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emergency respiratory care

Articles

“The Problem of Inadvertent Hyperventilation” - Resolving With Technology Part I

Last month's newsletter reviewed the causes and affects of “Inadvertent Hyperventilation” during CPR when bag-valve-masks (BVM) are squeezed too hard and/or too fast. While improved or increased frequency of training is important, there are technological solutions that provide both patient and rescuer benefits.

The **SMART BAG[®] MO** BVM was developed to compensate for rescuers “Inadvertently Hyperventilating” patients causing gas to enter the stomach - **Gastric Insufflation** - (when ventilating with a face mask), reduced venous return to the heart and decreased coronary perfusion pressure. In addition, it addresses a “preference” in the pre-hospital market for using BVMs over other ventilation devices (e.g. automatic ventilators). It works by controlling the flow of gas from the balloon based both on how the rescuer squeezes and the compliance/resistance of the airway. With a proper slow squeeze, as recommended in the resuscitation guidelines, the **SMART BAG[®] MO** works like any other BVM. If too much pressure is applied on the bag however, a **Smart Valve** or piston incorporated into the BVM will move forward limiting the flow of gas. A minimum flow rate of 40 L/Min will always be provided (adult). A rescuer will know if they are applying too much pressure as the balloon will become stiffer and the **SmartValve** will become visible in the neck of the BVM. In affect, the **SMART BAG[®] MO** is providing real time training or instant feedback to how well the rescuer is ventilating. If a patient's airway is poorly compliant or restrictive, the **SmartValve** will balance against the increased airway pressure and will not move forward. This indicates that there is a problem in the patient's airway and under these circumstances the rescuer can apply higher pressures.

An **override switch** allows the rescuer to “lock out” or override the **SmartValve** during intubated CPR (when a much larger flowrate is required to deliver the breath in between chest compressions) or should the rescuer feel that the patient's condition requires it (in our studies however, there is no situation where the override switch is necessary except during intubated CPR).

The **SMART BAG[®] MO** has undergone a number of clinical studies that have demonstrated its superiority claim over conventional BVMs. One study of 191 EMS physicians demonstrated results of lower mean inspiratory airway pressure, lower mean ventilation rates and a 75% reduction in stomach inflation volumes. With a fairly simple technology, rescuers are provided with the ventilation device they prefer (BVM), with no change to protocols but are able to provide the patient with improved ventilation and reduced gastric insufflation.