INTRODUCTION

An unanticipated difficult airway can present unexpectedly during airway management. Effective communication is vital during an airway emergency to minimize errors to avoid complications.[1,2] Clear and uniform language should be used in such situations to aid communication and understand the nature of the emergency. The term “critical language” used in the healthcare and other high reliability organisations refers to a standard communication, where specific terms having a clear, mutually understood meaning are used to avoid confusion and improve team situational awareness.[3,5]

Communication and team work are important components of human factors during an airway emergency. Human factors contributed to poor outcome in 40% of the cases reported in the Fourth National Audit Project of the Royal College of Anesthetists (NAP4) that examined major complications during airway management.[6]

Critical language like “cardiac arrest” used during cardiopulmonary resuscitation is universally understood. Unfortunately, during emergency airway management, there is no uniform language used for communication. Various difficult airway guidelines use different terminologies. Terminologies like “can't intubate, can't oxygenate” (CICO) and “can't intubate, can't ventilate” (CICV) have certain limitations. Though terminology like “Front of Neck Access” (FONA) is dominant in the literature, “emergency cricothyroidotomy” is used more often in clinical practice, suggesting a disconnect between the dominant terminology in the literature and in clinical practice. Terminology should not be used merely because it is catchy, simple and advocated by a few. It must accurately reflect the nature of the situation, convey a sense of urgency, and suggest an action sequence. An initiative to achieve consensus among existing terminologies is much needed. Leaders in the field should work towards refining airway terminology and replace poor phrases with ones that are more concise, precise and can be used universally in an airway emergency.

Key words: Airway emergency, complete ventilation failure, critical language, emergency cricothyroidotomy
emergency should be simple, concise, precise, easy to articulate, intuitive, memorable, non-intimidating, consistently used and readily understood by all team members. Having anatomical or physiological words in the terminology, further aids understanding in an emergency situation. There is a much felt need for uniform critical language for use during emergency airway management.[7,8]

A clear and concise declaration of both the emergency and the appropriate action is essential, like with cardiac arrest, to create team situational awareness and get team members to focus and work together to manage the airway crisis in a time sensitive manner.

**Terminology for Declaration of Loss of Airway**

The airway emergency which is dreaded by every airway operator is where one is unable to provide alveolar oxygen delivery, despite the best effort at the use of all the upper airway maneuvers and devices (face mask, supraglottic airway and tracheal tube) to ventilate the lung. The most common terminology used to describe this situation previously was “can’t intubate, can’t ventilate” (CICV). The change of this terminology to “can’t intubate, can’t oxygenate” (CICO) was initiated by Dr. Andrew Heard.[9] The rationale was to change the focus from “tracheal intubation” (which led to several adverse events) to “oxygenation” of the patient during an airway emergency.

The CICO terminology later found its way into the Difficult Airway Society (DAS) airway guidelines.[10-12] Though CICO is the dominant terminology in the literature, both CICO and CICV continue to co-exist, which may result in some confusion – especially if they are understood to be different situations. The change from CICV to CICO has led to the conversion of a term which though abbreviated, needed to be spelt out when verbalized to a spoken word “CICO”, which, depending on the geographical region, is pronounced variably. The pronunciation of the word CICO ranges from ki-koh, kick-koh, seekoh, psy-koh, sick-koh, with some even spelling out C-I-C-O. Though a word like CICO can be easily remembered, the potential danger of using a spoken word with no meaning, is that it may not be understood by all the team members (in addition to the lack of consistency on how it is verbalized), thus creating confusion. This highlights the importance of using concise, precise terminology that cannot be abbreviated, to be universally understood. Specifying “can’t intubate” in both CICV and CICO is not necessary, as tracheal intubation is not the only means of ventilating a patient today (there are supraglottic airways and mask ventilation as well).

The more serious concern about the shift from “can’t ventilate” to “can’t oxygenate” while using CICO, is the understanding of what is meant by “oxygenation” and thus “can’t oxygenate”. Oxygenation could refer to a state where there is delivery of oxygen to the lungs by ventilation, confirmed by an end tidal carbon dioxide (ETCO₂) trace; thus an absence of this confirms that one “can’t oxygenate”. However, adequate oxygenation can also be achieved by preoxygenation and apneic oxygenation, where the oxygen concentration in the alveoli is maintained, despite not ventilating the lungs. In this situation the oxygen saturation, especially when apneic oxygenation has been used may be preserved for several minutes. If one asks the question “Is the patient oxygenated?” or “Is oxygenation adequate?”, the answer would perhaps be “yes” from most individuals. In addition, there are no objective criteria to define “can’t oxygenate” in absence of end tidal oxygen monitoring. A clinician often relies on the oxygen saturation to define “can’t oxygenate”. This further leads to confusion about whether and what level of saturation should be considered as a “can’t oxygenate” situation. Thus, despite the inability to ventilate the lungs, the interpretation of “oxygenation” and therefore “can’t oxygenate”, can vary significantly, leading to disparity in the trigger for identifying CICO. This may delay the appropriate action and result in adverse outcomes. The Vortex, a cognitive tool for emergency airway management,[13] has defined a “green zone” which represents a ‘can oxygenate” situation, where one must strive to keep the patient (adequate oxygen saturation and ventilation confirmed by an ETCO₂ trace). This is much easier to define than “can’t oxygenate” in the setting of the confusion around “oxygenation”.

The real question to be asked is “When should you initiate airway rescue following inability to ventilate the lungs”. While the oxygen saturation is preserved or when the oxygen saturation starts to fall [Figure 1]. In the setting of difficult airway management, failure to ventilate the lungs precedes the development of hypoxemia, i.e., ventilation failure leads to oxygenation failure. Thus, using the terminology CICO may be potentially dangerous as “can’t oxygenate” may be interpreted variably, depending on an individual’s understanding of whether the
A patient is getting oxygenated or not, leading to a delay in the performing airway rescue. When one is unable to ventilate the lungs, despite using the best attempt at all of the three upper airway techniques for maintaining airway patency, fall in oxygenation saturation is inevitable. The rate and magnitude of desaturation depends on the cardiopulmonary reserve of the patient and the efficacy of pre oxygenation and apneic oxygenation. Since ventilation failure precedes oxygenation failure, it may be better to initiate airway rescue when failure to ventilate the lungs is recognized [Point 1, Figure 1], rather than wait for oxygenation failure [Points 2 and 3, Figure 1].

The All India Difficult Airway Society (AIDAA) extensively discussed and debated the applicability of the terminology CICO, before drafting their guidelines in 2016. Keeping in mind the potential danger of using the term CICO, the term “Complete Ventilation Failure” was proposed. Complete Ventilation Failure is a situation where after the best attempt at using tracheal tube, supraglottic airway device and face mask, one has failed to ventilate the patient, even if oxygenation may be maintained. AIDAA recommends proceeding to performing an emergency cricothyroidotomy when Complete Ventilation Failure is recognized. Using Complete Ventilation Failures as the trigger in this setting has the potential to enhance patient safety. In addition, the terminology is simple, concise, precise, easy to articulate, intuitive, non-intimidating, can be readily understood by all team members and cannot be abbreviated as a word like CICO. It is unlikely that ventilation failure can be mistaken for inadequate carbon dioxide removal in the context of failed upper airway management, especially considering cannot ventilate in CICO was the dominant term used before CICO, hence universally understood. Though the terminology is used in the Indian difficult airway guidelines, it has gained wide attention globally, especially for the rationale behind its use.

**TERMINOLOGY FOR DECLARATION OF AIRWAY RESCUE**

Once CICO or Complete Ventilation Failure are declared there is an urgent need for creating a passage between the anterior part of the neck and the trachea to deliver oxygen, since ventilation of the lungs via the upper airway has failed. This can be done using a needle puncture, commercial cricothyroidotomy kits or making a surgical opening into the airway via the neck. The preferred site for access is the cricothyroid membrane. The cricothyroid membrane is a superficial, easily felt, relatively avascular structure, placed away from thyroid gland, anterior jugular veins and laryngeal nerves, less mobile and held steadily in place. This makes a cricothyroidotomy easier and faster to perform than a tracheostomy in an emergency with lesser chance of bleeding complications.

The major airway guidelines from various societies for the management of the unanticipated difficult airway in adults have used different terminologies for this which include, ‘emergency invasive airway access’, “emergency surgical airway”, ‘front of neck access’, “CICO rescue”, ‘percutaneous tracheostomy’, ‘surgical tracheostomy’, ‘emergency cricothyroidotomy’. Terminologies like emergency invasive airway access, emergency surgical airway, front of neck access and CICO rescue are not specific. The use of such divergent terms may lead to variable understanding by team members, not only of the procedure to be performed, but also regarding the equipment required, resulting in delays and adverse patient outcomes.

The present dominant terminology in the literature is “Emergency Front of Neck Access” (eFONA) which was first used in the DAS 2015 guideline. Whichever terminology is used, it is important to distinguish it from an elective tracheostomy (surgical or percutaneous) or cricothyroidotomy, by using terms like emergency or rescue to ensure than the operator makes a distinction between critical and semi elective procedures. However, the “emergency” prefix of eFONA is likely to be dropped for convenience of saying the word FONA, as seen even within the DAS guidelines.
FONA though easy to remember, like CICO, has the potential danger of using a word with no meaning, that may not be understood by all the team members, especially the surgical colleagues. The acronym eFONA is understandable only to the English speaking world, thus limiting its utility as a universal term. If expanded as Emergency Front of Neck Access, it is a mouthful of words, making it impractical for verbalization in an emergency. “Front of” in FONA is understood, making the term unnecessarily lengthy. In addition, “neck access” is not specific. It could include access to a number of structures in the neck, like access to the internal jugular vein, tracheotomy, percutaneous tracheostomy etc. which are not all appropriate to be performed in an emergency. It is interesting to note that the “A” in FONA has been used for both “access” and “airway” in the expanded versions of FONA, both within the DAS guidelines[10-12] and the airway literature, making one wonder about the consistency with which the term is taught and used.

Percutaneous tracheostomy is not a procedure to be performed in an emergency. Surgical tracheostomy takes more time than a cricothyroidotomy and requires the presence of an experienced ENT surgeon to be performed rapidly. Surgeons from other specialties like gynecology, orthopedics, plastic surgery, urology etc. may not be in a position to perform an emergency tracheostomy. In addition, a surgeon may not be available at locations like the intensive care unit and the emergency department, where such airway emergencies may also be encountered. Many airway operators still believe that a tracheostomy should be performed when the upper airway patency is lost in an emergency, as was shown in an unpublished survey conducted by AIDAA before the guidelines were published. This has the potential danger of precious time being lost waiting for a surgeon to arrive, which may result in adverse outcomes. In addition, the inclusion of the word ‘surgical’ in the terminology as in “emergency surgical airway” limits the procedure to a surgical tracheotomy/cricothyroidotomy, removing the possibility of performing a needle or a cannula technique. This may also be mistaken as one to be performed by a surgeon. Hence the term “surgical” should best be avoided in such terminology.

‘Emergency cricothyroidotomy’ is the most commonly used terminology in clinical practice. All the guidelines which specify the anatomical landmark to be accessed during airway rescue, recommend to perform a cricothyroidotomy. These include the DAS, Canadian, Indian, Italian, French, German and Japanese guidelines.[10-12,14-17,19-23] The ASA guidelines[18] and the Vortex approach[13] do not specify any anatomical landmark. Though the DAS guidelines use the terminology eFONA, the guidelines specify that cricothyroidotomy is the preferred procedure to be performed in an emergency (along with the Canadian and Indian guidelines).[10-12,14-16,19] A recent survey of Anaesthetists,[24] found emergency cricothyroidotomy to be the most dominant terminology used in clinical practice, suggesting that there is quite a disconnect between the dominant terminology used in literature and in clinical practice.

The terminology emergency cricothyroidotomy conveys the sense of urgency with a focus on the anatomical landmark to be targeted. It has the advantage that it cannot be abbreviated like FONA. In addition, it is simple, concise, intuitive, precise, inclusive of all techniques, non-intimidating and well established. Specifying the anatomical landmark is important to make the operator focus on performing a cricothyroidotomy and not a tracheostomy. The Italian guidelines[20] have emphatically stated that surgical tracheotomy should no more be considered the first choice in an airway crisis, because the specific experience is often lacking, the procedure is more difficult, takes longer time, exposes the patient to more risks and last but not the least emergency oxygenation should be considered as an Anaesthetists’ task and not be delayed waiting for a surgeon to arrive. Thus though in children under the age of five years[17,25] and when there is an expert ENT surgeon present in the team, a tracheostomy may be preferred, these are exceptions and should not stop one from using emergency cricothyroidotomy in this situation, as the default terminology to enhance safety for the reasons outlined above.

Terminology should not be used merely because it is catchy, simple, and advocated by a few. It must reflect accurately the nature of the situation, convey a sense of urgency, and suggest an action sequence. The time has come to rethink about the terminology used during an airway emergency. An initiative to achieve consensus among existing terminologies, rather than adding to the list of already existing ones (which will only lead to further confusion) is much needed. Leaders in the field should work towards refining airway terminology and replace poor phrases with ones that are more concise, precise and can be used universally in an airway emergency.
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REFERENCES

1. Leonard M, Graham S, Bonacum D. The human factor: The critical importance of effective teamwork and communication in providing safe care. Qual Saf Health Care 2004;13:85-90.
2. Flin R, Fioratou E, Frerk C, Trotter C, Cook TM. Human factors in the development of complications of airway management: Preliminary evaluation of an interview tool. Anaesthesia 2013;68:817-25.
3. Primmer D. Teamwork and communication. J Contin Educ Nurs 2009;40:294-5.
4. Frankel AS, Leonard MW, Denham CR. Fair and just culture, team behavior, and leadership engagement: The tools to achieve high reliability. Health Serv Res 2006;41:1690-709.
5. Leonard MW, Frankel A. The path to safe and reliable healthcare. Patient Educ Couns 2010;80:288-92.
6. Cook TM, Woodall N, Frerk C. Fourth National Audit Project. 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 2011;106:617-31.
7. Edelman DA, Perkins EJ, Brewster DJ. Difficult airway management algorithms: A directed review. Anaesthesia 2019;74:1175-85.
8. Chrimes N, Cook TM. Critical airways, critical language. Br J Anaesth 2017;118:827-54.
9. Heard A. Percutaneous emergency oxygenation strategies in the can’t intubate, can’t oxygenate scenario 2013. Available from: https://www.smashwords.com/books/view/377530. [Last accessed 2020 Feb 25]
10. Frerk C, Mitchell VS, McNarry AF, Mendonca C, Bhagrath R, Patel A, et al. Difficult airway society 2015 guidelines for management of unanticipated difficult intubation in adults. Br J Anaesth 2015;115:827-48.
11. Mushambi MC, Kinsella SM, Popat M, Swales H, Ramaswamy KK, Winton AL, et al. Obstetric anaesthetists’ association; difficult airway society. Obstetric anaesthetists’ association and difficult airway society guidelines for the management of difficult and failed tracheal intubation in obstetrics. Anaesthesia 2015;70:1286-306.
12. Higgs A, McGrath BA, Goddard C, Rangasami J, Suntharalingam G, Gale R, et al. Difficult airway society: intensive care society; faculty of intensive care medicine; Royal college of anaesthetists. Guidelines for the management of tracheal intubation in critically ill adults. Br J Anaesth 2018;120:323-52.
13. Chrimes N. The vortex: A universal ‘high-acuity implementation tool’ for emergency airway management. Br J Anaesth 2016;117:20-7.
14. Myatra SN, Ahmed SM, Kundra P, Garg R, Ramkumar V, Patwa A, et al. Republication: All India difficult airway association 2016 guidelines for tracheal intubation in the intensive care unit. Indian J Crit Care Med 2017;21:146-53.
15. Ramkumar V, Dinesh E, Shetty SR, Shah A, Kundra P, Das S, et al. All India difficult airway association 2016 guidelines for the management of unanticipated difficult tracheal intubation in obstetrics. Indian J Anaesth 2016;60:899-905.
16. Myatra SN, Ahmed SM, Kundra P, Garg R, Ramkumar V, Patwa A, et al. The All India difficult airway association 2016 guidelines for tracheal intubation in the intensive care unit. Indian J Anaesth 2016;60:922-30.
17. Pawar DK, Doctor JR, Raveendra US, Ramesh S, Shetty SR, Divatia JV, et al. All India difficult airway association 2016 guidelines for the management of unanticipated difficult tracheal intubation in paediatrics. Indian J Anaesth 2016;60:906-14.
18. Apfelbaum JL, Hagberg CA, Caplan RA, Blitt CD, Connis RT, Nickinovich DG, et al. American society of anesthesiologists task force on management of the difficult airway. Practice guidelines for management of the difficult airway: An updated report by the American society of anesthesiologists task force on management of the difficult airway. Anesthesiology 2013;118:251-70.
19. Law JA, Breemling N, Cooper RM, Drolet P, Duggan LV, Griesdale DE, et al. Canadian airway focus group. The difficult airway with recommendations for management part 1-difficult tracheal intubation encountered in an unconscious/induced patient. Can J Anaesth 2013;60:1089-118.
20. Petrini F, Accorsi A, Azzario E, Agrò F, Amicucci G, Antonelli M, et al. Recommendations for airway control and difficult airway management. Minerva Anestesiol 2005;71:617-57.
21. Langeron O, Bourgain JL, Francon D, Amour J, Baillot C, Bourroche G, et al. Difficult intubation and extubation in adult anaesthesia. Anaesth Crit Care Pain Med 2018;37:639-51.
22. Piepho T, Cavus E, Noppens R, Byhahn C, Dörges V, Zwissler B, et al. S1 guidelines on airway management: Guideline of the German society of anesthesiology and intensive care medicine. Anaesthesist 2015;64:27-40.
23. Japanese Society of Anesthesiologists. JSA airway management guideline 2014: To improve the safety of induction of anesthesia. J Anesth 2014;28:482-93.
24. Rehak A, Watterson LM. Institutional preparedness to prevent and manage anaesthesia-related ‘can’t intubate, can’t oxygenate’ events in Australian and New Zealand teaching hospitals. Anaesthesia 2019. doi:10.1111/anae.14909.
25. Sabato SC, Long E. An institutional approach to the management of the ‘Can’t intubate, Can’t oxygenate’ emergency in children. Paediatr Anaesth 2016;26:784-93.