Focus on patient safety

MEASURING & IMPROVING QUALITY

Tracheostomised patients in the critical care setting

Tracheostomy, when life hangs by a tube

29 February 2024

It could happen to you too

Event 1

FITTING OF A SPEAKING VALVE ONTO A TRACHEOSTOMY TUBE RESULTING IN THE PATIENT'S DEATH

A female patient in her sixties had been hospitalised in intensive care for two months and tracheostomised for one month. She was seated in a chair, and breathing spontaneously with a tracheostomy tube that was fitted with a speaking valve. She showed drowsiness and a fall in pulse oximetry reading. Once mechanical ventilation had resumed, the patient woke up and her pulse oximetry returned to normal, but she then suffered a pneumothorax. After several failed attempts at drainage, the patient progressed to cardiac arrest and death, despite resuscitation manœuvres.

What happened? *Immediate cause*

The tracheostomy tube cuff was not deflated when the speaking valve was fitted.[1]

Why did it happen? *Root causes, absent or deficient barriers*

- **The nurse who fitted the valve was inexperienced:**
  - she had been working in intensive care for six months;
  - this procedure was not common in the department. She had performed it for the first time the previous day in the presence of the medical team, who had explained to her that it was necessary to deflate the cuff;
  - training of paramedical staff in pathophysiology and intensive care procedures by the department's doctors had been stopped;
  - there was no systematic theoretical training for new nurses before joining the unit, but only six weeks of buddying with an established nurse in the department;
  - use of speaking valves was not included in the guide for the department's new nurses.
- **The nurse was interrupted while fitting the speaking valve.**
- **The patient had been due to be moved to a chair and fitted with a speaking valve in the afternoon, but the morning nurse wanted to save her colleague some time. The event occurred just before the changeover between morning and afternoon shifts.**
- **The patient had an ICU-acquired weakness and was unable to use the call button.**

1. If the cuff is not deflated, the patient can breathe in via the speaking valve but cannot breathe out around the tube, which quickly leads to apnoea and increased airway pressure that may lead to pneumothorax or cardiac arrest.

Event 2

ACCIDENTAL DECANNULATION OF A TRACHEOSTOMY RESULTING IN THE PATIENT'S DEATH

A female patient in her forties was admitted to the intensive care unit immediately after emergency surgical tracheostomy due to hypertrophic keratosis of her vocal cords. Accidental decannulation occurred the day after the procedure. An ENT surgeon was called. An attempt was made at recannulation using a Killian retractor, but failed due to subcutaneous emphysema.[2] ***Mediastinal emphysema and pneumothorax occurred, followed by cardiac arrest. Despite pneumothorax drainage and resuscitation manœuvres, the patient died.***

What happened? *Immediate cause*

The failed recannulation attempts resulted in fatal asphyxia.

Why did it happen? *Root causes, absent or deficient barriers*

- No stay sutures had been put in place on the tracheal opening at the end of the procedure, which would have aided recannulation.
- There was a delay in management of the patient as there was no suitable retractor (Killian or Laborde retractor) available in her room.
- The fibre-optic endoscope that was available on a permanent basis in the ICU was not used during the recannulation attempts.
- Frequency of admission of tracheostomy patients to the intensive care unit is falling, so personnel lacked experience in managing this type of patient. In addition, the nurses were not trained in the management of tracheostomised patients.
- The nurse present was a back-up nurse during the Covid-19 pandemic.
- There was no hospital procedure for the management and monitoring of tracheostomised inpatients, containing a list of essential equipment to be placed in the patient's room and the monitoring to be carried out, among other things.

2. The layers incised by the tracheostomy heal gradually over ten days. If recannulation is required during this period, there is a high risk of a false passage in the cervical tissue and difficulty with recannulation.

Event 3

ARTERIAL TEAR DURING PERCUTANEOUS TRACHEOSTOMY RESULTING IN THE PATIENT'S DEATH

A female patient in her sixties was admitted to intensive care due to postoperative complications following a third heart surgery procedure. This most recent procedure had been complicated by cardiac tamponade, requiring revision surgery on D+2. Twenty-six days after this last procedure, it was decided to perform percutaneous tracheostomy to aid the weaning of mechanical ventilation. During the procedure, an arterial bleed occurred, followed by cardiac arrest resulting in the patient's death.

What happened? *Immediate cause*

A brachiocephalic artery tear occurred during percutaneous tracheostomy.

Why did it happen? *Root causes, absent or deficient barriers*

- Despite the patient's history (four heart surgery procedures, including a recent one 26 days earlier), morbid obesity and water/salt retention with severe oedema masking anatomical landmarks, a percutaneous tracheostomy was scheduled by the intensive care specialists, rather than a surgical tracheostomy.
- There was no consultation between ENT surgeons, heart surgeons and intensive care specialists, and there was no procedure making provision for any such consultation.
- Percutaneous tracheostomy was a routine procedure in the department and had come to be seen as being straightforward.
- The procedure was begun by a medical resident in training, accompanied by two senior doctors. Dilation of the tracheal opening was difficult and a first tracheostomy attempt failed. The senior doctors took over when the first difficulties were encountered.
- During the procedure, endoscopy was performed using a fibre-optic endoscope, allowing visualisation only by the operator (a pulmonologist), despite there being single-use fibre-optic endoscopes available in the department with a screen that would have been visible to all the operators. Exclusive control by the pulmonologist limited the team's understanding of the difficulties encountered during the procedure. Single-use fibre-optic endoscopes are expensive and are reserved for first-line use at night and in emergencies, when sterilisation is not available.
- There was no procedure or teaching video available in the department for the performance of percutaneous tracheostomy in intensive care settings. There was no document listing the indications for percutaneous tracheostomy by patient profile.

Key words: *Critical care – Intensive care – Tracheostomy – Speaking valve – Decannulation*

So it doesn't happen again

Tracheostomy is a common procedure in intensive care settings, but with considerable disparities between teams in terms of both frequency (from 5% to 54%) and techniques (surgical or percutaneous). The potential benefits of tracheostomy need to be weighed up against the sometimes serious risks. The most common complications are minor (for example, non-serious bleeding around the opening), but serious and sometimes fatal complications are reported in rare cases.

National and international guidelines have been published concerning the indications, tracheostomy placement method and tracheostomy care. They recommend to:

- have a hospital procedure;
- provide training for personnel, or even set up dedicated teams to reduce the frequency of complications and their consequences;
- be particularly attentive over the ten days or so following tracheostomy placement, when there is a particular risk of haemorrhage or accidental decannulation, and when recannulation can be difficult in unhealed tissue;
- ensure emergency recannulation equipment is available in the patient's room.

In some intensive care units, percutaneous tracheostomy is a frequent procedure that may have come to be seen as being straightforward. The risks should not be overlooked, however, particularly in case of obesity or recent thoracic surgery.

- **Always assess the benefit-risk balance of a tracheostomy and the choice of technique.**
- **Always have trained personnel insert, maintain and monitor tracheostomies.**
- **Always hold a pre-job briefing before performing technical procedures associated with the insertion or management of a tracheostomy tube.**
- **Always bear in mind the risk of decannulation and be ready to perform emergency recannulation (training, equipment and personnel available).**

Focus on patient safety collection

The "Focus on patient safety" collection aims to raise awareness among healthcare professionals as to risk management based on care-related adverse events that they have been confronted with, and which are always associated with a series of dysfunctions. **The HAS does not modify or interpret these care-related adverse events reported by healthcare professionals in national care-related serious adverse event databases and selected in focuses on patient safety**. This focus on patient safety concerns fatal adverse events associated with the management of tracheostomy tubes in patients hospitalised in critical care settings.

Find out more

Haute Autorité de santé. Reporting care-related serious adverse events. Saint-Denis La Plaine: HAS; 2022.

Haute Autorité de santé. Focus on patient safety. Saint-Denis La Plaine: HAS; 2021.

Haute Autorité de santé. Role and management of tracheostomy in the care of ventilator-dependent patients with slowly progressive neuromuscular diseases. Guideline. Saint-Denis La Plaine: HAS; 2020.

Haute Autorité de santé. Role and management of tracheostomy in the care of ventilator-dependent patients with slowly progressive neuromuscular diseases. Evidence report. Saint-Denis La Plaine: HAS; 2020.

Haute Autorité de santé. Briefing. Saint-Denis La Plaine: HAS; 2016

Société de réanimation de langue française [French-language intensive care society], Société française d'anesthésie et de réanimation [French Society of Anaesthesia and Intensive Care], Trouillet JL, Collange O, Belafia F, Blot F, et *al*. *Trachéotomie en réanimation. Recommandations formalisées d'experts*. [Tracheostomy in intensive care settings. Formalised expert recommendations.] Paris: SFMU; 2016.

Mussa CC, Gomaa D, Rowley DD, Schmidt U, Ginier E, Strickland SL. AARC Clinical Practice Guideline: Management of Adult Patients with Tracheostomy in the Acute Care Setting. Respir Care 2021; 66(1): 156-69.

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