



PATIENT SAFETY UPDATE

July 2020–March 2021



LEARNING POINTS FROM REPORTED INCIDENTS

July 2020–March 2021

This document aims to achieve the following:

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

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

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

Unintended inhalational anaesthesia

The National Reporting and Learning System (NRLS) identified a report of a patient being inadvertently anaesthetised because a vaporiser was left switched on and unnoticed. The patient was being recovered in an anaesthetic room after surgery. Whilst receiving oxygen via an anaesthetic machine the patient received an unintended dose of isoflurane because the vaporiser had been left switched on. The incident was reported as severe harm but the patient was later described as being fully awake and was returned to the ward.

An NRLS search identified nine similar incidents in two years in which patients were administered an inhalational anaesthetic agent from an unintentionally switched-on vaporiser. The patients were variously described as unrousable, anaesthetised, unresponsive, sedated and drowsy.

Some were instances where inhalational general anaesthesia was planned and the vaporiser was left on in between cases or switched on too soon, but others related to patients who should not have received an inhalational agent at all. Examples included inhalational agents being

given to women in obstetrics in an oxygen/nitrous oxide mixture (presumably being given for supplementary inhalational analgesia in theatre) and to patients after surgery where supplementary oxygen was intended (and presumably the oxygen mask tubing was connected to an anaesthesia workstation's common gas outlet).

Other than the numbers on the dial, vaporisers do not have any special visual flag that indicates that they are operational. Such an indicator could be added to the design, either voluntarily by manufacturers or mandated by a change to the ISO standard for vaporisers. Pursuing the latter option has been discussed at the Association's Equipment Standards Committee. However, changing an ISO standard is a long and complex process, which can take years to effect change. Some newer machines with electronic agent injection systems automatically reset the agent to zero in between cases – a fail-safe. With other machines, vigilance and disciplined checking between cases is necessary.

To remove the risk of inadvertent administration of inhalational agents, ideally the anaesthesia workstation would not be used to administer inhalational analgesia or supplementary oxygen. Inhalational analgesia can be given from a mobile cylinder or from a wall point if available. Supplementary oxygen can be given from a dedicated flowmeter. Many workstations have a separate flowmeter for this purpose. Patients receiving regional anaesthesia will frequently require supplementary oxygen and recovery in theatre will be an ever-present need for infection prevention and control. Using the common gas outlet should ideally be avoided. Organisations should put in place operating procedures and policies that protect patients from this avoidable risk

Tracheostomy

Case 1

"... tracheostomy cuff leak compromising ventilation... emergency tracheostomy tube exchange needed. Pt was on P_{supp} 20, PEEP 8, FiO₂ 55% with SpO₂ 92%, on about 20mcg / min NA. FiO₂ increased to 100% and SpO₂ picked up to 100%, pt still on remifentanyl infusion. ITU registrar passed in Aintree catheter after sedating with propofol and attempted to rail road 9mm trachy tube - unable to pass - tracheostome started to bleed. I was present on direct supervision. Immediately went in with unsterile gloves and attempted to pass the 9mm tracheostomy tube - unsuccessful (one attempt). Attempted to rail road size 8mm trachy tube by ITU registrar - unsuccessful (one attempt with this size). Bag mask ventilation initiated. Cardiac arrest call put out and fast bleep put out for Anaesthetic consultant to come in. I gowned and gloved and attempted to intubate

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patient with ETT from oral route as Aintree catheter not insitu anymore but no visualisation of cords as hypopharynx filled with blood - attempted to suction but no view achieved. Difficult airway trolley and CRASH trolley called in. Intubated blindly with 7mm ID COETT - no Capnograph noted - at this moment patient desaturating to 30% with dropping BP - cardiac arrest - CPR initiated. Rhythm Asystole. Immediate decision to go front of neck (whilst CPR ongoing) - vertical incision performed with scalpel and bougie inserted and size 6mm ID cuffed endotracheal tube uncut railroaded - capnograph trace confirmed - ETCO₂ picked up from around 2 to 6 and maintained with CPR. CPR continued and call put out to ITU consultant. By this time anaesthetic consultant, anaesthetic SHO were in and helping with resuscitation. CPR ongoing when ITU consultant came in. Reassessed situation and causes of cardiac arrest in the situation gone through and agreed that hypoxia was the likely cause. In the meantime, patient had 11mg adrenaline with no ROSC, rhythm remained asystole throughout. Decision taken by team to stop resuscitation."

The organisation's investigation identified factors contributing to this incident: critical illness with COVID-19, staff working in PPE because of COVID-19, patient anticoagulation, a mismatch between an unusually wide trachea and the tracheostomy tube inserted, gaps in consultant staffing. They planned to consider creating a risk assessment tool for use before tracheostomy changes in future and review the trust's policy for care of patients with front of neck airways. Emergency algorithms for emergency tracheostomy management can be found at tracheostomy.org.uk.

There appears to have been senior direct supervision. The bleeding (anticoagulated for COVID-19) and PPE requirement in this case no doubt made this even more challenging. The Aintree catheter has a ventilation channel and can be tested for ventilation before trying to railroad. However, railroading can be challenging and the rigid tracheostomy tube leading edges can catch on tissues. Flexible silicone tracheostomy or endotracheal tubes may also be useful for rescue in these circumstances. It is possible to use a percutaneous tracheostomy introducer over a guidewire to provide a smooth taper to the tracheostomy tube. Additionally, exchange catheters can become displaced during difficult exchanges. Judgement calls, depending upon experience, are often necessary to abandon railroading in favour of using a bespoke introducer for the new tube that removes a substantial step which can catch on tissues. Bag and mask ventilation was appropriately attempted (efficacy not noted and not indication of whether the stoma was covered to prevent air leak) and oral intubation unsuccessfully attempted. Following hypoxic cardiac arrest and CPR commencement, the stoma was refashioned via front of neck access. It

is not stated whether the patient was fully paralysed; neuromuscular blocking drugs should always be used in a scenario such as described.

Changing a tracheostomy tube in urgent or emergent situations inevitably carries risk despite mitigations many of which were applied in this case.

Case 2

"Patient being turned. Tracheostomy displaced. Critical Care team called. Algorithm followed but patient became hypoxic and suffered asystolic cardiac arrest."

There is little information here, but this case highlights the need for a dedicated skilled staff member to be responsible for and hold and control either endotracheal or tracheostomy tubes during patient repositioning. It can also be safer temporarily to disconnect the tracheostomy from the ventilator during turning to reduce risk of displacement, although COVID-19 protocols may discourage this. Tracheostomies can become completely removed, lie in the stoma or be re-advanced into a false passage. Additionally, consideration of adequate ongoing tube securing with snug ties (elasticated adjustable ties when regularly checked can provide this) in addition to swivel and/or flexible connectors and attention to supporting ventilator tubing to prevent drag.

Case 3

"... patient after bilateral neck dissection, resection of floor of mouth / tongue, free flap and elective trachy. Found to have respiratory distress/failure, seen by Outreach Team on more than one occasion. Subsequently transferred on 4th post-op day from ward to ITU side room (possibility of COVID-19 pneumonitis). Transfer uneventful, short period of desaturation after transfer into ITU bed. Normal SpO₂ for 30min after that. However, trachy tube then noticed to be slightly further out than before. Medical team asked to assess situation. On arrival in patient room SpO₂ at 82%, patient grey, agitated. Ventilator FiO₂+1.0, suction catheter possible to pass down full length but impossible to ventilate, even with higher P pressures. Respiratory arrest had caused cardiac arrest. CPR commenced. Bronchoscopy and surgical emphysema confirmed dislodged trachy tube / false passage. Oral intubation extremely difficult but possible while CPR ongoing. Bilateral surgical chest drains inserted to decompress any possible tension pneumothorax. Total 'downtime' until ROSC about 30 min. Patient had CT scan brain which showed early signs of hypoxic brain injury."

As with case 2, routine and continuous attention of securing of tracheostomies and prevention of drag from the ventilator tubing is vital. The initial desaturation followed by recovery may have indicated an intermittently critically unstable tube, which may have been intermittently obstructing in the stoma tissues before having ultimately

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reinserted into a false passage. After control was lost, oral intubation was correctly performed. Again, this reinforces the need for a high ongoing diligence with tracheostomy tube securing and circuit drag continuously and during transport and positioning.

Case 4

"Bedside nurse changed the tracheostomy inner tube at approximately 13:45. The bedside nurse thought that the outer ring on the tracheostomy inner tube had sheared off which prevented it being attached back to the ventilator. After the event, it seems that what happened was that the bedside nurse had a lapse in concentration and did not insert the replacement inner tube. This made it impossible for the ventilator tubing to be re-attached and the patient deteriorated quickly at experienced a cardiac arrest."

Some inner tubes have a "ring pull" type attachment to allow release and exchange that does not interfere with reconnection of the ventilator circuit. Others as in this case have the connector attached so if not replaced will not be able to be reconnected. It would seem likely that the bedside nurse did not have sufficient experience or immediate support; one would expect as a deterioration commenced, reassessment (following the lapse of concentration) of the situation to occur and immediate help from surrounding colleagues summoned. There should always be a spare inner tube at the bed side. If an inner cannula was not available or the connector judged to be sheared off, then first principles of mask ventilation of the (intubated) stoma – or mouth with stoma occluded – could be followed. Organisations are responsible to ensure that staff are adequately trained and experienced for the patients they are caring for.

Injuries associated with proning in ICU

Case 1

"Long stay patient in ITU with COVID-19 pneumonia. Admitted to ITU... Tracheostomy on [day 13]. Last episode of proning on [day 23]. On day 35 in ITU patient reported to medical team that he had no vision in his right eye. Prior to this he had been critically unwell requiring high levels of ventilator support including multiple episodes of proning (at least 6). His convalescence had been complicated by recurrent ventilator associated pneumonia, repeated episodes of sedation and delirium. On questioning, he was unclear when he had noticed the visual loss but thought it had been for several days. He did not report any pain. On examination, no vision in right eye. No direct pupillary reflex. Consensual reflex present on left. Ophthalmology team contacted immediately. Felt no indication for emergency review given likely onset had been several days prior. Patient

seen by ophthalmology... advised likely vascular injury causing optic nerve damage. Possibly thrombotic event but possibly related to globe compression during proning in conjunction with hypotension resulting in poor perfusion to optic nerve. Injury likely permanent with no treatment possible. Patient informed and advised of findings and implications."

Case 2

"... intubated COVID-19 patient required proning multiple times on ITU due to severity of lung disease. Patient is obese and had a difficult intubation requiring a smaller ETT tube. Often the proning procedure and head turns were difficult due to patient size and anatomical positioning, with concerns about losing the airway and desaturating across multiple nights. As patient recovered, and sedation has been lightened, they have reduced function and pain of right upper limb. This is in keeping with a brachial plexus injury, which has likely been caused by proning."

Case 3

"Patient has been proned for approximately 10 days and has developed soreness around the ETT tube. Also patient eyelids have remained swollen with pus like liquid oozing outside. Unable to assess the front of patient hence there would be a high risk of skin damage to the front part of patient."

Units should have a clear policy for managing prone patients to limit the risk of complications and staff need to be trained in its application. There have been many reports of complications associated with proning ICU patients during the COVID-19 pandemic both from airway loss and tissue damage. There will be a trade-off between securing the tube adequately and peri-oral tissue damage in the prone position. Many units' outcomes improved as experience increased and the swimmer's position was adopted which allowed for some access to the face. Ten days was a considerable time to remain proned continuously, but this may have been due to instability precluding supination.

Implantable defibrillators

"Death after elective surgery: patient underwent uneventful aorto-bifemoral bypass (two consultants). Patient returned to theatre for left graft limb thrombectomy and revision of the distal anastomosis a few hours later. The revision surgery was undertaken with sedation and epidural. It was uneventful and successful. Patient was progressing well till evening when they suffered a VF arrest. Patient was revived and transferred to cardiac surgery centre. Patient suffered another arrest during a coronary revascularisation procedure and died. Patient had a history of MI. Had atrial fibrillation. Patient

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was prone to ventricular fibrillation and had an implantable cardioverter defibrillator (ICD) in situ. The device was turned off by the cardiology technician on morning of the main operation. However, the second operation was out of hours and there was no facility for the ICD to be turned off. I believe the anaesthetist discussed with cardiologist (at least I advised so). I believe that magnets were applied on the chest to temporarily turn off the device during second operation. It seems that the device did not kick in immediately after first VF episode requiring 30 seconds of CPR.”

A reminder of the importance of understanding these devices. They are increasingly complex and the best course of management is always to involve a technician to turn them off or otherwise modify their activity before theatre and attach the external pads of a defibrillator to monitor and (if necessary) shock the patient. The use of a magnet to turn pacemakers off is the traditional teaching, although this is not the response of all modern devices and the effect of a magnet should be confirmed before relying on it. Out of hours, resident cardiology staff may be able to assist. If all efforts fail to find cardiology staff to turn off an ICD out of hours, consideration should be given to deferring surgery until office hours, although that was clearly not an option in this case.

Ventilator equipment

Case 1

“The patient was planned for an MRI head scan. Patient was transferred to and from scan without incident. On return from MRI scan the accompanying anaesthetic registrar realised the CICU bleep had been left in MRI and therefore returned to MRI to collect this. Informed that the patient was left attached to the Oxylog transport ventilator at this point. The patient was subsequently transferred back on to the ICU Maquet ventilator. [The patient desaturated and two calls to the emergency bleep were made]. The CICU consultant and anaesthetic registrar attended promptly and were directed to the patient bed space. The oxygen saturations were noted to be low at 49%. Immediate action was to place the patient on a [Mapleson C circuit] via the in-situ tracheostomy and ventilate manually with good bilateral chest rise and a rapid improvement in oxygen saturations. The ventilator settings were reviewed prior to resuming ventilation via the ICU ventilator. The settings were Automode PC – PS with the Rate set at 14, FiO₂ 40% PEEP 5 P_{insp} 5 P_{sup} 5. Reviewing the ventilator log revealed a tidal volume of approximately 160ml. The ventilator log shows a change in ventilation mode from PRVC – Automode at [time 32 minutes before emergency call]. Review of the monitoring trends at 1-minute intervals revealed a fall in oxygen saturation from 94% to 85% at [time 30 minutes before emergency call] with a subsequent progressive further fall. The lowest reading was 17% with the majority in the range 20-35%. The oxygen saturation improved to 73% at [two minutes after the

emergency call] and 97% at [one minute later]. A blood gas was discovered timed [13 minutes before the emergency call] with the results: pH 7.132 PaCO₂ 11.00 PaO₂ 4.28... ventilator involved in incident retained for interrogation... outcome log shows the user changed the ventilation mode...”

Case 2

“... the trainee ACCP noticed that the ventilator alarmed low oxygen supply. Oxygen saturations had dropped to 80%. The FiO₂ was set at 95% and dropped to 40% transiently. This picked up without any intervention and before the patient ventilator could be switched over from wall oxygen supply to cylinders. Estates were called immediately and asked to review the oxygen supply urgently. Site Manager and Theatre Lead informed as the oxygen supply to theatres may be affected. Oxygen cylinders were moved so they could be used if required. Porters were also requested to bring all additional oxygen cylinders that they could in the event of any further issues with oxygen flow. Following discussions with Estates team oxygen checks were completed and no immediate issues were highlighted. [Around 3 hours later] the Senior Sister and the Consultant Anaesthetist went in and were informed that the other patient (a level 2 patient) was hypoxic and potentially required intubation and ventilation. Patient was receiving CPAP via the Armstrong device. The Critical Care Senior Sister advised that the FiO₂ was on 100% oxygen and 70 litres of flow but upon inspection the Armstrong was alarming due to the machine only delivering 40 litres. The patient oxygen saturations dropped to 73%. At this point the Armstrong was changed over to cylinder oxygen and the patient oxygen saturations increased. Despite this the patient became unwell and required intubating and ventilating. Following an ECG, it was identified that the patient had a myocardial infarction.”

It is not clear from the stories, but these problems could have been related to excess total oxygen demand, as reported at several hospitals in the pandemic. The Healthcare Safety Investigation Branch has published an investigation with recommendations relating to oxygen issues during the COVID-19 pandemic.¹

Transfer between portable and ICU ventilator (and vice versa) is a time of potential high risk for error and it should be done in a structured way with all ventilation checks being completed. It is not clear who changed the ventilator settings or why in the first case. It may have been in error or it may have been as a result of unfamiliarity with the machine. In the second case, again unfamiliarity may have been a factor; the report does not state whether the oxygen supply or the ventilator were found to be faulty. Organisations should ensure all staff are fully trained to use any equipment that they are required to use.

1. [Health Services Investigation Branch. Oxygen Issues During the COVID-19 Pandemic. June 2021.](#)

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NG tubes in the time of COVID-19

Unrecognised misplacement of NG tubes is a recurring theme in the Patient Safety Update.

Case 1

"Patient admitted with COVID-19 pneumonitis, intubated and ventilated with cardiac support. During day shift, multiple NG attempts resulted in NG in left main bronchus of patient. When the NG was inserted correctly, an x-ray was taken. The X-ray was performed on the day shift evening, and reviewed by a radiologist [45 minutes later]. The day team had reviewed the NG position, but missed a large pneumothorax. The pneumothorax was reported by the radiologist, but [neither] the day team, nor the night team were informed about pneumothorax. Patient deteriorated throughout the night, and was reviewed by the night SHO, registrar and consultant on call. Patient arrested [in early hours of morning], at which time a pneumothorax was diagnosed clinically and a chest drain inserted. It wasn't until the night team were reviewing previous CXRs [next morning] that the missed pneumothorax was noted. A mitigating factor in the late diagnosis of the pneumothorax was a cardiac arrest of another [in the evening], during handover, which delayed the night team."

Case 2

"Whilst the doctor was reviewing the patient, he noticed that he had a quiet left lower lobe. Immediately I was told to turn the feed off. When the NG tube was inserted, two days prior there was hesitance about the positioning after it being x – rayed therefore it was resited and another NG tube was inserted and x-rayed. The doctor had told the nurse that it was fine to give medications through the NG tube and to commence the feed slowly starting at 10mls/hr and to hand it over to the night staff. The next day all of the usual nursing checks had been completed in regards to the NG tube . During the night shift... when the doctor found the quiet left lower lobe the feed was stopped and the NG tube was removed an x-ray showed that there was something blocking the bottom of the left lung. The feed was increased to 30ml/hr due to minimal aspirates and it was handed over from the day shift. An anaesthetic consultant on call came in after the doctors from the unit rang him and the doctors also rang the consultant on shift for advice. The anaesthetic consultant came in and performed a chest drain procedure 500mls drained straight away and a sample... was sent off for analysis. The patient oxygen requirements reduced and his blood gases were documented. Another X-ray was performed and highlighted a pneumothorax, so the ITU doctor removed the original chest drain and resited it."

Case 3

"The patient had a Ryle's NG tube inserted, which was not visible on the first x-ray. During ward round, discussion had, regarding the position of the tube. Consultant decision to administer a small amount of contrast down the NG tube under x-ray guidance. Nurse administered approx.. 15 – 20mls slowly, observing patient for cough – no cough seen. X-ray picture showed immediately that contrast was present. Patient showed immediate signs of deterioration."

Case 4

"Sudden deterioration in oxygenation and blood pressure. CXR done - NG tube in right lung and new consolidation on this side. On review of notes new NG had been inserted, no documentation of position check by aspirate or X-ray. Feed had been administered via this tube for several hours. Patient has had severe inflammatory response and has required significant escalation of treatment."

Misplacement of a naso- or oro-gastric tube in the pleura or respiratory tract that is not detected before starting a feed, flush or medication administration is a Never Event. The NHS has issued guidelines on confirming placement of NG tubes, including a video highlighting the four essential markers.¹ Case 1 is a good example of only seeing what you look for, in this case seeing the NG tube, but not the pneumothorax. A chest X-ray taken for NG tube placement should be read in the same systematic way as any other chest X-ray. Administration of contrast into an NG tube to confirm position (as in case 3) is not part of the guidelines and is as undesirable as administering feed. (It is sometimes done following discussion with radiology but requires the correct type of contrast which is not hyperosmolar and will not cause lung damage).

BAPEN, the British Association for Parenteral and Enteral Nutrition and icmaesthesia.co.uk website produced a comprehensive aide-memoire for checking NG tube placement before first use. Although specifically written for staff in critical care settings during the COVID-19 response, it provides a very useful guide for all practitioners.²

1. [NHS England. Patient Safety Alert: Nasogastric Tube Misplacement : Continuing Risk of Death and Severe Harm. December 2019.](#)
2. [British Association for Parenteral and Enteral Nutrition. Aide Memoire: Nasogastric tube \(NGT\) placement checks before first use in critical care settings during the COVID-19 response. May 2020.](#)

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CVC line placement

Salutary tales about line placement.

Case 1

"[An octogenarian patient] admitted to HDU post-operatively following laparotomy for gastric outflow obstruction. Patient prepped appropriately pre-op with Left CVC and radial arterial line. Drowsy initially on arrival to HDU but in keeping with a general anaesthetic and opiates for analgesia. Had been seen to move upper limbs in recovery. Just had IV fentanyl before transfer to the unit. Concern highlighted by nursing staff as patient still drowsy just before [evening] handover. Opening eyes to voice, appeared to be more awake than on initial examination. Decision to review in 1 hour and if no improvement for CT head. Not for Tinzaparin until review. Reviewed after 1 hour and seen to be moving left side only with new facial droop. Clinically looked like a left sided stroke. CT head arranged. Showed left sided MCA infarct. Whilst awaiting report we transduced the CVC catheter and took blood gas from the line. Both were found to be arterial with the trace and VBG mirroring the ones from arterial line. Discussion with vascular surgeons... to take out as usual, no other intervention needed. Removed with appropriate amount of pressure needed to stop bleeding. No complications of line removal. The line had not been used since insertion. Difficult anatomy at time of insertion handed over at pit-stop. Appropriate supervision due to difficulty and correct insertion technique with USS guidance. Care pathway completed. CXR in recovery used to sign off the line placement. Significantly rotated with abnormal but the CVC appeared to follow the course expected. Patient left with dense right sided hemiparesis, aphasic, facial droop and sensory inattention to right side."

Case 2

"Vascath inserted in intensive care for renal replacement therapy. No documentation of line available... During evening became profoundly unstable and then arrested. CPR, adrenaline required. CXR demonstrated large right sided tension haemothorax which was drained emergently resulting in return of stability. CT demonstrates that the vascath enters the venous system at the SVC below the junction of the internal jugular and subclavian veins."

Central lines should be transduced to confirm correct placement in a vein before they are used to administer any drugs. This is a definitive test as a CXR can be misinterpreted. Removing an arterial cannula as in the first example and pressing on the site is associated with increased risk of stroke. Interventional radiologists and surgeons should be consulted before removal of any arterial cannula in the neck.¹ In the second case, the organisation's own report hints at issues around supervision of junior and returnee doctors and suggests supervised line practice

before independent practice. They suggest earlier use of US chest to diagnose haemothorax could be useful. It is hard to argue with this.

1. [Association of Anaesthetists. Safe Vascular Access. 2016](#)

Neurological monitoring after obstetric RA

Case 1

"Spinal anaesthesia for elective caesarean section. Patient complained of pain in leg during procedure. Developed persistent neurological deficit in right leg post-operatively."

Case 2

"The patient complained of a motor nerve deficit after having had a spinal anaesthetic for an elective caesarean section. The spinal anaesthetic was done by myself. The unusual thing about the spinal anaesthetic injection was that the patient screamed and complained of pain in her right leg at the time the 25 gauge needle passed through into the sub-arachnoid space, as assessed by feeling a click. There was a slight withdrawal of the needle and the flow of cerebrospinal fluid was checked and found to be flowing well on aspirating the syringe. The injection was then started very slowly with no further pain and aspirating 4 times during the injection of 3.5 mL total volume of anaesthetic... I assumed that the scream was due to being very anxious because the patient had told me that she did not want to see any needles during the procedure of siting the intravenous cannula or doing the anaesthetic."

Neurological injury is an uncommon consequence of obstetric neuraxial block. Monitoring for such injury can be difficult to orchestrate in a busy labour unit with rapid turnover and prompt discharge. The Association of Anaesthetists and the Obstetric Anaesthetists' Association have recently issued a joint guideline on this topic.¹

1. [Association of Anaesthetists. Safety guideline: neurological monitoring associated with obstetric neuraxial block. 2020.](#)

Total intravenous anaesthesia (TIVA)

"... [Early final trimester] pregnant for dental extraction. Procedure undertaken under TIVA (received 30mg rocuronium at induction). Uneventful intubation. Prior to surgical procedure commencing and during positioning, noted that patient heart rate and blood pressure elevated. Depth of anaesthesia increased (increased propofol / remifentanyl infusion rates), access patient. Further 20mg rocuronium administered, as patient breathing against ventilator. After this no further muscle relaxant administered. Dental extraction proceeded uneventfully, heart rate, blood pressure much settled. On waking up patient mentioned she

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heard voices while she was being positioned, but couldn't move to tell anyone. Lasted few minutes, but then fell asleep again and was not aware of procedure. Experience of awareness accepted. Follow up planned. Patient was hyper-anxious and heavily pregnant, so was at higher risk of awareness, so gaining appropriate depth of anaesthesia challenging. Heart rate / blood pressure changes were recognised and acted upon when they occurred, patient unfortunately experienced a very brief period of awareness under anaesthesia." The clinicians followed the recommendations in NAP 5 to guide their follow up of the patient. The anaesthetist provided the following information about drugs and doses used: "Schneider (effect site), Minto. Induction was straightforward. I used a titrated technique as described in AAGBI guidelines. Patient was on THRIVE, with ST3 taking airway. I commenced Remifentanyl at 6ng/ml, and titrated up Propofol beginning at 2mcg/ml, then 3, then 4. Eyes closed at 4mcg/ml with no reaction to jaw thrust. I went up to 6mcg/ml for intubation. She also received 30mg Rocuronium. The ST3 failed at intubation so I took over, with bougie/McGrath and intubated with South RAE. It was when repositioning the table and reducing rate of infusion to 4/4 for Prop/Remi, I noticed patient looking uncomfortable, and heart rate/blood pressure increasing (probably the moment of awareness). I increased depth to 5/5 and ran at that rate for rest of operation (Propofol was running at 95ml/hr, she received a total of >1000mg, more than 2 syringes 50ml Propofol, Remi at 15ml/hr). I did give further 20mg Rocuronium after increasing depth to make sure ventilation was smooth. Towards the end of the operation / for wake up I reduced her rate again to 4/4, she began to open her eyes and move." The organisation's report states that the infusion pumps were all checked and the cannula was working. Processed EEG monitoring was not used. However, the timing of events from induction, the clinicians did not feel it would have alerted to any problem any quicker than the clinical signs did.

In this case, TIVA was used in conjunction with a neuromuscular blocking drug (NMBD) but processed electroencephalogram (pEEG) monitor was not used. The use of pEEG monitoring in such circumstances is recommended in the Association's latest recommendations on standards of monitoring.¹ Although the case predates this document, an equivalent recommendation appeared in its 2015 predecessor.² The Association and Society for Intravenous Anaesthesia's joint 2018 *Guidelines for the Safe Practice of Total Intravenous Anaesthesia*³ (which the case report alludes to) state that "Use of a processed EEG (pEEG) monitor is recommended when a neuromuscular blocking drug is used with TIVA" and that "Processed EEG monitoring should commence before administration of the neuromuscular blocking drug."

The statement in the report that "the clinicians did not feel [pEEG] would have alerted to any problem any quicker than the clinical signs did" replicates a common misconception about accidental awareness during general anaesthesia and monitoring; clinical signs such as heart rate, blood pressure, sweating and lachrymation are poor indicators of awareness. The rationale for pEEG monitoring is that using it (along with the usual monitoring such as observing the patient, monitoring ECG and BP) decreases the likelihood of accidental awareness occurring.

The description of the patient opening her eyes and moving when the propofol target was reduced to 4 mcg.ml⁻¹ and the remifentanyl target was reduced to 4 ng.ml⁻¹ suggest that this was a patient who required higher than usual doses of propofol and remifentanyl. A second lesson is that there is considerable variation between patients in the response to hypnotic drugs and opioids. The dose or target concentration required is not known in advance and this is a further reason for using pEEG monitoring.

Finally, one error highlighted by surveys of practice is that of omitting to draw the remifentanyl into its syringe, resulting in a syringe containing saline only. Drug error should always be considered.

1. [Association of Anaesthetists. Recommendations for standards of monitoring during anaesthesia and recovery 2021.](#)
2. [Association of Anaesthetists of Great Britain and Ireland. Recommendations for standards of monitoring during anaesthesia and recovery 2015.](#)
3. [Association of Anaesthetists. Safe practice of total intravenous anaesthesia TIVA 2018.](#)

Retained guidewire

"Patient has a retained intra-thoracic / abdominal CVC guidewire, noted on post CVC line insertion chest x-ray. This was not present on the previous CXR. A bedside echocardiogram appeared to demonstrate the guidewire present."

A Never Event, by dint of being a retained foreign body, which is another relatively frequent entrant in the Patient Safety Update. The reported incidence has been increasing year on year despite traditional interventions. Engineered solutions which introduce a "forcing function" into the insertion process can prevent guidewire retention. One such device, whose potential efficacy and impact is still being evaluated, is the Wiresafe.¹ Developed by Dr Peter Young, an elected member of Association board and a member of SALG, it has been recognised and supported by the Association (Innovation prize), SALG (Presidents Award 2016), National Patient Safety Award (2016 – highly commended), Intensive Care Society (innovation forum), NHS Innovator Accelerator programme and

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Academic Health Service Networks and the NHS Clinical Entrepreneur Programme.

1. [KLIPS UK, Oxford Academic Science Network. The WireSafe Implementation Support Pack for Provider Organisations. 2017.](#)

Tracheal foreign body

"Patient deteriorating and desaturating with severe COVID-19 pneumonitis, intubated and ventilated. Therapeutic bronchoscopy performed to try to clear secretions. Tracheostomy cleaning swab found in trachea with swab end in right lung. Removed after a great deal of difficulty, removing tracheostomy and guiding graspers through tracheostomy stoma with fiberoptic bronchoscope. Required reintubation via mouth and tracheostomy removal (subsequently re-inserted). Severely unstable with low saturations and low blood pressure during this. Sats 80% on 100% oxygen following the procedure and prone positioning. This could have been caused by the severe COVID-19 pneumonitis as the ventilator parameters were not significantly different to before removal (airway pressures slightly lower but no other significant difference)."

The report does not state how or when the swab found its way into the airway. It is likely that any respiratory difficulties will have been ascribed to the COVID-19 diagnosis.

Vascular complications of lines

More salutary tales. These highlight the importance of transducing a CVC before it is used. During US-guided insertion, visualisation may miss needle passing straight through vein into artery if not careful. Before proceeding to dilation and insertion of the line, the guidewire should be visualised in vein in both transverse and longitudinal views for visible length of vein.

Case 1

"Patient admitted to PICU [in the evening] with triple lumen central line in left femoral, inserted by retrieval team. Over the course of the night patient became mottled across stomach and down left leg. Reviewed by reg. Elevated. Femoral line used for triple inotropes, blood products and medication. [Next day] - USS and review from vascular team during the day for leg as all toes now dark purple. CT scan [in evening] 3 of left leg. Femoral line placed in left femoral artery. Returned to PICU. Line removed by PICU reg with radiologist ultrasounding left leg. Patient went to theatre for emergency surgery - vascular exploration and compartment release... plastics team carried out 'Left exploration and repair of femoral artery with fasciotomies to left lower leg'... The line was transduced (as is policy) at the time of insertion but the patient had a very low blood pressure at the time so

the differentiation may have been difficult. The consultant on PICU asked for an ultrasound to check that the line was in the vein and it was thought to be in the vein; the vascular surgeon also thought the line was in the vein. Other access was very difficult and the patient was coagulopathic otherwise I think the line would have been removed anyway. It wasn't until the CT that the line was seen to be arterial - and hence plastics took to surgery. We are cautiously hopeful about the leg as some CR has returned to the foot, but time will tell... The retrieval team involved have reflected through their own Root Cause Analysis (RCA) investigation and identified that they will take portable ultrasound machines to retrievals, and ensure that all their staff have vascular training updates... Prior to this incident CVP reading was not included in the transport documentation, and was not routinely recorded as an observation. The service are amending the transport documentation to include a value to be recorded when a line is inserted. Where central lines are placed at retrieval sites prior to admission, there should be a higher index of suspicion as to their correct position..."

Case 2

"PICC line inserted during day shift. Observed to be darker in colour - drs believed to be vasopressin-related, infusion stopped. Improvement in colour observed by day staff. On handover to night shift... noted leg to be dusky. On ward round consultant observed that colour improved. Queried if plastics reviewed - told that as improving not required. Colour of leg became deep purple / no pulse / cool - consultant reviewed and PICC line removed immediately. Queried plastics referral however consultant asked us to monitor as line now out. Colour not improving and no pulse or improvement. Escalated to team leader and dr that plastics required to see. Plastics reviewed. Unable to provide complete information due to no documentation of line procedure in notes. Consultant updated and heparin commenced."

Case 3

"Pre-operative line insertion. R IJV CVC and PA sheath inserted by myself. USS confirmed intravenous placement witnessed by cons anaes. Seemingly easy dilation and line insertion. CVC aspirate and flush with ease. PA flush but no aspirate possible. Removed and replaced by cons anaes. Shortly afterward; refractory hypotension and established on bypass. Lots of blood in right hemithorax and associated R distal sub-clavian artery injury (likely from PA dilator). Surgically repaired and blood transfused. Arterial gases on bypass gradually improved. Surgical team described injury as a "through and through" with a pleural injury too."

Blocked filter

"Noticed that patient was not ventilating having been on spont mode of ventilator, blood pressure dropping. Called for help. ITU consultant, registrar and nurse in charge present. No pulse felt despite ECG reading. CPR commenced. Defib pads attached. Patient had PEA arrest. 2 Cycles of CPR + 1 adrenaline given before ROSC. Making no respiratory effort. Taken off ventilator by consultant and connected to water circuit, hand ventilated with a high resistance. HME and flex connector noted to contain a lot of white frothy secretions. Decision made to change both. After they had been changed it was much easier to ventilate patient and respiratory effort improved. HME examined by consultant and found this to be the cause."

When heat and moisture exchange (HME) filters become wet they may suddenly block. There are multiple reports of this happening when a heated humidifier is used in addition to an HME filter or with excessive bronchial secretions and it was seen frequently during the COVID-19 pandemic when HMEs were used with humidified circuits or when circle systems were used with soda lime. The NHS issued an alert about this in 2015.¹ A high risk time for this is after transfer from theatre, imaging locations or other remote areas, when an HME is placed in circuit for portable ventilator but is then not removed when the patient returns to an ICU ventilator with an active humidifier.

1. [NHS England. Patient Safety Alert. Stage One: Warning Risk of using different airway humidification devices simultaneously. December 2015.](#)

ECMO

"Patient on unstable ECMO following cardiac arrest at induction of anaesthetic ?anaphylaxis (intended elective left atrial appendage occlusion). Difficult to wean ECMO. Right pleural effusion noted by ITU team. Chest drain inserted. Appropriate position on ECMO. Patient continued to deteriorate. ?blood loss. Given overall clinical condition of patient decision not to carry out explorative thoracotomy (on ECMO). Continued instability on ECMO - unable to continue support. Patient died on ECMO. At post mortem chest drain identified in liver. Patient is thought unlikely to have survived however this contributed significantly to death at this time."

This case highlights the importance and utility of using ultrasound to guide correct initial placement of chest drains and as a bedside diagnostic aid. ECMO alone is not a reason not to explore for a source of bleeding. Patients on ECMO can be transferred to the operating theatre or exploratory surgery can be performed at the bedside, although this patient's instability may have prevented it. Unexpected injury or complications should always be sought and this may prevent or reverse patient deterioration.

Extravasation injury

"Started day shift and noticed that the patients right foot looked very pale, there was a puncture site in the middle and the surrounding area over the dorsal area looked dead." [The report then goes on to describe that it had likely been used at some point to give dextrose 20% for a hypoglycaemic event]. "Discussed with Plastics team... 'likely extravasation injury'... likely to be due to dextrose and would require excision and skin graft when patient fit for surgery."

This case provides a general reminder of this potentially devastating complication.

Transfer of patient with neurological injury

"Delay in transfer of time critical anticoagulated head injured patient from [referring hospital] to [neurosurgical centre]. [Ambulance service] called at ...; ambulance did not arrive until [1h 51min later] as it had allegedly been downgraded by [ambulance service] control as it was a Cat 2 call. Unclear if referring hospital had declared this... During the delay in ambulance arriving patient GCS dropped to 7 and pupil dilated such that by [time of ambulance arrival to collect] patient needed intubating and this delayed patient getting to [neurosurgical centre] further. Patient did not leave [referring hospital] until [3h 20min after initial call]."

The Association of Anaesthetists and the Neuro Anaesthesia and Critical Care Society have published joint guidance on transfer of such patients.¹ Organisation and preparation for transfer is the responsibility of the referring team, but should be done in liaison with the receiving unit.

1. [Association of Anaesthetists and Neuro Anaesthesia and Critical Care Society. Guidelines for safe transfer of the brain-injured patient: trauma and stroke, 2019.](#)

Missed intraoperative medication

"Patient with known Parkinson disease. Usually takes Madopar 125 every 2.5-3hours during the day from 0800hrs onwards. Given doses of Madopar [twice during morning] pre-op. In theatre [all afternoon and into early evening] having surgical procedure. Missed at least 3 doses of immediate release co-beneldopa during his operation. Trust Parkinson NBM guidelines not followed. Given sustained release Madopar 25 / 100 [in late evening]."

It is uncommon for a patient to be taking a medication whose timing of administration is so crucial as this, but this case serves as a reminder to remain vigilant for the uncommon.

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Fractured neck of femur

Yet another perennial feature in Patient Safety Update are the elderly frail patients listed for fractured hip surgery who demonstrate in various ways just how high risk this group really is. The Association of Anaesthetists has published a consensus statement on the treatment of these patients.¹

Case 1

"Mortality following revision DHS to total hip replacement. Patient from Nursing home. Had DHS fixation of LEFT hip following proximal femur fracture... Post op had pneumonia but recovered well and was discharged. Re - admitted [five months later] with DHS cut out but was not fit for surgery at that time. Was put on DNA CPR at that time for severe shortness of breath and COPD. Due to the COVID-19 situation I saw patient in fracture clinic many months later and following a full discussion of the risks of surgery was listed for DHS removal and total hip replacement. Patient was seen in preop assessment reviewed by anaesthetist who advised HDU care and pre and post op chest physio. Patient was brought into hospital [thirteen months after initial DHS] for potential theatre on but could not proceed due to lack of HDU beds. Surgery was carried out [three days later] after confirmation of availability of HDU beds. Following discussion amongst the anaesthetists... the plan was for a spinal anaesthetic. Unfortunately the spinal started wearing off 1 hour into the operative procedure and therefore the anaesthetic had to be converted to a general anaesthetic. The patient dropped blood pressure a little after the general anaesthetic and just before cementing of the acetabulum and therefore we waited for the blood pressure came up again before cement was used. Again approximately 20 minutes later the blood pressure dropped and needed further interventions to bring up the blood pressure before cement was used in the femur. The surgical procedure was completed and patient was transferred to recovery. Patient was found to have difficulty breathing there and low blood pressure. ECG, ECHO and chest x ray were carried out in recovery which were all inconclusive as to the cause of sustained low blood pressure. An ABG showed acidosis and raised lactate. Patient was reintubated and transferred to ITU where they passed away [later that night]."

Case 2

"Massive PE with PEA arrest then unexpected ICU admission. Frail patient from residential home on apixaban for AF. Admitted with neck of femur fracture. Apixaban omitted appropriately prior to surgery. Uneventful hip hemiarthroplasty. On arrival in PACU patient awake on phenyl infusion and stated had "had a nice sleep". Then sudden collapse with PEA arrest in PACU requiring adrenaline boluses and intubation. Then transfer to ICU. Subsequent CTPA

confirmed massive pulmonary embolus. Patient currently recovering on ward after discharge from ICU."

Case 3

"I anaesthetised this patient for a hemiarthroplasty for fractured neck of femur. Patient had a history of aortic stenosis, previous cardiac failure, mitral stenosis, tricuspid regurgitation and type II diabetes. The spinal was performed uneventfully, following fascia iliaca block. Following the spinal, she was positioned for surgery on the operating table. I was concerned that we had not had a BP recording since the spinal so was trying to get a recording but the cuff was repeatedly inflating without a successful reading. At this point the patient started feeling nauseous and the heart rate began to fall. I presumed hypotension as well and went to get the emergency syringe of ephedrine but before I could administer it the patient became unresponsive."

Case 4

"This elderly patient... A pre-operative fascia iliaca block was to be performed in order to allow for more comfortable positioning for a spinal anaesthetic. Just after an uneventful block, the lady became unresponsive, and then fitted. She then had a cardiac arrest, and despite an hour of resuscitation, this was not successful."

The choice of anaesthetic technique in case 3 raises questions. Perhaps the use of invasive blood pressure monitoring, sited before the spinal anaesthetic, would have been a good choice given the patient's stenotic heart valve lesions. The anaesthetist would have been alerted to a falling blood pressure as soon as it began to fall, rather than being alerted by the failure of non-invasive measurements.

Cases 3 and 4 also highlight the topic of fascia iliaca blocks. These blocks imply the administration of large doses of local anaesthetic drugs in elderly frail patients and both of these episodes of collapse had the hallmarks of local anaesthetic toxicity. Neither report mentions that it was considered or that lipid emulsion treatment was tried. Clinicians should remain alert to the possibility of immediate and delayed local anaesthetic toxicity when these blocks are performed.

1. [Association of Anaesthetists. Guidelines for the management of hip fractures. 2020.](#)

Anticoagulant therapy

"Medical emergency call. Patient had massive left sided hip haematoma 14 hours post operation for removal of metalwork. Low GCS (7 on arrival E1V1M5) and decompensated (tachycardic, hyperventilating). Transfused 3u RBC and further held due to raised JVP. Wound explored on ward

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demonstrating large amount of blood loss into bed, massive subcutaneous haematoma, bleeding onto inco pads and further oozing during exploration. Patient transferred to CT for CT head as low GCS and upgoing plantars to explore if major blood loss had caused watershed infarct. Results not back. Patient had surgery and neuraxial anaesthesia 18 hours after stopping Edoxaban and subsequently had major blood loss."

It's not stated whether the surgery was urgent but this story reminds us of the importance of knowing a patient's anticoagulant status and of timing interventions appropriately. This is a vital part of pre-operative assessment and planning and if surgery is needed more urgently than ideal delay, this should be communicated at the team brief and at handover. The Association of Anaesthetists has produced guidance (which is scheduled for update) on timing of regional anaesthesia in this context.¹

1. [Association of Anaesthetists of Great Britain and Ireland. Regional anaesthesia and patients with abnormalities of coagulation. 2013.](#)

Awake fiberoptic intubation

"Patient was booked for emergency thyroidectomy due to enlarged goitre causing respiratory compromise. Also had a history of partial glossectomy for oral cancer with radial free flap. During WHO team briefing with ENT surgeons, decision made to secure the patient airway awake ([plan] A: nasal endoscopy with planned awake nasal intubation, B: awake VL & C: awake tracheostomy). During nasal intubation, difficult oral anatomy encountered, oedematous, secretions and tracheal narrowing. While attempting to railroad nasal tube over the scope, patient became rigid, unresponsive & hypoxia noted. Reverted back to bag, mask, ventilate (BMV), remifentanyl infusion stopped with aim to improve oxygenation and ventilation."

The proposed plan and alternatives seem very reasonable. The story provides a reminder of the perils of this type of intubation, including complete airway obstruction as the tracheal tube is railroaded and of course of the side effects of remifentanyl.

Anaphylaxis

Case 1

"Cardiac arrest in Anaesthetic Room - likely due to anaphylaxis. Soon after induction of anaesthesia in the patient, they desaturated (ETT thought to be endobronchial and pulled back with resolution). Patient then became hypotensive, which initially responded to metaraminol, head down position and IV fluids. Rate of AF then became very fast, with loss of radial pulses and cycling NIBP. Emergency help called immediately and A line inserted... Further IV

fluids with metaraminol, but then BP dropped even further. More help called for and arrived. Adrenaline boluses given, but adequately perfusing blood pressure lost. Arrest declared and CPR started. PEA arrest, with ROSC after 3 cycles. Adrenaline infusion started. Total peri-arrest adrenaline requirement 3mg. CVC line sited post ROSC and patient eventually transferred to ICU... likely a sensitivity to suxamethonium... patient subsequently died."

Case 2

"Patient presented with large bowel obstruction and required an urgent laparotomy. During induction of anaesthesia he had an anaphylactic reaction."

Case 3

"Anaphylaxis in trauma theatre. GA for semi-elective fixation of broken femoral nail, shortly after induction of anaesthesia and administration of muscle relaxant (atracurium) the patient developed profound bronchospasm, desaturated and became hypotensive. AAGBI anaphylaxis protocol initiated and help sought from 2nd consultant. Patient stabilised on adrenaline infusion and transferred to ITU intubated and ventilated. Operation abandoned and will need to return to theatre at some point in the future."

Patient positioning

"Patient had an elective gynae operation, she woke up following the operation unable to feel or move her right arm. Patient is right-handed... I elected for a TIVA technique and intubation for airway management for the planned laparoscopy and management of endometriosis... Her IV line was sited on the dorsum of her right hand and blood pressure cuff sited over the left upper arm. Transfer into theatre and onto the operating table was unremarkable. Positioning was carried out by the whole team... shoulder supports to be fitted in anticipation of steep Trendelenburg positioning... during my final check before drapes were used, I noted that the right shoulder support was not facing correctly with the padding over the shoulder but instead with a small indentation to the skin from the metal side - the indentation was relatively minor and could only have occurred over a less than five minute period... corrected the position of the right shoulder support. As per the SIVA regulations I had her right arm out on an arm support board and secured it at an angle of slightly less than 90 degrees abduction so that the intravenous site could be observed. The arm was secured to the board in pronation with incontinence padding over the arm and micropore tape to keep it in place. Her left arm was secured by her side. During the case, I made periodic checks of positioning and IV line more than once per hour..." The anaesthetist and assistant were quite certain that the positioning of the arm was not a possible cause for the nerve

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damage and felt the steep Trendelenberg was more likely to be to blame.”

Who comes in an emergency?

“Patient deteriorated on unit, fast bleep made to anaesthetist on call... Call also made to on call registrar looking after the patient via switchboard at the same time - operator came back to me after a few minutes stating there was no reply on that number, the patient by now had gone into cardiac arrest. I asked the switchboard to call the on-call consultant and the patient’s own consultant. The on-call consultant answered and I explained the seriousness of the situation and gave him background details of the patient and the preceding events. Their response was very unhelpful and asked what I expected them to do in this cardiac arrest situation. I explained that I was calling because they were the on-call consultant and one of their patients was now seriously ill, and I wasn't getting any response from the anaesthetic fast bleep. It was clear we needed help and quickly as we were unable at this point to secure an airway. The unit’s own consultant was called in to assist along with the crash team. A response from the on-call anaesthetist [from one unit] came through just after to say they could not attend as they were already in theatres. When our consultant arrived, the patient had been in arrest for 15 minutes. Still no response from the anaesthetic fast bleep put out at 00.05 and still no airway in situ. [A different unit’s] anaesthetist arrived not long after our own consultant and said he would not be able to assist as he was already in theatres. Unit’s own registrar attended to patient at first sign of acute deterioration... Pt’s own consultant arrived Pt taken to theatres... reporter of incident has since spoken to the on-call anaesthetist and the on-call registrar who both stated that neither of them received the outgoing messages for assistance during the time of the critical event.”

There should be a clear pathway for emergency and cardiac arrest calls on intensive care and the cascade when clinicians are unavailable. There should be a robust hospital communication system which seems to have failed here. In anaesthesia, all consultants should know who they are supervising and what they are doing and all non-autonomous anaesthetists should know who is supervising them and how to contact them. This has been enshrined in the Royal College of Anaesthetists’ Cappuccini Test.¹ Perhaps this story hints at a similar need in critical care environments.

1. [Royal College of Anaesthetists. The Cappuccini Test. 2019.](#)

Testing the block

“The patient has raised a complaint regarding the ineffectiveness of her epidural during an emergency c-section. The patient has reported that she could feel every part of the procedure on the right-hand side, feeling the knife cut into her, hot and a sharp pain, feeling sick. The patient informed the anaesthetist of all of this she was experiencing, however, the procedure continued. The patient has advised that her right leg was held down as were her arms, in order to prevent her pushing the team away.”

Little comment is needed; although there is no clinical context given, taken as read, this would be viewed as utterly indefensible on every level. If a patient reports pain during regional anaesthesia, it is vital to believe them and take action including, where appropriate, an offer of general anaesthesia. The patient’s complaint of pain should never be minimised and clinicians should guard against trying to persuade the patient that it is not pain.

Cannula faults

Case 1

“Child was cannulated with a 22g BD Venflon and prior to flushing it was noted that blood was flowing freely from the patient out of the cannula port (where the blue cap is situated). This was found to be due to malpositioning of the valve over the port so that it was only partially occluded. This could have led to significant blood loss if it had not been noticed prior to draping.”

Case 2

“BD cannula failure. The silicone bung that lies under the injection port appears to be liable to slip. When the bung fails and slips out of position, blood and drugs are able to track back from the indwelling catheter in the vein and spill out of the injection port. This leaves the patient vulnerable to awareness, particularly if TIVA is used. The only way to stop the blood and any drugs that the anaesthetist has given spill out of the injection port is to put an empty syringe on the injection port. This issue has happened a total of 4 times at our institution.”

Case 3

“BD Venflon Pro Safety 16G inserted into patient. Induction of anaesthesia attempted via top port. One way valve contained within cannula displaced posteriorly resulting in leakage of both fluid from infusion line and blood from patient end leaking out of the top port. No actual harm resulted in this case, but a repeat incident might have significant implications. This has apparently been previously observed in this hospital in a 16G cannula of the same make (date unknown).”

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There has been a recall of certain BD Venflons in the light of [similar reports](#):

Tongue injury

"Noticed hypersalivation around mouth, tongue already very swollen (purple). Orange Guedel airway in situ pressing tongue down into lower teeth. Escalated to the doctor and on review appearances and keeping of traumatic tongue transection with lower teeth imbedded into tongue."

COVID-19 CPAP

"Patient was on CPAP mask 60% FiO2 80L flow and on variable PEEP valve... on PEEP of 10 at the time desaturated to 54% when attended by myself. Patient CPAP mask disconnected for few minutes and caused rapid desaturation. Patient was conscious vocalising they cannot breathe. Their lips were blue and sats continued to drop further down to 42%. Nurse caring for patient was redeployed to us for the first time and is unfamiliar with CPAP care and troubleshooting. I managed to change the CPAP mask and reapplied back with FiO2 100% 120L flow and PEEP of 10. Patient's saturations stayed on low 50 briefly as the variable PEEP valve was partially occluded. Patient was still conscious throughout. Consultant sorted partially occluded valve and it brought the patient sats back up to 90. After few minutes patient's respiration was back from before their respiratory arrest."

This highlights the need for staff adequately trained in the management of these complex patients with an adequate ratio of nurses to patients, working in an appropriate setting. The importance of this has been reinforced by experience during the necessary redeployment of non-ICU support staff during the pandemic and the relative paucity of experienced staff on a per patient basis. The challenges of working in 'full' PPE and workforce exhaustion add to this pressure.

Awareness under ICU sedation

"Disclosure from patient about being awake whilst paralyzed for a Vascath... Patient vividly described being unable to move or communicate that they were aware of people putting things into them and moving their ETT. Patient described feeling that they were trapped in her body and that they had her bowels open on purpose to attract the nurse's attention and that they were having flashbacks about the incident."

Sadly many patients recall discomfort or distress during critical care treatment. In some studies this applies to over 50% of patients but may be much higher as the reported discomfort may be masked by amnesia.¹ This case is a reminder always to assess a patient's additional analgesic and sedation requirements during procedures and to

exercise particular caution when a neuromuscular blocking drug is administered.

1. [van de Luer, JP; van der Schans, CP; Loef, BG; Deelman, BG; Geertzen, JHB; Zwaveling, JH. Discomfort and Factual Recollection in Intensive Care Patients. Critical Care, October 2004.](#)

Rapid sequence induction

"Patient arrived to emergency theatre for hernia repair. In induction large amount of bilious content came out of their mouth and they aspirated. Following the incident they had high oxygen requirements and went to ICU as level 3 (unplanned)... Pt was noted to have an umbilical hernia on CT with small bowel obstruction, hence requirement for emergency surgery. CT shows stomach distended and fluid-filled with no NG in situ. Induction was as a rapid sequence induction. Unfortunately, the pt aspirated on induction. Two consultant anaesthetists managed this incident appropriately at the time as recorded... by the reporter. Unfortunately, the patient died..."

This serves as a reminder that aspiration can happen despite rapid sequence induction. The stomach was full and there was no NG tube; why not?

Arterial blood gas

"This was reported to me by the ITU consultant who received the patient from theatre... The ITU consultant initially emailed me to say they had concerns about this case over that weekend. At that point the patient was still alive in ITU. The patient was admitted through ED with an acute abdomen. They were seen in ED by a consultant anaesthetist and the estimated mortality risk was 50%. They were subsequently taken to theatre for an emergency laparotomy. [In the early hours of the morning] the ITU consultant went to theatre to check on progress - the surgeons were closing the abdomen. The intra-operative findings were perforated rectal Ca with infiltration and perforation of the bladder which required urology input, secondly the plan for right hemicolectomy changed to subtotal colectomy due to acute bowel ischaemia intra-operatively. When abdomen was closed and the drapes removed the patient was completely mottled over the whole body with hypotension 70/ and tachycardia 140. The one and only ABG had been taken in the beginning of the operation straight after intubation - decompensated metabolic acidosis, with pH 7.35, BE -15, HCO₃ -15. Noradrenaline double strength running at 20 ml/hr. The ITU consultant requested ABG and the results were: pH - 6.8, HCO₃ - 2, BE -2, lactate -9.5..."

This patient was clearly in extremis, with a high estimated mortality risk. It is not stated what 'concerns' were raised about the case. An arterial line was placed and yet only an initial arterial blood gas was measured. It is not clear

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why further measurements were not taken intraoperatively. It may have been that the workload associated with a moribund patient was too great, but it may have guided therapy and helped clarify prognosis.

Wrong drug

"Patient undergoing laparoscopic hepatectomy. Accidental in injection of approx 10 mmol KCL into left subclavian central line leading to VT. Patient immediately DC cardioverted. 1 x DC shock immediate return of Sinus rhythm and normotension. No adverse metabolic outcome on ABG x 2. Surgery recommenced and successfully completed. Patient doing well on ward. Explanation of above and apology undertaken..."

It is not stated whether this was strong potassium chloride, which has specific storage requirements or a weaker preparation. Neither is it stated whether the drug was intended to be present within the anaesthetist's reach or if this was an error. The mantra as ever: Always read the label.

Complication of epidural

"Patient for open AAA. Patient anxious, sedated with 2 mg IV midazolam but good verbal communication. Epidural catheter inserted with patient (5 cm depth) on side at T8/9 but blood in epidural catheter therefore removed. Attempted epidural at T9/10 but dural tap with Tuohy needle – CSF blood stained. No loss of resistance identified. Attempted epidural at T8/9 but at 6 cm depth patient c/o severe pain at needle site. LOR syringe removed but again dural tap (no LOR to saline). Tuohy needle removed and pain immediately resolved. I tested power in feet – 5/5 plus patient able to bring up knees to chest. Eventually epidural catheter sited at T7/8 using paramedian technique (previous attempts all midline). Epidural space at depth of 7 cm. No fluid aspirated from epidural catheter. 5 mls 0.125% L-bupivacaine given down epidural catheter. Able to easily straight leg raise after 5 mins prior to induction of GA. Prior to knife to skin, another 15mls 0.125% L-bupivacaine and 100 mcgs fentanyl given plus further 10mls 0.25% L-bupivacaine given during difficult operation – poor quality tissue. BP drops at times treated with IV fluid / salvaged blood plus metaraminol. Patient extubated and taken to recovery [early afternoon]. Patient unable to move. Decided to hold off starting epidural infusion until movement returned to feet. Returned after another case in IR suite [four hours later] but patient in recovery could still not move feet / had no sensation below T6 or proprioception and no pain from abdominal wound. D/W 2 consultant anaesthetic colleagues – decision to order MRI thoracolumbar spine. Patient taken into scanner [report states a time 16 hours after arrival in recovery]. MRI scan report –

very complex appearances of thoracic spinal canal and cord. Extensive subarachnoid haematoma with signal change in lower thoracic cord. Low signal changes around anterior cord in upper / distal thoracic cord felt to be due to haematoma. Extensive haematoma with cord ischaemia / infarction. Urgent neurosurgical opinion – no operation advised."

The insertion of the epidural was clearly difficult, with multiple attempts at multiple levels with multiple problems. With hindsight, perhaps this was a portent and perhaps it should have been abandoned. The timing of the scan (16 hours after arrival in recovery) seems very delayed given the circumstances, and may reflect a 12- versus 24-hour clock error – it may in fact have been only four hours after arrival, coinciding with the consultant's return from interventional radiology.

CVC line and air embolus

"Patient was one day after major gynaecological surgery and developed sudden respiratory distress and failure, low conscious level and leg weakness resulting from air embolus. Air embolus had occurred via central venous line with Braun Infuvalve devices attached to the ends of both lumens. This device is a one-way valve to prevent backflow within an IV line, but it doesn't feature a membrane or cap to prevent air entrainment. Recognition of air embolus as the cause of the patient collapse took several hours with a negative CT pulmonary angiogram, unremarkable ECG and bloods. An echocardiogram was undertaken due to the intermittent nature of the hypoxia which demonstrated echo contrast (i.e. air bubbles) in the right ventricle. Transfer to the nearest hyperbaric facility was considered but not undertaken as the patient was improving with high flow oxygen treatment. Additional training delivered to staff involved in placing these valves on the central line. Email alert to all anaesthetic staff (medical and assistants). Presentation at local meeting. Submission of summary to Anaesthesia Reports for publication. Alternative product ordered."

This highlights the importance of understanding exactly what protections are offered by the various types of end cap that are available for i.v. lines. There have been previous incidents where hollow port caps that were only intended for sterilisation and transport were assumed to be suitable for clinical use, with subsequent harm. Increasingly, clinical areas are seeing a preference for i.v. administration sets and multiport connectors with injection ports with polymer or silicone membranes and no cap. There have been alerts about the dangers of backtracking of infusions but not all administration sets have valves, so we are all likely to see individual one-way valves being available. There is a profusion of different intermediate and end connectors

and we all need to understand the intended function, protection provided and risks introduced by each. Perhaps there is a need for an educational campaign to highlight this. Manufacturers have a part to play in clearly labelling devices such as this. It is not stated whether this case was reported to the MHRA.

Complication of oesophageal intubation

"Iatrogenic perforation of the cervical oesophagus, likely secondary to oesophageal intubation and the induction of anaesthesia."

We are all aware of the major risks associated with oesophageal intubation, but these focus on unrecognised occurrences. This is a lesser known and perhaps lesser suspected complication to which we should remain alert.

