

Optimizing Care for Patients with Artificial Airways

by Michael S. Harrell, BS, RRT

The goal of medical intervention is to return an individual to optimal health and function. When planning care management, the interventions should cause the least possible interference with the body's healing processes. This premise should provide the guiding principles in developing the care plan for individuals requiring the placement of an artificial airway. This can become a complex decision-making maze when the multiple factors involved in the care of the individual with an artificial airway are considered. There is no one "right" way to manage this care plan. Each individual must be assessed and a specific plan adopted on an ongoing basis. The purpose here is to provide several points for consideration in the development of an effective care plan.

How long?

The optimal duration for nasal or oral endotracheal intubation prior to performing a tracheotomy has been discussed and studied for many years. Many opinions remain, and this short discussion will not likely settle the debate. There are, however, several important issues that must be considered when developing the care plan.

The primary considerations must involve safety, effectiveness, comfort, and communication. Studies have shown that mortality and morbidity is minimal for both endotracheal intubation and tracheostomy, indicating that a properly performed tracheostomy is a safe procedure and may hold no more risk than endotracheal intubation.¹

The act of performing endotracheal intubation, as well as

the presence of the tube, present significant risks, including infection, aspiration, damage to the tissues of the airway, and short-term and permanent damage to the vocal folds.² The potential for aspiration as well as for various types of infection are common to both endotracheal intubation and tracheostomy.

Current research is pointing to evidence that the presence of an endotracheal tube for longer than seven days significantly increases the risk of permanent damage to the upper airways and the vocal folds.³ In addition, recent studies are showing significant reductions to the cost of care when a tracheostomy is done within the first seven days. One significant contributing factor to this cost reduction is that the removal from mechani-

cal ventilatory support is quicker once a tracheostomy is placed.

What procedure should be used?

Two basic types of procedures may be used. The traditional approach is the surgical transection of the trachea with the placement of the tracheostomy tube. The percutaneous insertion of a tracheostomy tube is gaining acceptance. This procedure does not require a trip to the surgical suite, and only local anesthesia is used. It is less costly and can be done without transporting the patient.

Considerable debate has occurred over the safety of the percutaneous procedure. Bleed-

ing has been an issue. Concern has also been raised about the level of skill of those performing the percutaneous procedure. The literature on this subject indicates that the percutaneous procedure can be done safely by

tracheostomy that will be cared for in the home will be different than the tracheostomy cared for in the hospital.

The standard tracheostomy tube has a low pressure cuff and is constructed of some type of

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adequately trained and competent practitioners. Because the procedure can be easily scheduled and can be performed by a broad range of physicians, the percutaneous insertion of a tracheostomy tube may make the procedure more accessible, facilitating timely placement of the tube.

Some individuals will not be candidates for the percutaneous procedure, and the clinical situation must be assessed as the care plan is being developed.

What type of tracheostomy tube?

Myriad types of tracheostomy tubes exist. Before selecting the tube to be used, consider the reason for the tracheostomy. A permanent tracheostomy must be considered differently from the tracheostomy performed for acute, short-term reasons. The

synthetic material. The tube may or may not have an inner cannula. The inner cannula is present for cleaning and maintenance purposes. The disposable inner cannula may be easier to take care of, but the permanent inner cannula may be less costly to maintain over a period of time. The skill level of the individuals caring for the tube must also be considered when making this decision.

The cuff is present to direct the flow of air to the lungs. It also has the role of obstructing the entry of large quantities of material into the lungs. Aspiration is defined as the penetration of material below the vocal folds. By this definition, the cuff cannot prevent aspiration. Also, when fluid rests on the cuff, it cannot help but leak around the cuff and enter the lungs. The closure of the vocal folds is the pri-



mary protection for the lower airways.

The need for a cuff must be evaluated. If the cuff is not required, an uncuffed tube should be used. The fenestrated tube is intended to restore speech. The fenestration or “window” in the distal end of the tube may encourage granulomatous tissue growth. Plugging with secretions may also be a consideration. An alternative is the use of an uncuffed tube with a speaking valve. When placing the uncuffed tube, it may be most appropriate to downsize from the original tracheostomy tube.

The use of a speaking valve has a few significant advantages. The restoration of speech can return the individual to active participation in their own health care. Communication has real value in physical and emotional well-being. This is often an overlooked value in the care of patients with artificial airways.

The speaking valve can be placed in line with a mechanical ventilator, and the acute critical care setting does not preclude its use. If an individual can tolerate cuff deflation, even for a short period, that individual can be considered as a potential candidate for the use of a speaking valve.

The placement of a tracheostomy tube presents a leak in a naturally closed system. The function of the vocal folds in this regard is bypassed. When the speaking valve is put in place, the system is returned to its naturally closed state. Swallowing becomes closer to normal, and the likelihood of aspiration can be significantly reduced.⁴

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additional reading

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What kind of weaning process?

The weaning process from the artificial airway can vary from “sink or swim” to prolonged neglect and should be based on individual needs. Each patient’s requirements will be different, and assessment and planning must be given to the process of weaning. Once a tracheostomy tube has been placed, normal functions of the upper airway are compromised. Before removal of the tube, these functions must be evaluated.

In assessing upper airway functions, the length of time that the tracheostomy tube has been in place must be considered. Before decannulation, the effectiveness of the swallow must be evaluated, preferably by fiberoptic endoscopic evaluation of swallowing (FEES) or video-fluoroscopic swallow study (VFSS). The effectiveness of cough for airway clearance is

another important factor to be considered prior to removing the tracheostomy tube.

With the tracheostomy tube in place, a speaking valve can help in the assessment of upper airway function. Positive closure means that the valve returns to the closed position when airflow into the airway ceases. No pressure is required to close the valve.

Once cuff deflation can be tolerated, the clinician can use a cuffless tracheostomy tube of a smaller size and gradually increase the individual’s dependence on the upper airway. Just as unused respiratory muscles require strengthening during weaning from mechanical ventilatory support, so is the same strengthening required in many situations related to restoring the use of the upper airways.

If the stoma must be kept open, but no tube is required, various types of buttons are available for this purpose. Indi-

viduals who have undergone laryngectomies require a tube specifically designed for this purpose.

Once decannulation has been accomplished, the clinician should assess the individual on an ongoing basis for adequate swallowing function, airway clearance, and phonation. It is also important for the individual to have adequate vocal fold function in order to create the necessary subglottic pressure for defecation and lower airway protection.

Who should participate in the care plan?

When an artificial airway is placed, whether it is an endotracheal tube or tracheostomy, multiple functions of the individual are affected. The care team should include at least the primary physician, respiratory therapists, nursing, and speech and language pathology professionals. To consistently maintain positive outcomes for individuals requiring the placement of an artificial airway, it is important to develop individu-

alized care-management plans based on interdisciplinary assessment. Viewing the use of an artificial airway as a process rather than a procedure or device is a significant step in the right direction toward successful management of the care plan. 🧠

Michael Harrell is assistant director of cardiopulmonary services at Charlotte Regional Medical Center in Punta Gorda, FL. He is also president of the Florida Society for Respiratory Care.