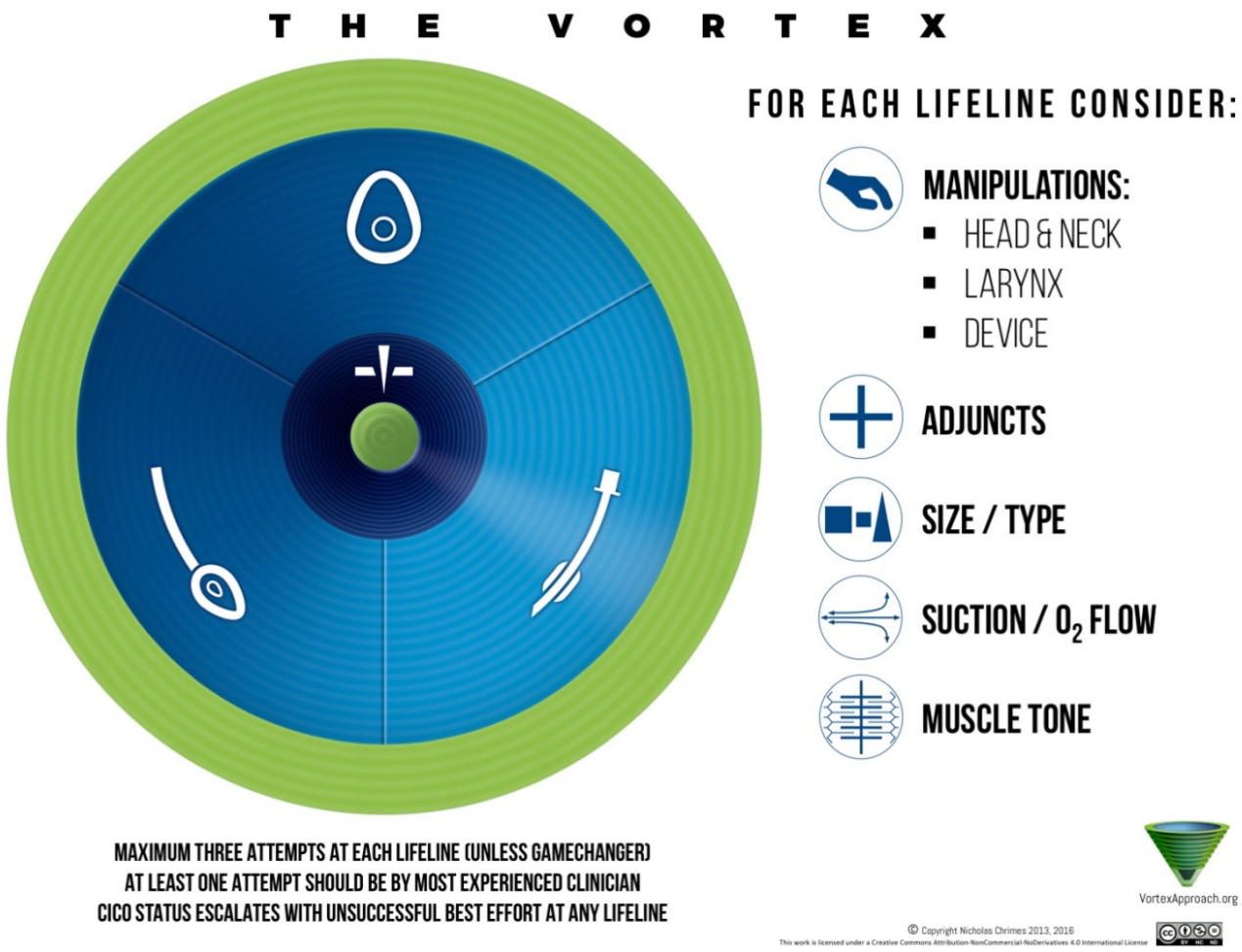
The Vortex approach to airway management

Nicholas Chrimes

Monash Medical Centre, Australia

While technical competence and adequate planning are crucial to effective airway management, it is well recognised that even well prepared airway clinicians can sometimes fail to perform basic interventions under stress. The major airway algorithms are valuable training tools to familiarise clinicians with an approach to emergency airway management *prior* to the occurrence of an airway crisis. They are not, however, usually presented in a format that makes their content readily accessible in real-time to teams of potentially highly stressed clinicians *during* the process of managing a challenging airway. In addition, they typically provide guidance which is predominantly directed at anaesthetists and is usually restricted to the circumstance where the primary plan for airway management is endotracheal intubation.

The Vortex Approach, in contrast, is based around a "high acuity implementation tool", specifically designed to be used during the high-stakes, time critical situation of an evolving airway emergency. It is intended to help clinical teams perform under pressure by providing a simple, consistent template that can be taught to all clinicians involved in advanced airway management, irrespective of critical care discipline and whether they are from a medical, nursing or paramedical background.



It is also able to be used in any context in which an airway management takes place.

The Vortex implementation tool is based on the premise that there are only three upper airway 'lifelines' (non-surgical techniques) by which alveolar oxygen delivery can be established and confirmed: face mask, supraglottic airway and endotracheal tube. If a 'best effort' at each of these three lifelines is unsuccessful then a can't intubate, can't oxygenate situation (CICO) situation exists and 'CICO Rescue' (emergency front-of-neck access) must be initiated.

Completion of a 'best effort' at any of the three upper airway lifelines without being able to restore alveolar oxygen delivery mandates spiral movement inward towards the next lifeline. The circular arrangement of the three lifelines on the tool means that airway management can be initiated using any lifeline and proceed to the remaining ones in whatever sequence is judged most appropriate in the clinical circumstances. A list of five categories of optimisation, applying equally to each of the three lifelines, is provided to prompt consideration of the available options for maximising success during a best effort at any lifeline.

Completion of best efforts at all three lifelines without restoring alveolar oxygen delivery culminates in spiral movement to the centre zone of the tool, representing the need to initiate CICO Rescue. Conversely, confirmation of alveolar oxygen delivery using any of the three lifelines, results in outward movement into the circumferential 'Green Zone'. The Green Zone prompts recognition of the opportunity to re-oxygenate, gather resources and make a plan, that arises whenever alveolar oxygen delivery is able to be established. The Green Zone is also visible in the centre of the tool to remind clinicians that, when all three lifelines have been unsuccessful, CICO Rescue also restores alveolar oxygen delivery and provides the same opportunities.

The Green Zone refers to any situation in which adequate alveolar oxygen delivery can be confirmed and the patient is no longer at imminent risk of critical hypoxia. This provides the clinical team with time to pause and consider the opportunities available to them before further instrumenting the airway.

Inability to intubate is an inconvenience. It is the loss of alveolar oxygen delivery resulting from repeated airway instrumentation that creates an emergency. Declaration that the Green Zone has been entered emphasises a key moment of situational awareness to the team. This has the potential to interrupt the process of repeated airway instrumentation that can convert the 'can oxygenate' situation into the 'can't oxygenate' situation.

The Vortex implementation tool is the core of the broader Vortex Approach which provides a comprehensive array of resources to facilitate all phases of airway advanced airway care including airway assessment, development of an airway strategy and performance of airway interventions in both the routine and emergency setting. The focus of the Vortex Approach is on providing "implementation tools" for real-time use during the process of airway management. In addition, it provides "foundation resources", to be referred to prior to undertaking airway management, that teach clinical teams how to use to use the Vortex Approach.

Implementation Tools – The Vortex Approach incorporates a suite of implementation tools designed to facilitate both the preparation and intervention phases of advanced airway care. These aim to present information in a manner that is simple enough to be accessible to teams during clinical practice. These adjunctive tools work in an integrated fashion with the primary Vortex tool using the same concepts and language.

Foundation Resources for the Vortex Approach – "implementation" tools will not be effective without prior familiarity and training to lay a foundation for their use. The Vortex Approach therefore provides a number of "foundation" resources that establish understanding of the

background principle specific to the Vortex Approach and proficiency in the team behaviours required for its successful implementation.

Technical Foundation Material – effective airway management requires that clinicians have a foundation in the requisite technical knowledge, skills and attitudes that make them competent to make appropriate decisions in response to the prompts provided by the Vortex and implement the chosen interventions. Although the resources of the Vortex Approach provide a limited amount of technical material, the bulk of this technical content should be derived from other recognised airway management resources and formal airway training programs. The Vortex Approach then provides a template to prompt team recall and application of this technical background material in real-time. Thus the Vortex Approach should not be viewed as an alternative to the major airway algorithms but as a complementary resource, designed to facilitate implementation of the management recommendations outlined by these training tools and improve the performance of clinical teams.

The Vortex serves to maximise opportunities to establish alveolar oxygen delivery by:

- Facilitating effective planning for airway management
- Facilitating efficient best efforts at each of the three upper airway lifelines.
- Encouraging appropriate decision making when any of these are successful and the Green Zone is entered.
- Promoting early priming for CICO Rescue as an airway crisis evolves.
- Facilitating rapid recognition of the need for CICO Rescue.

More free resources relating to the Vortex Approach can be found at VortexApproach.org