

DECREASING DURATION of MECHANICAL VENTILATION with endOclear®

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INTRODUCTION

During mechanical ventilation, management of the critical patient can be a challenge in the Intensive Care Unit (ICU). Complications include an increased amount of secretions adhering to the endotracheal tube (ETT), which causes higher peak inspiratory pressures (PIP) and airway resistance (Raw) making it difficult for patients to tolerate weaning from mechanical ventilation. Regular ETT suctioning is generally done to remove secretions, but this can be ineffective, resulting in residual biofilm. Biofilm contains potentially pathogenic bacteria for the lung and is always present in intubated patients, regardless of the duration of mechanical ventilation (Danin et al., 2015). The presence of biofilm may cause increased airway resistance and prevent early extubation.

The objective of this study was to determine the benefits of cleaning the ETT using the endOclear®Restore™ device. This device is a rigid, sterile single use, manually operated wiper designed to effectively remove ETT secretions quickly and efficiently to maintain airway patency. According to Mietto et al. (2014), the process of insertion, activation and clearing of the ETT, using endOclear®Restore™, requires only 3-5 seconds and collected secretions are trapped inside of the device connector making the whole system disposable. Therefore, this easy to use airway clearance device has the potential to minimize the complications associated with mechanical ventilation.

METHODS

An IRB exempt, 2-year retrospective, observational single center study was conducted to evaluate the efficacy of cleaning the ETT with endOclear® after regular ETT suctioning and oral care had been completed. Ventilation day data was collected prior to using endOclear® on 374 subjects and post data collected on 336 subjects. Subjects included in the study were admitted into our adult Medical/Surgical/Neuro ICU and intubated with an ETT while on mechanical ventilation (MV). Exclusion criteria included patients admitted for coronary artery bypass grafting, cardiac valve replacement, tracheostomy and patients younger than 18 years of age. The measurements obtained before and after cleaning the ETT were PIP (362 observations) and Raw (352 observations) using the paired t-Test to compare sample means.

RESULTS

Data from this 2-year study revealed that the average duration of MV decreased from 2.85 to 2.42 days (0.43 ± 1.58 , $p < 0.01$), PIP was decreased from 26.2 to 24.9 cmH₂O (1.3 ± 3.9 , $p < 0.01$) and Raw was decreased from 17.3 to 15.8 cmH₂O/L/sec (1.5 ± 4.2 , $p < 0.01$) with the use of endOclear®. Data is presented as mean \pm SD.

TIME FRAME:

- Baseline Data: July 1, 2014 to June 30, 2015
- New Process Data: July 1, 2016 to June 30, 2017

CONCLUSIONS

This study revealed that cleaning the ETT using the endOclear® Restore™ device, after regular ETT suctioning and oral care had already been completed, effectively reduced the average duration of mechanical ventilation. The removal of adherent secretions and residual biofilm also dramatically decreased peak inspiratory pressure and airway resistance, which assisted in decreasing patients' work of breathing.

TABLE 1 Pre and Post endOclear® Usage Comparison

Parameter	Before	After
Average Duration of MV	2.85	2.42
PIP	26.2	24.9
Raw	17.3	15.8

The endOclear® Restore™ device was used to clean patients' ETTs, which helped to minimize biofilm formation and maintain airway patency.

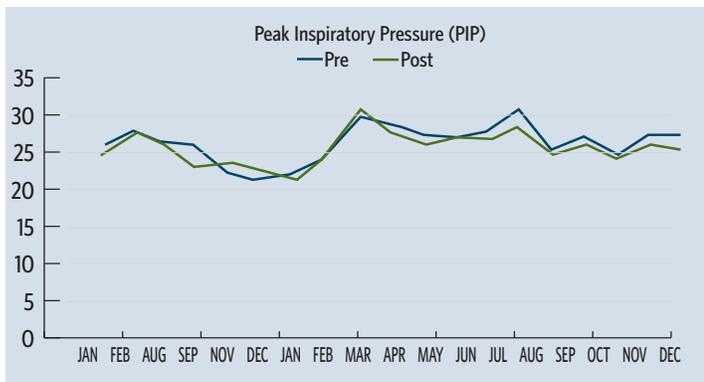


FIGURE 2 PIP before and after use of endOclear®.

Peak Inspiratory Pressure (PIP). The highest amount of pressure applied to the lungs during inhalation.

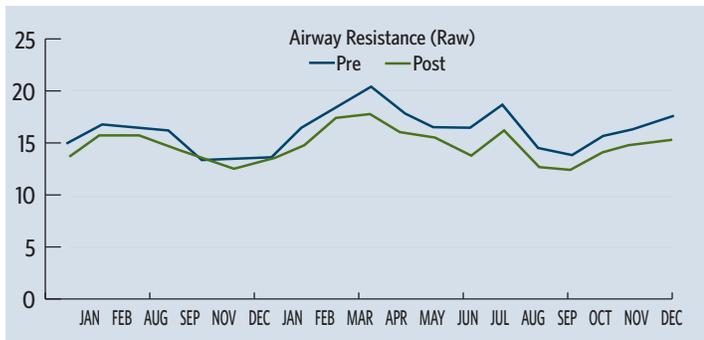
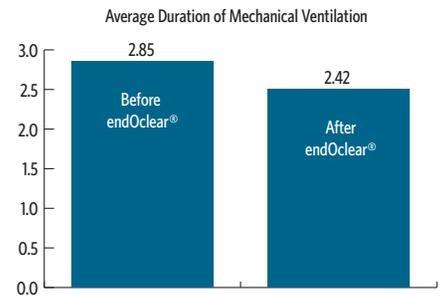


FIGURE 3 Raw before and after use of endOclear® measured in centimeters of water pressure per liter per second.

Airway Resistance (Raw) A concept in respiratory physiology that describes the resistance of the respiratory tract to airflow during inspiration and expiration.

FIGURE 1

Total time spent on mechanical ventilation measured in days.



REFERENCES

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