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CORRESPONDENCE

Emergency airway management: What are the roles for surgical cricothyroidotomy and the Ventrain® device?

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The National Audit Project 4 (NAP4) data[1] indicate a high failure rate for emergency airway rescue, which in my mind is not a surprise. Anesthesiologists and allied health practitioners encounter truly difficult airway scenarios infrequently - likely because of the inherently low risk of these scenarios and the practioners' individual competence and ingenuity. When the scenarios do arise, however, it is not always possible to control the context (i.e., planning, preparation, prevention) or the preferred path to take. The final common pathway for the management of a "can't intubate can't oxygenate" (CICO) airway emergency involves the time-sensitive creation of a surgical airway. The rarity and uniqueness of these events combined with the aggressiveness and unfamiliarity of the techniques proposed to address the CICO situation can generate significant stress and fear, which may impair both judgement and performance. The search for a universally optimal approach to this dilemma arguably remains in its relative infancy.

The NAP4 report[1] also states that the most common overall cause of adverse airway events is poor judgement. The conclusion of the NAP4 report is strengthened by observations and conclusions from a variety of other sources; recent Difficult Airway Society (DAS) guidelines,[2] recommendations from the Australian and New Zealand College of Anaesthetists (ANZCA),[3] and recent Canadian publications in the *Journal*.[4,5] These sources address this problem mainly by focusing on non-technical human factors: leadership, teamwork, communication, planning, preparation, practice. Identifying meaningful thresholds for transition during the dynamic process of airway management are key to ensuring effective, timely intervention. Rehearsal (both mental preparation and physical practice—simulated and real-time) consolidates everything. These concepts seem to me to be the crux of effective airway management.

The challenge of transitioning in a CICO scenario has been met in the DAS[2] guidelines by choosing to simplify the approach in the hope that it will result in better outcomes by eliminating any reference to needle cricothroidotomy. I am concerned, however, that the specific recommendations in DAS Plan D may amount to "wishful thinking." The plan focuses on eliminating the potential for life-threatening consequences of barotrauma associated with using a high-pressure insufflation technique.[1,2] This strategy may be counterproductive by concentrating efforts and resources on awareness of a guideline that depends too much on expert opinion and I fear may be interpreted as a standard of care. It focuses on attaining and then maintaining proficiency using an invasive technique (i.e., surgical cricothroidotomy) with which many anesthesiologists are not comfortable[4] and do not have an opportunity to practice. It promotes research and quality improvement of one invasive technique to the exclusion of other approaches.

The Ventrain device (Ventinova Medical B.V.; Eindhoven, The Netherlands) is based on concepts and skills familiar to most anesthesia practitioners.[6] The device (see Figure) is portable and can be adapted to virtually any hospital setting. It has proven efficacy for managing obstructed airways in adults and children,[6] and the technique can be practiced *in vitro*. In addition, perhaps most importantly, it can be used in routine cases (as a

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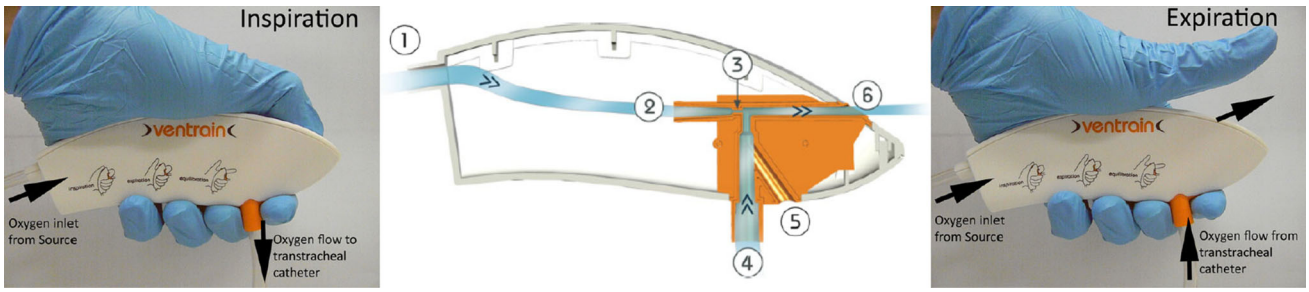

Figure The centre image is the cross section of the Ventrain®, showing the oxygen outlet source connected to the oxygen inlet port (1). In the centrepiece (orange), the diameter decreases from the inlet (2) to the jet nozzle (3), resulting in flow acceleration. Oxygen then enters the conically shaped exhaust pipe (4). If the bypass outlet (5), which functions as an on/off switch, is completely covered, active expiration is enabled (right image). If the exhaust pipe (6) is closed, airflow is directed through the side port (4) to the patient, enabling active inspiration (left image) through a transtracheal catheter. Images used with permission from Schmidt *et al.*[7]

simple jet ventilator), during which the practitioner gains experience with its use before it is needed in an emergency situation. It oxygenates and ventilates via a small-bore cannula.[6,7] The device can be linked to capnography and adapted to allow pressure measurements. It is not associated with the same risk of barotrauma that has been found with the use of other high-pressure jet ventilation techniques.[7] Its design overcomes previous limitations of low-pressure cannula ventilation by means of an active expiratory phase. I can imagine it being used as an early rescue device until definitive airway intervention is possible. Although not without limitations (that might require more extensive experience to fully understand),[6,7] I believe that awareness, familiarity, and availability of the device and the concepts it leverages could benefit patients greatly. It is certainly worth considering, and further research in this area is worth promoting and supporting. I also believe, most importantly, that awareness of, familiarity and proficiency with, and dissemination of the device will certainly be easier and quicker to achieve than a cultural shift that would be necessary to ensure maintaining competence with surgical cricothyroidotomy.

Conflicts of interest None declared.

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