

Critical language during an airway emergency: Time to rethink terminology?

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ABSTRACT

Clear language should be used during emergency airway management to aid communication and understand the nature of the emergency. 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

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. There is a lack of clear definitions and different terminologies are used in various regional airway management guidelines.^[7] In a high stress situation, like during a difficult airway scenario, using inconsistent critical language could result in misunderstanding or confusion among team members resulting in errors and even delays in time sensitive interventions, which may impact patient outcomes. Ideally, the critical language during an airway

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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

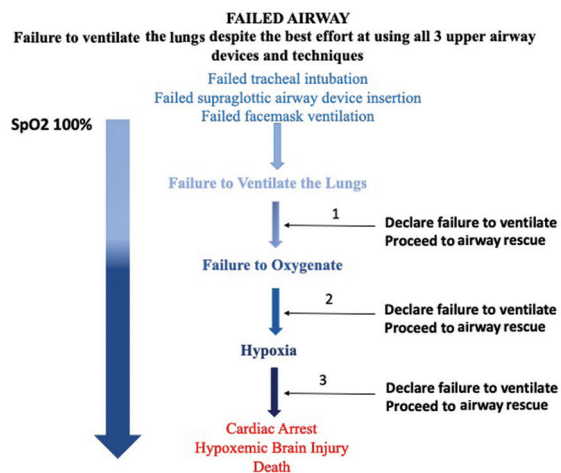


Figure 1: Pathway to Hypoxia and Adverse Events Following a Failed Airway. Points 1, 2, 3 represent potential time points at which one may consider airway rescue

patient is getting oxygenated or not, leading to a delay in the performing airway rescue. When one is unable to ventilate the lungs, despite 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.^[14-17] 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 Failure* 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 *CICV* 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.^[14]

The major airway guidelines from various societies for the management of the unanticipated difficult airway in adults^[10-12,14-23] 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.^[10] 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 that 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.^[10,12] The word

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 airway 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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