

ARTICLES

Compression Only CPR - Are we singing the "Blues" for EMS?

The American Heart Associations recommendations for Compression Only CPR for lay personsⁱ may have a significant "Domino" effect for patient care by EMS crews arriving on scene. The strategy for dealing with the patient and the complications that may ensue from the lack of oxygenation that compression only CPR will provide comes into sharp focus. The old adage that "You can't start a blue heart" now becomes more of an issue. The AHA changes to the CPR algorithm seem to be based, not on strong science, but on fear-

Fear - By the lay rescuer of catching something by performing mouth to mouth resuscitation,

Fear -By the resuscitation community that people will continue to do nothing rather than attempt to perform the current CPR algorithm

Fear -That doing nothing will result in a decrease in survival rates.

Compression Only CPR is undoubtedly a compromise rather than a revision of protocols, based on clear scientific evidence that the change will result in an improvement in patient outcomes. On the 31st March 2008 the European Resuscitation Council rejected the evidence (put forward by the AHA in their Advisory Statement) on the following basisⁱⁱ:

"The recently published studies are uncontrolled, observational studies of experience dating from 1990 - 2003. Such studies are generally considered to be insufficient to enable definitive conclusions about the superiority or equivalence of any methods of CPR. The outcomes of these studies are still compatible with the hypothesis that the currently recommended combination of chest compressions combined with mouth-to-mouth ventilations is superior to chest compression-only CPR".

"At this moment a worldwide science evaluation process has been initiated to review all scientific data on resuscitation. ...it is appropriate to await the outcome of this process before new changes in the guidelines are recommended".

"There have been no studies published in which chest compression-only CPR has been compared with CPR performed according to the Guidelines 2005".

“It is not in the interest of the quality of CPR and of teaching to so many hundreds of thousands of potential rescuers, to introduce new changes while the current Guidelines are just being implemented. The resulting confusion will be counterproductive”.

“Ultimately, even if chest compression-only CPR is recommended, there will be several circumstances, in which ventilation remains critical. Such circumstances are un-witnessed cardiac arrest, cardiac arrest in children, most in-hospital cardiac arrests, cardiac arrest of non-cardiac origin such as drowning or airway obstruction, and during resuscitation attempts lasting more than approximately 4 minutes”.

“This list may not be complete. It is unlikely that lay rescuers will be able to identify, with confidence, these circumstances and, if taught to give only chest compressions, may provide CPR of inferior quality to many victims”.

What is certain is that the patient's condition, upon arrival of professional assistance in the pre-hospital environment, will certainly require a re-think of resuscitation protocols. Current strategies for the professional rescuer will need to initially focus much more on the quality of ventilations being provided (as well as the compressions). While the quality of ventilations provided by rescuers have always been assumed to be adequate, it will be imperative to ensure that the oxygen depletion, created by a prolonged period of no ventilations, is corrected during the first few minutes on scene. This is vitally important if the best conditions for defibrillation are to be provided. If defibrillation is not advised (which may well be the case depending on the response time) then ventilations and compressions, at the prescribed rates and volumes will need to be provided with even greater efficacy.

While manual resuscitators (commonly called Bag-Valve Resuscitators or AMBU bags) are the current mainstay of resuscitation by professional rescuers, their efficacy as a ventilating device has been brought into question in the last few years. **Inadvertent Hyperventilation** (the inadvertent or not deliberate delivery of an excessive minute volume) has been shown to be common. The reported detrimental affects of Inadvertent Hyperventilation are:

- [1] Gastric insufflation with a subsequent risk of aspiration of stomach contents^{iii,iv}.**
- [2] Decreased coronary perfusion pressure as excessive ventilation volume or stacked breaths reduce the venous return and decrease the heart's refill capability^v.**
- [3] Increased brain ischemia due to cerebral vasoconstriction caused by CO2 washout as high Ventilation rates are applied^{vi}.**

These issues create adverse conditions for the patient and may, in the words of two writers in the British journal, The Lancet may, - **"be contributing to the currently poor survival rates from Cardiac arrest"^{vii}.**

Better ventilation strategies and perhaps more reliance on technology rather than rescuer skill and training (which have also been brought into question) must be employed.

For the last 10 years automatic ventilation has been described as the “GOLD STANDARD” for resuscitation yet there are still very few emergency medical services in North America using these devices. Much of this is due to a false perception of the efficacy of standard Bag-Valve ventilation and the issue of capital expenditure in equipping a fleet of ambulances with automatic transport ventilators. The cost of these devices however

does not need to be prohibitive. The type of ventilator and associated features need to be explored to ensure that the devices chosen are not over specified for the job at hand.

For resuscitation and short term transport it is unnecessary to have a ventilator with multiple ventilation modes and alarms when all you are looking to replace is a Bag-Valve device (which of course has neither alarms nor ventilation modes)! Providing the device is time/volume cycled and has the capability to deliver 2 breaths followed by a pause of 20 seconds for chest compressions to be performed, then it will replace the Bag-Valve device. Note that **“Pressure cycled devices should not be used during CPR, as chest compressions will terminate flow and the patient may not be adequately ventilated”**.

Additional desirable features include adjustable rate and tidal volume, manual ventilation (for mask ventilated CPR and manual pressure support) and demand breathing for the patient in respiratory distress. For ease of use devices, with simultaneously adjustable tidal volume and frequency reduce the decision making time for the rescuer during the critical minutes of a resuscitation (Check our website for information and specifications on the CAREvent[®] ALS Automatic Transport Resuscitator for just such a device)!

New, flow controlling, Bag-Valve technology also exists that assists the rescuer in providing good quality manual ventilation without the risks of Inadvertent Hyperventilation. The SMART BAG[®] MO controls the flow of gas from the bag no matter how hard and fast the rescuer squeezes it. This reduces the airway pressure and subsequently reduces the risks associated with Inadvertent Hyperventilation. Check out our website - www.otwo.com for details on this unique and very exciting product.

Regardless of the application of compression only CPR or full CPR the quality of ventilations provided by the professional healthcare provider do need to be improved if patients are to be given a better chance of survival.

References

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