failed with Burman airway; attempted without airway but simply hit back of oropharynx. Patient stopped breathing and had laryngospasm, settled with facemask, oxygen and PEEP. Remifentanyl stopped. Then patient became apnoeic and had trismus; unable to open mouth and unable to ventilate or oxygenate. Emergency buzzer pulled and front of neck access attempted. Initially seemed successful with bubbles of air appearing but unable to pass bougie or tube. ITU consultant attended emergency bleed and attempted front of neck with scalpel and bougie. Felt in trachea but unable to ventilate and no end tidal CO₂. Pt had arrested and full ALS algorithm was ongoing. ENT registrar attended and consultant ENT surgeon quickly attended. Oral intubation attempted in tandem with Anaesthetic Registrar using the McGrath but all the anatomy was extremely unusual and laryngeal inlet could not easily be identified. Further front of neck access attempted but significant bleeding into trachea occurred and caused further difficulty... 25 minutes with no oxygen to the brain and no return of spontaneous circulation. No airway achieved. Team decision made to stop further attempts and stopped CPR.”

The remifentanyl dose appears incorrectly stated. It is presumed that the authors meant 4 ng.mL⁻¹, and that this means effect site concentration. This is slightly higher than the recommended dose range (1-3 ng.mL⁻¹) in a recently published Difficult Airway Society guidelines for awake tracheal intubation in adults¹ The guidelines further advise: “Cautious use of minimal sedation can be beneficial. This should ideally be administered by an independent practitioner. Sedation should not be used as a substitute for inadequate airway topicalisation.”

NAP4² noted several cases of airway failure during awake fiberoptic intubation and also several cases of failure associated with remifentanyl use. NAP4 noted: “... lack of patient co-operation, apnoea, and airway obstruction were widely reported complications of awake fiberoptic intubation contributing to failure: the review panel and local reporters considered poorly managed sedation to be a factor in these cases. There were several reports of problems when remifentanyl was used in combination with other drugs for sedation. Problems noted during these events that may have been due to remifentanyl included respiratory depression, apnoea and delayed respiratory arrest. It was the impression of the review panel that remifentanyl was more likely than other sedatives to cause these types of events but this remains unclear.”

This case is a potent reminder that awake fiberoptic intubation does not always work and a backup strategy is still needed.

1. [Guideline for the management of hip fractures 2020](#). Association of Anaesthetists.
2. [NAP4: Major Complications of Airway Management in the United Kingdom](#)

Nasogastric tube placement

“NG placed... Noted on CXR today... that likely intra-bronchial placement of NG (had NOT been used for feeding). Removed and patient immediately desaturated. Pneumothorax seen on repeat chest x ray.”

The misplacement of an NG tube into the tracheobronchial tree is a well-known complication most commonly because of the fear of feed being infused. Routine immediate confirmation of position should occur.¹ This case reminds us of the long recognized direct trauma that can occur especially with wired tubes, which has been reported on.²

1. [Patient safety alert: Nasogastric tube misplacement: continuing risk of death and severe harm](#), NHS England.
2. [Tracheopulmonary injuries following enteral tube insertion](#), National Library of Medicine.

Safe flushing of intravenous cannulae

The on-call anaesthetic team were called down for an emergency on an operating list: “A patient had become apnoeic and unresponsive after a cannula was flushed. We supported the airway and gave oxygen. The anaesthetist said they had used normal saline to flush the cannula. We attached a peripheral nerve stimulator and found the patient had no muscle twitches. We gave sugammadex, which reverses muscle relaxants. The patient immediately started breathing and became responsive. The flush for the cannula had been Rocuronium, which had been left drawn up, but unlabelled after a previous case. The administration of this had led to the patient being paralysed and unable to breathe, but completely conscious.”

This type of error was addressed in NAP5.¹ Syringes should always be labelled at the time the drug is drawn up, unless the drug is given immediately. Neuromuscular blocking drugs require particularly vigilant handling, because of the catastrophic potential effects of giving them inadvertently. There is the immediate threat to life and the long term psychological sequelae. The NAP 5 Handbook offers advice on the acute and continuing management of this complication.² The Association of Anaesthetists has forthcoming guidance on safe handling of injectable medications and on the standards for labels used in anaesthesia and in associated areas. There is a trailer for these guidelines in January’s *Anaesthesia News*.³

1. [NAP5 - Drug errors and awake paralysis](#). National Audit Projects.
2. [NAP5 Handbook](#). National Audit Projects.
3. [Handling injectable medications in anaesthesia](#). *Anaesthesia News*.

LEARNING POINTS FROM REPORTED INCIDENTS

Brachial plexus injury

"The patient has numb arms with poor motor function post op. This is likely a brachial plexus injury sustained in the course of his operation. most likely related to positioning."

Everybody involved in moving and positioning patients in theatre has a responsibility to ensure it is done properly and safely. Organisations have a duty to ensure staff have the correct training and equipment to do this. SALG is beginning a piece of work looking at injuries relating to positioning.

Fractured neck of femur

Case 1

"Patient in cardiac arrest following ?cement syndrome . CPR commenced and ROSC achieved. Patient consequently RIP"

Case 2

"... patient's death as confirmed by anaesthetist is cardiac arrest due to reaction to application of bone cement..."

The perennial reminder of the perils of surgery and anaesthesia in patients with fractured neck of femur. Increasingly, these patients include very frail and vulnerable individuals. The Association has previously issued guidance on avoiding bone cement implantation syndrome¹ and has more recently issued updated guidance on management of patients with hip fractures.²

1. [Safety guideline: reducing the risk from cemented hemiarthroplasty for hip fracture 2015](#)
2. [Management of hip fractures 2020](#), Association of Anaesthetists.

Persistent neuraxial block

A patient presented for open abdominal aortic aneurysm repair: "I saw the patient... in the preoperative assessment clinic 2 days before the surgery. After assessing the patient and reviewing all the investigations (normal clotting and patient not on any antiplatelet/anticoagulant drugs), I explained the plan for general anaesthesia and Epidural anaesthesia and postoperative ICU admission. I explained the risks of epidural anaesthesia and risk of postoperative complications including death involved with the major vascular surgery. They understood the information given and agreed to proceed with surgery. I had an experienced junior doctor with me [who] started the insertion of epidural. With standard aseptic precautions, epidural was first attempted at T10-11 level, it was technically difficult (bony), but managed to identify the space and the catheter was inserted. On aspiration of the catheter, there was blood in the catheter, so the catheter was removed. Second attempt was done at T11-12 space, unfortunately there was a dural puncture at this level and the procedure abandoned. I scrubbed and inserted the epidural at T9-10 level uneventfully. After ensuring that there was no blood or CSF aspirated, I gave a test dose of

local anaesthetic. There were no immediate effects. We inserted an arterial line and then induced general anaesthetic. Before induction, we confirmed that the patient did not have any motor block in the legs. The epidural infusion was started intraoperatively and continued until the patient went to recovery. On arrival to recovery, when the patient was able to follow commands, on asking to move the limbs, they were unable to do so. The epidural infusion was stopped immediately, suspecting a dense block or intrathecal spread of the local anaesthetic. Then the patient was transferred to ICU, I handed over this information to the night team, and instructed them not to start the epidural infusion until they are able to move the legs and informed them to update me if they do not regain motor power. Later that night the ICU doctor called and informed me that there was some improvement in the motor power in the right leg and as they were not complaining of any pain, decided not to start the infusion until he regains motor power. Next morning I contacted the ICU consultant to find out the progress. Unfortunately there was no improvement in the motor power, so we decided that they needed urgent MRI to rule out epidural haematoma."

The Pain Society has published guidance on management of epidurals¹ which says: "Monitoring of sensory and motor block is essential for the early detection of potentially serious complications. The Bromage Scale is an accepted tool for the measurement of motor block. An increasing degree of motor weakness usually implies excessive epidural drug administration. However, it can indicate very serious complications including dural penetration of the catheter, or the development of an epidural haematoma or abscess. Therefore, it is essential that protocols are in place to manage the scenario of excessive motor block. Examples of suitable algorithms and specific advice on protocols for this situation are given in the report on the audit of major complications of central neuraxial block performed by the Royal College of Anaesthetists."² The Association has published specific guidance for the management of obstetric neuraxial block.³ It is important that clinicians and associated healthcare professionals know what to expect, what to look for and what to do when faced with the unexpected.

1. [Best practice in the management of epidural analgesia in the hospital setting](#), Faculty of Pain Medicine.
2. [NAP3 - National Audit Projects](#)
3. [Safety guideline: neurological monitoring associated with obstetric neuraxial block 2020](#), Association of Anaesthetists.

Obstetric local anaesthetic toxicity

"Sudden loss of consciousness with twitching in upper limbs, during caesarean section under epidural top up (using 0.5% levobupivacaine). Patient immediately given a GA, lipid rescue and investigated for other causes of seizure. Incident occurred approx 45 minutes following last local anaesthetic

LEARNING POINTS FROM REPORTED INCIDENTS

injection, and after delivery of the baby. No other cause for seizure and loss of consciousness found? LA toxicity. No cardiovascular instability or conduction defects. Overnight stay in ICU and 3 day in-patient stay. Patient well and discharged with follow up."

The important message here, which these clinicians recognised is that local anaesthetic systemic toxicity (LAST) can occur some time after administration of the drug, via systemic absorption over time. The Association has published guidance on LAST¹ and this is also in the Quick Reference Handbook.²

1. [Management of severe local anaesthetic toxicity](#). Association of Anaesthetists.
2. [Quick Reference Handbook \(QRH\)](#). Association of Anaesthetists

Standards of monitoring

This report came from a critical care unit. "Cardiac arrest buzzer pulled, patient found unresponsive in bed. Patient had been found unresponsive on morning obs round. Last seen responding and speaking 45 min – 1 hr previous. Last set of obs [approximately five hours before found, were] Sats 92% on 0.35 SVTM RR23 HR 100 BP 125/80. No monitoring on patient when found unresponsive. Monitoring had been removed by the bedside nurse as patient was pulling it off. Patient was agitated in the bed. On arrival good CPR ongoing. Airway being bagged with no resistance. Patient cold. Sats 37%. CPR given for 16 minutes. 3x adrenaline 1 mg given at 3-4 min intervals. Asystole throughout... Developed bloody secretions per trachea approx 10 min to CPR. Suctioned ~ 50 ml. Gas... pH 6.7, pCO₂ 14.7, pO₂ 1.33, Hb 119, sO₂ 1.4, K 9.6, Na 149, Glucose not recorded, Lac 16. EtCO₂ 0.4 at best despite good CPR and ventilation. Decision taken to stop given terrible gas despite 15min resuscitative attempts indicating prolonged down time."

GPICS is the document defining standards in the UK.¹ The standards have clarity for ventilated patients, but adopting normal medical practice proportionate to the patient's severity of illness and risks. The agitation that caused the monitoring to be removed may have been a sign of deterioration and in this circumstance direct supervision would be required. GPICS comments on ICU design: "Managing patient safety; particularly ensuring good visibility/'line of sight' of patients, and alarm/monitoring capabilities."

1. [The Guidelines for the Provision of Intensive Care Services \(GPICS\)](#), Intensive Care Society.

Arterial line

"A PICCO arterial line was placed into the left brachial artery for monitoring purposes. The patient has suffered a complication from the procedure – arterial thrombosis which will lead to an amputation of this arm...". The organisation's investigation said: "This is a rare known complication from

arterial line placement. However this was for a PICCO line (an additional line placed for the use of a PICCO monitor), the patient did not require the line for blood pressure monitoring (as already had art line in situ). This is a rarely used monitor now a days and not all clinicians use it. Therefore, given the severity of this outcome from the patient we should review the use of PICCO for the future."

This case reminds us all of the potential risk of brachial artery cannulation as there is no collateral flow to the distal arm if arterial thrombosis occurs.

Multi-modal anaesthesia

"Patient with background history of HTN, IHD, admitted via A&E with acute abdominal pain. Booked for diagnostic laparoscopy +/- laparotomy for colitis/bowel ischemia. Resuscitated in OT before starting. Arterial line was inserted for invasive BP monitoring, while patient was awake. Spinal anaesthesia (morphine + bupivacaine) given for pain relief, IV metaraminol infusion started for low BP. GA was induced with TIVA (remifentanyl + propofol). Soon after induction, patient had PEA cardiac arrest. CPR started, ROSC after 3 cycles. Central line was inserted, noradrenaline infusion started. After stabilisation surgeons were asked to proceed with the procedure. Due to patient's unstable condition surgeon decided to proceed with laparotomy. Ischemic large bowel was identified which was resected. Patient had two more PEA cardiac arrests intraoperatively with immediate CPR and ROSC after 2-3 cycles. Patient was sent to ITU for level 3 care postoperatively."

There are no details about the patient's underlying status (e.g. further vital signs, functional status, NELA score) but the choice of anaesthesia technique could be regarded as unusual in the context of a clearly very unwell acute abdomen. Mixing spinal opiates for post-operative analgesia and remifentanyl intra-operatively as part of a balanced anaesthetic technique would not be unusual in many circumstances, but it would have been informative to hear the justification in this situation. The cause of the PEA arrest is unclear. Remifentanyl might be implicated, as could incomplete fluid resuscitation, or it could simply be related to the patient's underlying status. More details would have helped paint a more complete picture.

Deterioration following chest drain insertion

"Incident reviewed by Consultant Intensivist. The patient appeared to have been improving from their illness up until the afternoon of ... when they develop respiratory distress and a large A—a gradient refractory to high flow O₂ and NIV. It is my opinion that the patient's sudden deterioration was as a result of a large sputum plug occluding either the right main bronchus or bronchus intermedius. This led to RLL collapse which is clearly demonstrated on the CXR post-intubation

LEARNING POINTS FROM REPORTED INCIDENTS

and needle thoracocentesis. RLL pneumonia is described on the post-mortem. The correct course of action should have been to perform a bronchoscopy and/or physiotherapy. I cannot see an indication for the chest drain insertion from the evidence available - there is possibly a small right sided apical pneumothorax present after the thoracocentesis but no evidence of tension radiologically - the mediastinum is displaced into the right hemi thorax not away from it. The risk of an inadvertent breach of the pericardium with the Seldinger chest drain kit would be higher in the presence of right sided displacement of the mediastinum. The PM report describes a haemopericardium but does not say whether there was any evidence of an external breach of the pericardium or if the haemorrhagic area seen on the aorta was within the pericardial sac. The finding could be explained if either a mediastinal structure was injured during a procedure or a guide wire caused mediastinal injury. It would appear from the notes that the Seldinger drain was removed and then a surgical drain sited... statement is inadequate to determine the exact sequence of event. Spontaneous bleeding into the pericardium is extremely rare, unless there is a marked coagulopathy, but could explain the death. I am unable to find the contemporaneous APTT measurement (as the patient had been receiving heparin anticoagulation to enable CVVHDF). From a governance viewpoint, I cannot see that any LocSSIPs checklists were used during intubation or any of the procedures."

This is presented as a clear case of collapse due to a mucus plug requiring bronchoscopic clearance and misdiagnosed as a pneumothorax. It is not clear of the seniority or experience of the clinician diagnosing, formulating the treatment plan or performing the procedure. Failure to follow LocSSIPs, identified by the reporters is of concern. It also highlights a risk of Seldinger chest drains performed as a blind technique. Ultrasound guidance should be used for insertion to treat pleural effusion and definitive imaging (e.g. CT scan) for pneumothorax. A surgical approach should be considered and may be safer for pneumothorax as blunt dissection and finger sweep should confirm pneumothorax.

