APSF.ORG
NEWSLETTER
THE OFFICIAL JOURNAL OF THE ANESTHESIA PATIENT SAFETY FOUNDATION

CITATION: Urdaneta F. A preventable airway management disaster [Letter to the editor]. *APSF Newsletter.* 2023;38:76–77.

LETTER TO THE EDITOR:

A Preventable Airway Management Disaster

by Felipe Urdaneta, MD, FASA

There has been tremendous growth and progress in airway management in the past four decades, despite an increase in high-risk groups such as patients of extreme size and weight, trauma, and obstructive sleep apnea, to name a few.[1] The introduction and refinement and widespread adoption of airway management guidelines, coupled with technological advances such as the introduction and widespread use of newer supraglottic airways, indirect laryngoscopes (video laryngoscopes), advances in invasive airway emergency methods, advanced methods of peri-intubation oxygenation methods such as noninvasive positive pressure ventilation, and high-flow nasal oxygenation, have revolutionized how we approach the airway in elective and emergency settings.[2] Airway management procedures are required in patients of all demographics and are performed by health care providers with different experience and training backgrounds. While the trends seem promising, significant adverse events still occur, and we must not let our guard down.

A recent international consensus guideline sheds light on an old airway management adverse event.[3] The members of the Project for Universal Management of Airways (PUMA) came out with Management Guidelines for preventing unrecognized or undetected esophageal intubation. These new guidelines were endorsed by seven airway management societies from across the world.[3] Some readers might be taken aback. Is there a need for such guidelines in the 21st century? Chances are that every practitioner has experienced firsthand, during laryngoscopy and intubation, a case in which the endotracheal tube (ETT) accidentally ends up in the esophagus. If this happens and it is immediately recognized, little harm comes out of misplaced ETTs. The real problem comes when the ETT is misplaced, there is delayed recognition, or it is missed altogether. This may result in severe, irreversible hypoxic brain damage or even death.[4-6]

The exact rate of unrecognized esophageal intubation is unknown. Incidences as high as 4–26% of all intubations have been reported in high-risk groups such as trauma, low-flow states, and neonates.[5,7,8] While it is estimated that more cases occur outside the operating room and when the procedure is carried out by nonanesthesia personnel, anesthesia professionals are not immune to unrecognized esophageal intubations. The incidence of unrecognized esophageal intubation in the ASA Closed Claims Analysis (CCA) depends on the era reported. In the 1980s, it was responsible for 6% of all closed anesthesia malpractice claims.[9] In the 1990s, the ASA mandated that the adequacy of ventilation be continually evaluated through the detection of exhaled carbon dioxide unless invalidated by the nature of the patient, procedure, or equipment.[4] As a result, the occurrence fell dramatically and led to unrecognized esophageal intubation being considered by some as "virtually extinct"; in the latest 2019 CCA revision, there were no reported cases.[10] In the 2011 National Audit Project IV (NAP4) database, there were nine cases of unrecognized esophageal intubation; it was the second most common adverse event that resulted in death or disability.[11] As a result, the Difficult Airway Society and the Royal College of Anaesthetists in Great Britain championed a successful campaign to mandate capnography whenever airway procedures occurred.[12] Unfortunately, other cases happened afterward that could not be attributed to the lack of detection of exhaled CO_2.[13] The publication of these new guidelines, an accompanying editorial, and several letters to the editor suggest that unrecognized esophageal intubation remains a significant concern for all health professionals engaged in airway management and it is underreported.[14-17]

As these new guidelines suggest, we must follow strict protocols to reduce the incidence of esophageal intubation altogether. Using videolaryngoscopy as a first-choice device seems prudent and backed up by literature.[16] However, this is currently not universally possible and remains aspirational due to perceived cost and limited resources even in affluent countries. Ensuring correct tracheal tube placement after every intubation and continuous monitoring of exhaled CO_2 in patients with mechanical ventilation should always be performed. Not all instances of esophageal intubation happen during intubation; endotracheal tubes might be dislodged from the respiratory tract. This is especially common in the pediatric population or when the patient's head or body moves altogether, for example, during resuscitation maneuvers. A high index of suspicion of esophageal intubation should be present if it is impossible to ventilate a

See "Preventing Airway Disaster," Next Page

Preventing Unrecognized Esophageal Intubation is Paramount to Patient Safety

From "Preventing Airway Disasters," Preceding Page

patient on a mechanical ventilator. This becomes evident after administration of neuromuscular agents. There are many anecdotal reports of patients with misplaced ETTs who can breathe so long as their diaphragmatic function is preserved; once this ceases, after muscle relaxation, profound deterioration and desaturation will occur.

Esophageal intubation can happen even in the hands of experienced health care professionals. It is not just a problem for inexperienced or less skilled providers. It may not always be possible to prevent esophageal intubations. The goal should be to prioritize and work on measures to help prompt the detection of tracheal tube placement. These new guidelines remind us to resist being complacent and passive in promoting measures to decrease undue patient harm.

In conclusion, these newly published Guidelines on preventing unrecognized esophageal intubation shed a modern view on an old problem, a low-frequency, high-impact adverse event. Despite many technological advances and successes, there is still a lot to be learned. No patient should be harmed by unrecognized esophageal intubation, and we should all abide by the fundamentals to reduce this unwanted event.

Felipe Urdaneta, MD, FASA, is a clinical professor of anesthesiology, University of Florida, Gainesville, FL.

Felipe Urdanata, MD, FASA, is part of the Advisory Board for Vyaire and Consultant for Medtronic. He also serves on the speaker bureau for Vyaire and Medtronic.

REFERENCES

1. Schroeder RA, Pollard R, Dhakal I, et al. Temporal trends in difficult and failed tracheal intubation in a regional community anesthetic practice. *Anesthesiology.* 2018;128:502–510. PMID: 29189209
2. Apfelbaum JL, Hagberg CA, Connis RT, et al. 2022 American Society of Anesthesiologists practice guidelines for management of the difficult airway. *Anesthesiology.* 2022;136:31–81. PMID: 34762729
3. Chrimes N, Higgs A, Hagberg CA, et al. Preventing unrecognised oesophageal intubation: a consensus guideline from the Project for Universal Management of Airways and international airway societies. *Anaesthesia.* 2022;77:1395–1415. PMID: 35977431
4. Honardar MR, Posner KL, Domino KB. Delayed detection of esophageal intubation in anesthesia malpractice claims:brief report of a case series. *Anesth Analg.* 2017;125:1948–1951. PMID: 28207593
5. Rost F, Donaubauer B, Kirsten H, et al. Tracheal tube misplacement after emergency intubation in pediatric trauma patients: a retrospective, exploratory study. *Children.* 2022;9:289. PMID: 35205009
6. Wollner E, Nourian MM, Booth W, et al. Impact of capnography on patient safety in high- and low-income settings: a scoping review. *Brit J Anaesth.* 2020;125:e88–e103. PMID: 32416994
7. Jemmett ME, Kendal KM, Fourre MW, Burton JH. Unrecognized misplacement of endotracheal tubes in a mixed urban to rural emergency medical services setting. *Acad Emerg Med.* 2003;10:961–965. PMID: 12957980
8. Timmermann A, Russo SG, Eich C, et al. The out-of-hospital esophageal and endobronchial intubations performed by emergency physicians. *Anesth Analg.* 2007;104:619-623. PMID: 17312220
9. Caplan RA, Posner KL, Ward RJ, Cheney FW. Adverse respiratory events in anesthesia: a closed claims analysis. *Anesthesiology.* 1990;72:828–833. PMID: 2339799
10. Joffe AM, Aziz MF, Posner KL, et al. Management of difficult tracheal intubation: a closed claims analysis. *Anesthesiology.* 2019;131:818–829. PMID: 31584884
11. Cook TM, Woodall N, Frerk C. Major complications of airway management in the UK: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 1: anaesthesia. *Br J Anaesth.* May 2011;106:617–631. PMID: 21447488
12. Russotto V, Cook TM. Capnography use in the critical care setting: why do clinicians fail to implement this safety measure? *Br J Anaesth.* 2021;127:661–664. PMID: 34503831
13. Cook TM, Harrop-Griffiths AW, Whitaker DK, et al. The 'No Trace=Wrong Place' campaign. *Brit J Anaesth.* 2019;122:e68–e69. PMID: 30857613
14. Baker PA, O'Sullivan EP, Aziz MF. Unrecognised oesophageal intubation: time for action. *Brit J Anaesth.* 2022;129:836–840. PMID: 36192220
15. Jooste R, Roberts F, Mndolo S, et al. Global Capnography Project (GCAP): implementation of capnography in Malawi—an international anaesthesia quality improvement project. *Anaesthesia.* 2019;74:158–166. PMID: 30255496
16. Rogers AM, Hansel J, Cook TM. Videolaryngoscopy, oesophageal intubation and uncertainty: lessons from Cochrane. *Anaesthesia.* 2022;77:1448–1450. PMID: 35897123
17. Sakles JC, Ross C, Kovacs G. Preventing unrecognized esophageal intubation in the emergency department. *J Am Coll Emerg Physicians Open.* 2023;4:e12951. PMID: 37128296