AN EVOLUTION IN AIRWAY MANAGEMENT

By Dr. Richard Ma, Chief Medical Advisor

Air management via tracheostomy has been documented in Hindu literature from 2000 BC. In 1878, the first elective endotracheal tube placement was documented with anesthesia. During the First World War, the intubation and tracheostomy were widely performed. It was during this period that the superiority of intubation over tracheostomy was established. The specialty of anesthesiology was developed.

Oxygen is essential to life, and our brains are hardwired to panic when we develop shortness of breath. Having been in healthcare for more than 20 years, I have seen my share of respiratory failure and the difficulty of establishing an airway. Other than an anesthesiologist, most health care providers have as much fear as the patient when confronted with establishing an airway in patients in distress. Studies have shown that the success of intubation is around 74% on the first attempt. The overall success rate is about 97%, but with each successive attempt the patient has longer periods of hypoxemia. It is widely established that intubation is operator dependent. Complications of intubation include teeth extraction, vocal cord damage, tracheal stenosis, and vocal cord paralysis.

BUILDING ON KNOW HOW

In 1981, Dr. Archie Brain developed the laryngeal mask airway (LMA) to make the process of establishing an airway easier. He was inspired to do this after having difficulty with intubating a patient. The LMA is easier to place because it is done without having to visualize the vocal folds. Once inserted, it is inflated to block off the esophagus so that patients can be adequately oxygenated. Using the LMA avoids many of the complications of endotracheal intubation.

Complications of LMA include laryngeal spasm, sore throat, nerve injury, and pharyngeal rupture. Studies have shown that the success rates of intubation on the first try with LMA is around 81 percent.

The aerFree AMS (airway management system) device was recently invented as a non-invasive method to maintain a patient airway, in spontaneously breathing adults undergoing medical procedures less than 2 hours in duration where the patient is intended to have mild-to-moderate sedation. The aerFree device is a simple device applied to the anterior aspect of a patient's neck. Once the device is placed on the neck, constant negative pressure is applied to keep the airway patent. This device is very simple to use and the only complication is mild irritation of the skin of some patients from the pressure.

EASING VOLUME-DRIVEN STRAIN

Our healthcare system is currently overburdened and the wait time for appointments and procedures are excessively long. I see the aerFree device as one of the solutions to the long wait times. Using this device, you can have a nurse place it on a patient for short surgical procedures. This will make surgical centers more efficient because it will free up the anesthesiologist to take care of more complex patients. If intubation or LMA is used in the same cases, then the start time is delayed by waiting for the anesthesiologist to be free.

Further, when a procedure is done, the patient must wait for the anesthesiologist to remove the airway. If each case can be shortened more patients can get procedures on the same day. Also, the longer a patient is sedated, the more complications they will have with anesthesia. Shortening the duration of cases will lead to better care, less complications, and improving the wait times for procedures. Even though most cases are elective, many are done to screen for cancer. Minimizing any delay in treatment can greatly increase a patient's chance of survival.

EFFICACY OF NEGATIVE PRESSURE THERAPY

Respiratory complications during moderate sedation are reported to be infrequent. However, the true incidence of respiratory impairment may be underestimated by relying on pulse oximetry as the sole measure of respiratory function in patients receiving supplemental oxygen. An open label pilot study was conducted to, 1) determine the frequency of apneas and oxygen desaturation during routine colonoscopy as assessed by a Nox T3 monitoring system (Nox Medical), and 2) investigate the effects of negative pressure therapy applied to the upper airway using aerFree AMS. Twenty-four control subjects were enrolled to assess the frequency of apneas and hypopneas ≥ 30 sec. Thirty subjects were studied with the application of aerFree AMS. The two groups were similar with respect to age, sex, BMI, STOPBang scores and sedation dosage. The results are summarized below:

	Control (n=24)	aerFree (n=30)
Mean Apnea Hypopnea Index (range)	12.9 (0-42.4)	4.1 (0-18)
% of subjects with Obstructive Apnea (OA)	87.5	10
Mean episodes of OA/subject	2.9	0.1
% of subjects with O_2 desaturation ≥ 5 mm for ≥ 30 sec	54	12.5
% of subjects with O_2 saturation < 90%	30	13.3
% of subjects requiring increase in O_2	41.6	10

These observations suggest that obstructive and central apneas are common during moderate sedation. The application of aerFree AMS is a safe and effective means of diminishing obstructive apneas and improving oxygenation.

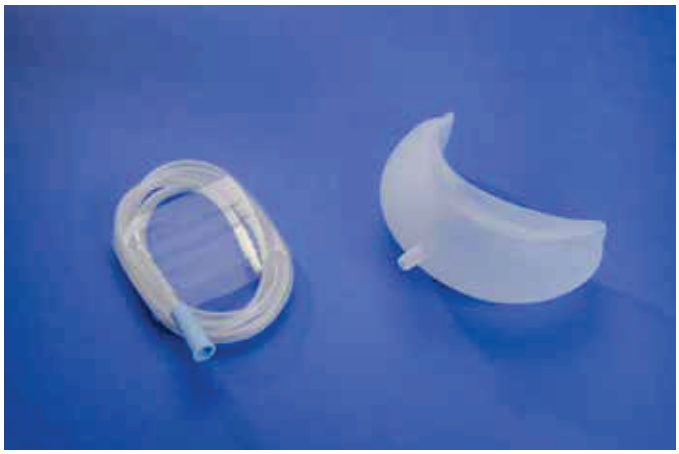
NEW INNOVATION

aerfree® AMS

Airway Management System

First Non-Invasive External Airway Aid

FDA Cleared



Avoid Airway Issues Before They Start

Clinical Benefits

Non-Invasive Airway Patency Support: May eliminate invasive interventions during sedation
Easy to Use: Applies to patient in seconds
Simple: Minimal training required. May be used by personnel of all experience levels
Effective: Used prophylactically, reduces the occurrence of upper airway collapse
Improves patient safety and comfort
Hands-Free Chin Lift: Decreases interventions which can disrupt workflow

Clinical Evidence

Clinical Study: Conducted at Scripps Clinic, La Jolla, California, utilizing aerFree AMS during screening colonoscopy procedures.

Conclusion: During screening colonoscopy, sedation-related respiratory impairment is significantly reduced by aerFree AMS.[1]

Study published in Endoscopy, June 2016

45% reduction in respiratory impairment
92% reduction in obstructive apneas >20 sec.
82% fewer patients with obstructive apneas
76% fewer patients required supplemental 0_2

For more information, visit our website at www.aerfree.com.

[1]Kais, S.S., Klein, K.B., Rose, R.M., Endemann, S., Coyle, W.J. (2016). Continuous negative external pressure (cNEP) reduces respiratory impairment during screening colonoscopy: a pilot study. Endoscopy 48(6), 584-587.

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