Review / Update

USE OF THE SMART BAG® IN PROVIDING ASSISTED VENTILATIONS TO THE RESPIRATORY IMPAIRED PATIENT.

Patients in respiratory distress or those suffering from impaired lung function due to conditions such as Congestive Heart Failure, Pulmonary Edema, COPD, Asthma or Cystic Fibrosis may require support of their inspiratory efforts with a mechanical device.

One of the primary features of the SMART BAG® is its ability to balance its function based on the patient's respiratory parameters. If the patient's airway is less compliant or more restrictive higher airway pressures will be required to provide adequate ventilation. In responding to this increased pressure requirement in the patient's airway, the SMART BAG® decreases the resistance to flow from the BVM, balancing the pressure on either side of the SMART valve. This allows the required pressure to be exerted by the rescuer on the patient's airway to overcome the resistance/compliance problem and provide adequate ventilations.

In the patient with poor compliance the healthcare provider may wish to "top up" the patient's spontaneous breath by providing an additional tidal volume to that inspired by the patient. Under these circumstances the initial part of the patients inspiratory effort will cause the compliance to increase as air is sucked into the lungs by the action of the patient's diaphragm and intercostals muscles. As the patient nears the end of their inspiratory effort compliance will decrease back to their normal baseline level and it is at this point that the assisted ventilation will take over and provide the higher tidal volume delivery.

When using the SMART BAG® the valve will react to the rescuer's squeeze of the bag as it would with a patient with healthy lungs during the patient's inspiratory cycle. If the rescuer squeezes too hard the SMART valve will activate slowing down the delivered flowrate as the resistance to flow is decreased by the inspiratory effort made by the patient. It is therefore important that the rescuer provides the

correct, slow, controlled squeeze of the bag as the patient breathes in ensuring that the valve remains fully open.

As the patient's lungs near their normal capacity the flow patterns will change, the inspiratory flow will decrease as will the lung compliance. As this occurs the operators delivered volume will supplement the inspired tidal volume and provide the additional volume required. Because the compliance is decreasing the SMART valve will react to this and remain open "providing the rescuer is squeezing the bag correctly". If the bag is over squeezed and the airway pressure generated by the increased flow exceeds that required to provide adequate ventilation then the valve will close down the flow. Remember, the valve never closes completely so continued ventilation is always possible even with the SMART valve fully activated.

NOTE: The only reason that the valve will activate is if the bag is squeezed too hard.

We have evaluated the SMART BAG® under the circumstance of assisted ventilation against a mechanical lung model that provides an inspiratory effort and have then provided assisted ventilations. When properly squeezed the SMART Valve does not activate and the desired additional tidal volumes can be provided.

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Remember that the SMART BAG® will only allow you to apply higher flowrates and airway pressures when the patient's airway condition requires them. You will "feel" this change in compliance and resistance as the SMART BAG® allows the higher flowrates and airway pressures to be generated.

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