Review / Update

# The use of visual and audible prompts and automatic ventilations as a means of improving layperson CPR performance

**Overview:**

There has been much debate over the concept of compression only CPR (CCPR) for out of hospital (OOH) cardiac arrest. CCPR is simple, easier to teach and more laypersons may be willing to undertake CCPR than the current compression/ventilation CPR (CVCPR). It has been often stated that the risk of cross infection from mouth-to-mouth (MTM) ventilation is the primary reason for lay persons not being willing to do CPR. However, in a 2006 study by Swor et al[1], fear of doing harm was the primary reason given with only 1% stating that MTM ventilation was their concern.

While studies are showing that CCPR may be as effective as CVCPR[2,3,4] for witnessed OOH cardiac arrest it does not provide any improvement in overall survival[5,6] which must be our fundamental goal in cardiac arrest management. There are also many patients that require ventilation, especially if the arrest is of a long duration (greater than a few minutes)[5,7] is un-witnessed, the cause of the arrest is asphyxiation or the victim is a child[8,9]. The need for ventilation to be provided, or not, is therefore not as black and white as current media reports may indicate.

Perhaps the problem lies then, not in the CCPR/CVCPR argument but in the provision of the necessary tools to laypersons to provide for an overall improvement in patient outcomes.

**Discussion:**

The use of CPR guidance, voice prompts, telephone directed CPR and other CPR adjuncts during training and actual cardiac arrests all seek to make the CPR process simpler and more effective. A review paper by Yeung et al[10] of some 28 clinically relevant papers concluded that "There is good evidence supporting the use of CPR feedback/prompt devices during CPR training to improve CPR skill retention. Their use in clinical practice as part of an overall strategy to improve CPR quality may be beneficial". It seems to be clear that laypersons are not totally afraid of doing CPR but are concerned that by so doing they may cause harm. It is logical to assume that a device which guides them through the CPR process and assists them in the timing of CPR would assist in overcoming that fear. However, perhaps visual and audible prompts are not sufficient, especially where MTM ventilation is concerned.

While MTM ventilation appears to be low down on the scale of things as to "why I won't do CPR", it is clear that providing ventilations is a very necessary part of the "Chain of Survival" for a significant number of patients. Professional responders are all trained to give ventilations and are provided with the tools to do so. Lay persons are given the option of using simple barrier devices to protect themselves from contamination. Even these however do not provide an effective means of facilitating the inflation of the patient's lungs. There is also the issue of the lower than ambient oxygen concentration provided by an expired air breath.

Professional responders utilize bag-valve-mask (BVM) resuscitators as the primary means to ventilate patients. These devices require a particular skill set and their efficacy is generally very poor, even in highly skilled hands. Automatic ventilators/resuscitators are the "gold standard" when it comes to ventilation and

O-Two Medical Technologies Inc.
45A Armthorpe Road Brampton, ON, Canada L6T 5M4
+1 905 792-6896 | +1 800 387 3405 Toll Free
+1 905 799 1339 Facsimile
www.otwo.com
resuscitation@otwo.com

are widely used around the world by those with a duty to respond, yet there have been no automatic devices manufactured for those who, by their limited training and even more limited opportunity to practice their skills, are the most in need of assistance when they are called upon to undertake life saving measures, the CPR trained lay persons. AEDs have revolutionized CPR by laypersons and yet overall survival rates have changed very little during the last decade. Perhaps it is now time to automate the CPR process further by providing lay person rescuers with automatic means of providing ventilations as well as visual and audible guidance in the performance of CPR.

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