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Reduction of ventilator associated pneumonia using the AnapnoGuard system

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INTRODUCTION

Ventilator Associated Pneumonia (VAP) is a common complication in mechanically ventilated patients. VAP causes significant morbidity and mortality, drives increased cost of healthcare and significant antibiotic usage. Frequently the pathogens responsible for this pneumonia derive from aspirated secretions of the upper respiratory tract or the stomach. In order to prevent aspiration, two missions should be attained: a good tracheal cuff seal with a well tolerated pressure, together with continuous evacuation of secretions from the subglottic space. These two goals can be achieved using the AnapnoGuard system (Hospitech Respiration Ltd.) and its related Endo Tracheal Tube (ETT).

METHOD

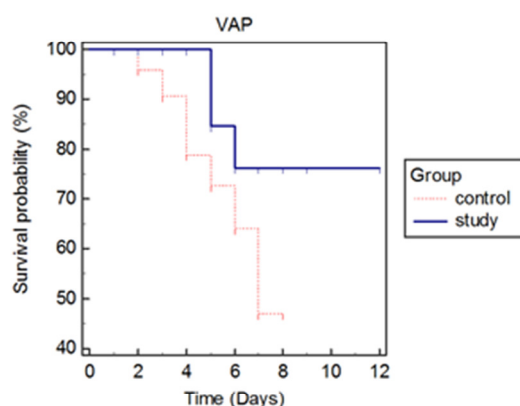
A single center, open label study in a general intensive care unit. Control Group: (Retrospective data). Mechanically ventilated patients on standard of care regular ETT, manual suction of the trachea and oral-pharyngeal space by nursing staff. Study group: (Prospective data), patients with a specialized ETT connected at all times to the AnapnoGuard system. The AnapnoGuard system is a new ventilation guard system that includes: An ETT with two above-the-cuff suction ports and a third port & lumen for rinsing and CO₂ measurement. A triple lumen harness is connected to a control system designed to measure CO₂ levels above the cuff (to identify leaks), inflate the cuff accordingly, rinse and suction secretions above the cuff. To be included in the study patients had to have no pneumonia on admission and at least 3 days of mechanical ventilation. VAP was diagnosed for a new chest X-Ray infiltrate accompanied by fever, leukocytosis and positive sputum culture. The study was approved by the hospital IRB.

RESULTS

Control Group: 100 patients who received standard intubation and treatment in 2009-10. Of these, 4 dropped out due screening failure of pneumonia on day of enrollment. Study group: In 2011-14, 192 patients were screened. Of these, 49 were found eligible and were enrolled. Of these, 14 dropped out (4 screening failures with pneumonia on day of enrollment and 10 withdrawals with MV of less than 24 hours). Mean age 51 (control) and 49 (study). Males 75% of both groups and mean weight 81 kg in both.

1.VAP

VAP was diagnosed in 26 (27%) of controls and only 3 (8.5%) of the study group ($p=0.03$). Mean time from admission to VAP diagnosis was 4.7 days in controls Vs. 5.12 Study (NS). The Kaplan-Meier survival curves, represent the probability (Y-axis) of surviving at a given length of time (X-axis). A separation occurs at two days and stays throughout 12 days of mechanical ventilation.



2. Safety

No serious adverse events occurred.

CONCLUSIONS

Patients connected to the AnapnoGuard system demonstrated a statistically significant lower VAP rate compared to the control group (8.5% vs. 27% respectively, $P=0.03$). The estimated relative risk of VAP occurring in the control group was more than 3 times higher than the study group. Study results through 12 mechanical ventilation days in the ICU, demonstrate a reduction effect of the AnapnoGuard system on the occurrence of ventilator associated pneumonia compared to the standard of care. Rinsing and aspiration of sub-glottic secretions combined with cuff pressure and seal management may be an effective method to prevent VAP.