

Effectiveness Study of The HALO® Vent™ Utilizing A Standardized Spontaneously Breathing Open Pneumothorax Swine Model.

Dennis J. Kelly, MS, Kari L. Scantlebury, MD



Objective

The primary objective is to determine if the HALO Vent can prevent the development of a tension hemopneumothorax in a swine patient model with open chest wall trauma.

Methods

To evaluate the effectiveness of the HALO Vent, communicating chest wall injuries were created in anesthetized spontaneously breathing swine models (n=6). The HALO Vent was applied over the injury, followed by serial air injections (60 mL) into the chest cavity to a maximum volume of 50 mL/kg (Avg. 1106.2 mL ± 146 mL), followed by an autologous blood infusion into the chest cavity representing approximately 10% of the subjects estimated blood volume (184.5 mL ± 22.5 mL). Throughout procedures, subjects were monitored for hemodynamic shifts signifying the development of tension physiology defined as a decrease in mean arterial pressure (MAP) by 20% from baseline, or an increase in heart rate by 20% from baseline.

Results

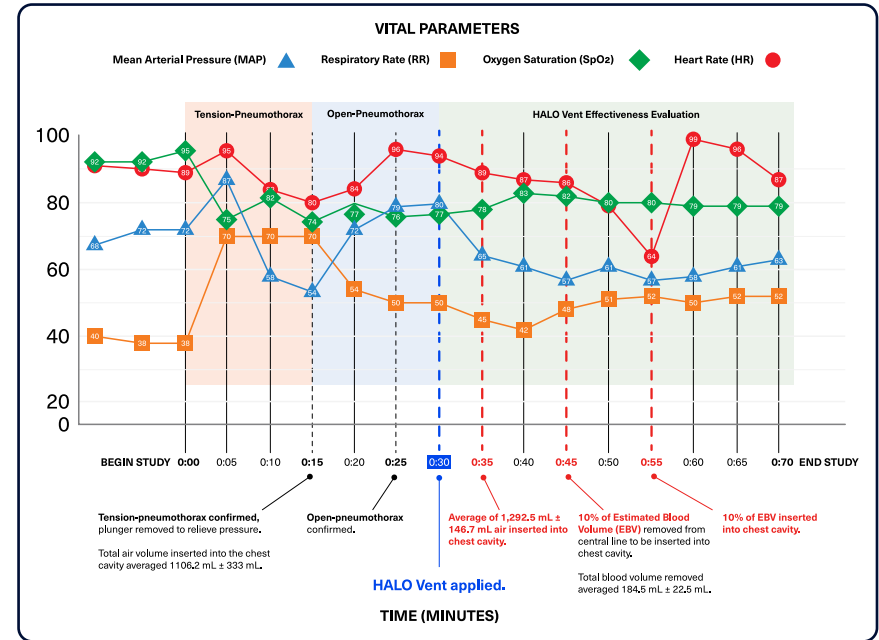
Treatment of open pneumothorax with the HALO Vent stimulated the stabilization of poorly trending hemodynamic parameters in all subjects, and successfully prevented the development of tension hemopneumothorax with ensuing circulatory instability and traumatic arrest.

Conclusion

The HALO Vent was evaluated for its ability to effectively vent air and blood in the presence of a tension hemopneumothorax. The subjects tolerance to procedures and resultant hemodynamic stability with the HALO Vent applied produced data that suggests that the HALO Vent offers superior protection against the development of tension physiology in casualties with penetrating or blunt force thoracic trauma.

KEY WORDS: vented chest seals; chest seals; occlusive dressing; prehospital chest trauma; tension-pneumothorax; tension-hemopneumothorax; swine model

Performance Overview



Observe **valve function** vacuuming down around open chest injury during inhalation.



Observe **valve function** expansion during exhalation.

All research was conducted in compliance with the Animal Welfare Act and adhered to the principles in the Guide for the Care and Use of Laboratory Animals: Eighth Edition. The facility conducting the study maintains full accreditation by the Association for Assessment and Accreditation of Laboratory Animal Care International.

