The Faculty of Intensive Care Medicine

Safety Bulletin

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Introduction

Through a data sharing agreement, the Faculty of Intensive Care Medicine can access a record of incidents reported to the National Reporting and Learning System (NRLS). Available information is limited and from a single source; all that we know about these incidents is presented in this report. The safety bulletin aims to highlight incidents that are rare or important, and those where the risk is perhaps something we just accept in our usual practice. It is hoped that the reader will approach these incidents by asking whether they could occur in their own practice or on their unit. If so, is there anything that can be done to reduce the risk?

Case 1 | Oesophageal intubation (Prevention of Future Deaths Report)

A patient was brought to the emergency department requiring intubation secondary to a medication overdose. The endotracheal tube was inserted into the oesophagus which was not immediately recognised, resulting in a cardiac arrest and ultimately death from hypoxic ischaemic encephalopathy. Further details of this case can be found in the prevention of future deaths report.

Comment

This is sadly not the first death as a result of unrecognised oesophageal intubation that has triggered a coroner to issue a prevention of future deaths report. In this case, the inquest reported concern around the interpretation of capnography.

As the report highlights ***"capnography is the only reliable test, the gold standard, to confirm that a tracheal tube is in the right place and that no other test should override it."***

The Project for Universal Management of Airways (PUMA) consensus guidelines suggest verbalisation of the presence of ***seven breaths of consistent or increasing amplitude*** as the test to exclude potential oesophageal intubation. This is to reflect the fact that in some cases of oesophageal intubation the capnograph trace is not flat, but instead attenuated or abnormal.

In order for guidelines to be successful in preventing unrecognised oesophageal intubation, the importance of human-factors based strategies must not be underestimated. In particular, multidisciplinary team training is key. Intensive care units are urged to review and discuss their guidance and training for the recognition of oesophageal intubation.

Cases 2 and 3 | Pericardial drainage

A patient was admitted for planned drainage of pericardial effusion but the procedure was delayed. The effusion progressed to tamponade resulting in cardiac arrest. Another patient underwent semi-elective drainage of a massive pericardial effusion (3l drained). This patient subsequently developed acute heart failure requiring mechanical support pending transplant.

Comment

The timing of drainage of a pericardial effusion is described in this position statement from the European Society of Cardiology. It also describes when surgical decompression should not be delayed by percutaneous drainage, and when emergency percutaneous drainage is required. For intensive care teams this may involve difficult decisions around transfer and access to specialist areas. If a patient in your hospital presented with the scenarios described in the position statement, do you have a plan for each that would be effective 24 hours a day?

European Society of Cardiology guidelines suggest limiting the volume of pericardial effusion drained on each occasion to one litre. It has also been suggested elsewhere that initial drainage should only be to the point of clinical improvement. The rationale for this guidance is to reduce the risk of pericardial decompression syndrome. This is a rare complication, but one that units should be aware of.

Case 4 | False Reassurance

A lightly sedated ventilated patient pulled on their endotracheal tube and subsequently desaturated. The doctor did not think that the patient had self extubated as they could hear air entry and pass a suction catheter. Monitored saturations were <60% and an ABG was requested to confirm (pO2 approx. 4kPa). At this point the patient was reintubated but suffered a cardiac arrest.

Comment

This case illustrates how our actions, when stressed in an emergency, can be uncomfortable with hindsight. Several cognitive biases will have been working against this doctor.

Case 5 | Drug Induced Hyperpyrexia (Prevention of Future Deaths Report)

A patient underwent a procedure under general anaesthesia and shortly afterwards developed signs and symptoms consistent with serotonin syndrome. Fentanyl and Ondansetron are thought to the be causative agents. An incorrect diagnosis of neuroleptic malignant syndrome was made.

After admission to intensive care, large volume fluid resuscitation was given as well as Dantrolene. Shortly after administration of Dantrolene the patient suffered a cardiac arrest. The cardiac arrest was thought to be due to hypoxia due to pulmonary oedema caused by the additional fluid administration associated with Dantrolene therapy. Further details of this case can be foundin the prevention of future deaths report.

Comment

In Safety Bulletin 10 we reported a case of serotonin syndrome. Opioid associated serotonin syndrome is further described in this article from the British Journal of Anaesthesia; the co-administration of Fentanyl and Ondansetron is common in UK anaesthetic practice. At inquest, the Coroner raised concern around the knowledge of neuroleptic malignant syndrome (accepting this patient was suffering from serotonin syndrome), which is described in more detail in a review published in Current Neuropharmacology.

Clinical differentiation between drug induced hyperpyrexias can be challenging. The presence of hyperreflexia (including clonus) and dilated pupils in serotonin syndrome are often described as useful determinants, but this publication is useful in listing not only differences but also common features. With increasing use of volatile anaesthetics in intensive care, this is a useful opportunity to highlight the AAGBI guidelines on malignant hyperthermia.

This case also highlights that drug preparations may contribute significant volumes to a patient's fluid balance. The use of Dantrolene in neuroleptic malignant syndrome is itself controversial (as discussed in this article from the Archives of Internal Medicine and this article from the British Journal of Psychiatry). The current formulation of Dantrolene (Dantrium) requires reconstitution in a large volume (approximately 2 litres of hypotonic fluid for a typical adult dose). A new Dantrolene formulation (Agilus) is being introduced, allowing the same dose to be to given in approximately 150ml of fluid. The switch to Agilus will require co-ordination across the hospital to ensure that the change is effected safely and that all potential users are informed.

Case 6 | Inadvertent intra-arterial injection

A patient's hand was noted to be white after starting an antibiotic infusion via a cannula in the antecubital fossa.

Comment

There is a suggestion that the injection of drugs intended to be given intravenously into an artery is under-reported. This case suggests inadvertent intra-arterial cannulation, which has also been described at the wrist and hand. Injection into designated arterial lines is also possible. The use of coloured lines, line identification stickers and non-injectable connectors should reduce this risk. Further background and information is provided in this tutorial including a description of potential management strategies.

Case 7 | Chest drain suction

A nurse received a patient with bilateral chest drains with an instruction to start suction. The surgical note prescribed pressures of -20 (no units specified).

Comment

A usual pressure* for chest drain suction is -1 kPa to -2 kPa, equivalent to -10 to – 20 cmH2O (presumably the unit missing from the surgical note). If kPa was thought to be the intended unit, the result would be delivery of ten times the intended suction pressure (1kPa = 10.2 cmH2O).

Medical pipeline systems can deliver at least -40kPa making delivery of higher pressures possible (mucus clearance from the airway utilises pressures in the region of -10 to -25kPa). Furthermore, the display on a standard wall mounted regulator can be a source of confirmation bias. When applying suction to a chest drain, a dedicated and appropriately labelled high volume low pressure regulator should be used.

*Appendix 10

Get involved

We also invite you to submit anonymous summaries of incidents or near misses that have lessons that we can learn from. If you wish to do so, please get in touch via contact@ficm.ac.uk.

Safety News

The MHRA have provided additional advice for the prescribing of Valproate. The latest alert highlights a possible increased risk of neurodevelopmental disorders in children born to men treated with valproate in the three months prior to conception.

Working with the Intensive Care Society, we have revised our template Local Safety Standards for Invasive Procedures (LocSSIPs). These are currently with supporting organisations for consultation, but we hope to be able to release them soon.

In Safety Bulletin 10 we reported concerns of Burkholderia sp. infections potentially associated with carbomer containing lubricating eye gel. The UK Health Security Agency have recently reported a multi-region cluster of Burkholderia sp. infections suspected to be associated with non-sterile ultrasound gel. A field safety notice has been issued for a product recall, and we are reminded of guidance for the safe use of ultrasound gel, and of an associated patient safety alert.

Special Webinar on Death Using Neurological Criteria

13 November | 11:30am-12:30pm | Book now

The Academy of Medical Royal Colleges 2025 Update of the Code of Practice for the Diagnosis and Confirmation of Death will come into force on the 1st January 2025. To coincide with this, updated testing forms for Death using Neurological Criteria will be needed. Join Dr Dale Gardiner, co-chair of the working group updating the Code of Practice and chair of FICM's Professional Affairs and Safety Committee as he goes through the changes to neurological criteria and explains the updated testing form. **There will only be one form from 2025.**

The webinar is designed for intensive care doctors but all intensive care healthcare professionals are welcome.

Join the FICM Professional Affairs and Safety Committee!

We are recruiting four new consultant and SAS/specialty doctor members to join the FICM Professional Affairs and Safety Committee in 2025. More details can be found in the role profile.

Closing date 9am on Thursday 21 November.

FICM Safety Webinar - CONTRIBUTIONS NEEDED!

FICM want to share good practice for the benefit of the ICM community.

Have you implemented something in your unit that has made it safer for patients or improved outcomes? What does your unit do that other units should think about doing themselves?

It could be something small or large, but we are particularly interested in how you made the change and the difference it has made. Examples could include a change in process, a new way of working or a new approach to a problem.

The FICM are planning to host a Safety Webinar in early 2025 and would like to invite you to showcase your work with a five minute presentation. To register your interest please email the Faculty at contact@ficm.ac.uk