The Faculty of Intensive Care Medicine™

Safety Incidents in Critical Care

December 2020

Introduction

This is an initial bulletin based on NHS England/NHS Improvement reports from Datix and related reporting from 1 February 2019 to 31 January 2020. It is not a scientific quantitative report; even though issues can be classified, numbers may not reflect the incidence in the NHS. It does however allow an insight into problems that staff have decided to report. Most of these accounts rely on what was recorded initially and, while this has disadvantages, it has the strong advantage of maintaining separation of this bulletin from those reporting. The aim is to learn and change practice to reduce incidents, without disincentivising those who otherwise might not report episodes .

There were 141 reports, including six children and 21 neonates in the inital data. This report examines those related to adults and children, grouping them according to commonly reported areas of care or difficulty. We aim to promote learning and an awareness of the type of events that have occurred, in order to facilitate changes in practice and preparations ahead of procedures, handovers or other events or key moments of care. Case reports directly communicated to FICM and COVID related incidents communicated to FICM ViRUS are also included.

Airway, ventilation and oxygenation

A discharged ICU patient on face mask oxygen was transferred to a side room on the ward. The oxygen was being administered from an oxygen cylinder and was not then connected to wall oxygen. The receiving nurse did not complete the transfer handover because it was ward handover time in the ward office. On returning, the patient was found to have suffered a cardiac arrest. The oxygen in the cylinder had run out whilst the patient was not being supervised.

A ventilated patient was connected to the ICU ventilator, which was in standby. There was a period before this lack of ventilation was noticed, resulting in a cardiac arrest.

An endotracheal tube developed a leak and an attempt to change it for another replacement ET tube over a bougie failed. Front of neck access was gained, but the event resulted in hypoxia and a cardiac arrest.

A tracheostomy tube became occluded and attempts were made to change it, but the airway was lost resulting in death.

During an emergency intubation a patient vomited massively on induction. Some staff were not wearing suitable PPE and became contaminated.

A percutaneous tracheostomy was complicated by pneumothoraces and bronchospasm. It was converted to a surgical tracheostomy, but the patient died.

A nasogastric tube was inserted in a critically ill patient in the emergency department. This was passed into the lungs and the patient developed a pneumothorax.

> "The aim of this bulletin is to promote learning and an awareness of the type of events that have occurred, which can be used to facilitate changes in practice.

Delayed or misinterpretation of diagnostic investigations including radiology

Delayed or unreported radiology affected two patients: one patient with a small unreported subdural received tinzaparin, which was followed by a more severe bleed. A second patient had an unreported bleed on an initial CT head report and then the updated report was not received by the treating clinicians.

One patient did not have a femur x-ray in an initial series and was later found to have a femoral fracture.

In one case, there was confusion between an APTT and an anti-Xa level that led to high levels of anticoagulation. In a second case a high APTT was not reported by the labs. This was thought to have been caused by the result being unmeasurably long. It has also been noted that in some centres very abnormal results can sometimes be confused with low normal results because a symbol is used to replace the value.

In one case a low blood sugar was not acted upon even though the result had been received.

HSV encephalitis was not diagnosed in a fitting patient who deteriorated.

> A ventilated patient was connected to the ICU ventilator, which was in standby. There was a period before this lack of ventilation was noticed, resulting in a cardiac arrest.

Unwitnessed events

Four patients fell when not being directly observed, resulting in fractures. Two patients died in side rooms unobserved and one patient was reported as deteriorating over eight hours on HDU. The onset of asystole was unwitnessed in one episode where alarms were not in place.

Lack of suitable ICU/HDU beds

Late transfer was associated with deterioration in five reports. These included a failure to admit 10 patients to cardiac ICU, a delay in transferring a patient with a spinal collection to a spinal centre for drainage and a situation where two ICM consultants on a ward were unable to contact the ICU to arrange admission. One incident involved a delay in pacing where no beds were available and the external pacer became ineffective. Another incident occurred where a potential MERS patient had not been diagnosed and was admitted to an open ICU bay without staff using appropriate PPE.

A patient with severe burns had a high body temperature whilst being cared for in a room on ICU. The unit was very hot (around 28 degrees C). Despite efforts to cool the patient and multiple calls to estates to reduce the temperature, the room remained hot and the patient died.

There were two further patients who might have benefitted from earlier admission to the ICU, however this could not be confirmed. One patient who was septic and received seven litres of fluid on the ward, but continued to be hypotensive. Another severely agitated patient repeatedly injured themselves after an overdose by head-butting the floor.

Lines and drains

Hand ischaemia resulted in one patient who had an ulnar arterial line in the same hand where a radial arterial line had previously been sited during the same admission. Digital ischaemia occurred in a patient with a brachial artery line. A further emergency abdominal aortic aneurysm vasculopathic patient may have been underfilled whilst on vasoconstrictor drugs and developed digital ischaemia.

One CVP seldinger wire was lost into a patient's circulation at insertion during a cardiac arrest.

Morphine was administered via a peripheral line resulting in reduced consciousness, perhaps due to accumulation from a tissued cannula.

A surgical drain in the neck of a patient was documented as having been removed, but was later recovered from under the patient's skin.

Pressure related ulcers

Five sacral ulcers were reported, plus two mouth or tongue ulcers thought to be related to methods of securing an ET tube using ties.

> A patient with severe burns had a high body temperature whilst being cared for in a room on ICU. The unit was very hot (around 28 degrees C). Despite efforts to cool the patient and multiple calls to estates to reduce the temperature in the room the room remained hot and the patient died.

Unexpected change to back-up mode from APRV during suctioning in a patient with severe lung damage due to COVID-19, resulting in desaturation

Situation

A patient with severe lung injury secondary to COVID-19 was being ventilated with Airway Pressure Release Ventilation (APRV) mode, via a GE Carescape R860 ventilator, which had recently been introduced to the ICU because of the COVID-19 pandemic.

They required frequent airway suctioning. During a period of suction, the ventilator defaulted to its back-up mode of A/C VC (Volume Control) when the minute volume fell below the lower limit. This was quickly followed by a rapid desaturation to an SpO2 of 50%, which was thought to be due to the change in mode in a patient whose respiratory system was very unstable. Medical staff were summoned urgently, suctioning was stopped and the patient returned to APRV and recovered.

Background

This case illustrates the need to consider actions that might cause a change to a back-up mode from any mode that they are currently using and, as in this case, whether the mode selected actually has a back-up mode. The back-up mode is normally a specific mode which cannot be altered to a different mode by the user. It is normally designed to be a safety component in case apnoea occurs when the patient is in a spontaneous breathing mode. It is therefore important when setting the spontaneous mode that settings of the back-up mode are suitable. It is also important for staff to appreciate that suctioning can preoduce a change to back-up mode.

In this case the patient was in APRV, which has a mandatory component to its ventilation as well as having the capacity for the patient to, in effect, spontaneously breathe around two levels of CPAP. Therefore, the presence of a back-up mode had not been fully considered during the setup. This was further complicated by the ventilator being an unfamiliar model on that ICU.

Assessment

It is important to understand the potential individual consequences for a patient who cannot maintain the necessary tidal volumes or respiratory rate on the mode in use, or the possibility that other actions or interventions could trigger a change to the back-up mode. Considering the likelihood of this happening and its potential implications for the specific patient, might lead to the selection of a mode which either does not need a default or might produce less disturbance as the change occurs. Alternatively, a mode could be selected which intentionally bridges the division between a spontaneous mode to a mandatory mode, such as PRVC VS automode seen in Maquet ventilators.

Recommendation

The most likely major changes to back-up mode to consider would be from a spontaneous mode, (such as pressure or volume support) or a complex mode with a spontaneous component (such as APRV) to a mandatory mode, typically volume control or pressure control. When selecting the ventilatory mode, the consequences of an abrupt change to a mandatory back-up should be considered and the context of the patient instability and staffing familiarity taken into account. The pressure, volumes and other parameters required in the back-up setting must be selected with a view to the likely needs of the patient if a reversion to back-up occurred. Finally, if a patient is being ventilated on an anaesthetic machine in a critical care situation, there may be an unconventional or even no back-up mode. This must be considered, when assessing the relative risks for that patient and whether a change to a more sophisticated or suitable ventilator is needed.

Endotracheal Tube Revision on the ICU

Situation

A 45-year-old gentleman was admitted to ICU with pneumonia. He required intubation for deteriorating respiratory function and subsequently developed ARDS. Whilst in the midst of invasive respiratory support, the patient developed a cuff leak secondary to migration of the ETT. This necessitated a revision of the ETT.

Background

This revision was complicated by a loss of the airway.

The team encountered a 'Can't Intubate, Can't Oxygenate' (CICO) scenario, with an inability to ventilate effectively for approximately 20 minutes.

This event resulted in a severe hypoxic brain injury, and ultimately the patient's death.

Assessment

The incident highlighted a number of issues:

- The need for a safety checklist: ETT revision in the critically ill being a high-risk procedure
- Clarity of airway planning for airway revision
- Avoidance of difficulties related to human factors during an airway emergency
- Forward planning of the role of fibreoptics, videolaryngoscopy and airway exchange catheters during airway revision
- Importance of simulation in preparing for difficult airway management
- Need for nominated timekeeper/scribe during airway emergencies
- Usefulness of recording of key endpoints and parameters including hypoxic time and hypoxic cardiac arrest within future guidance.

Recommendation

- ETT revision in the critically ill is a high risk procedure and should be fully prepared for.
- A safety checklist for ETT revision has been produced to support teams during occasions of ETT inadequacy, failure or migration. The checklist promotes the availability of immediate backup, the consideration of airway optics and the designation of a timekeeper/scribe. The checklist can be found on the FICM website.
- A commitment to simulation-based team training (SBTT). This training focusses on promoting the use of safety checklists, strong airway planning, open team communication and human factors.

Conclusions

The aim of this bulletin is to highlight important changes that might help improve processes, procedures and patient care. Themes often mirror cases that have been seen in the FICM safety reports or ViRUS COVID related reports which can be found **here**.

Based on the events discussed in this bulletin, we have made some suggestions for development and change to practice. Please note that this is not an exhaustive list.

1. **Vigilance at handover or transfer times**. It is a priority to ensure that safety-critical tasks are completed. This is especially important in relation to ventilation, respiratory support and oxygen supply as failure to adequately connect, commence or set oxygen, respiratory support or ventilators can have very serious consequences. The use of checklists is helpful to avoid a situation where, in some cases, no one takes responsibility for ensuring these processes are satisfactorily completed, and where different parts of the team separate into areas that they feel are important, so leaving tasks or recognition of facts incomplete. A checklist for ventilation and handover is under development.

2. **Drug errors continue to be an issue, especially in pressured situations.** These include problems of dose rate on pumps, as well as a failure to ensure a pump is running in a transfer situation. This has similarities to the issues seen in point one above.

3. **Endotracheal tube revision on the ICU should be regarded as a high risk procedure** requiring suitable preparation.

4. **Processes to ensure up to date reports are seen and acted on by clinicians.** This includes making sure that systems are in place to flag updated reports and that abnormal results are not delayed, especially by the use of unclear symbols, which may represent a value that is outside the expected range, but can be confused for another meaning.

5. **Measures to increase availability and suitability of beds, including the design of the patient environment.**
   - Lack of suitable ICU beds continues to be an issue and this impacts on practice, care and timely admission. Where possible an increase in staffed beds should be included in present and future plans.
   - Adequacy of design or facilities in critical care units for all likely contingencies including the provision of adequate temperature control are an issue and should be improved.

6. **Where possible, design/re-design efforts are encouraged to help minimise the difficulties of supervising patients in cubicles, especially when staffing is under pressure.** Problems with unwitnessed events and related incidents are described. The difficulties of supervision of patients in cubicles are highlighted.

7. **Vigilance and adoption of practices to reduce pressure sores including in and around the mouth** related to securing ET tubes in the correct position are highlighted.

8. **Vigilance with arterial line siting.** Problems related to the use of the ulnar artery and brachial artery contributing to digital ischaemia are highlighted, often in patients with limited access.

The Faculty of
Intensive
Care Medicine™

Churchill House | 35 Red Lion Square | London | WC1R 4SG
tel 020 7092 1688 | email contact@ficm.ac.uk

www.ficm.ac.uk

@FICMNews