Ensuring Quality Care for Infant Tracheostomy Patients

by Mike Czervinske, RRT

Infant and pediatric tracheostomy tubes seem to bring out the extremes in managing a patient requiring a tracheotomy. In particular, infant tubes usually seem too long or too short, too deep or too shallow, and seldom wide enough. Add to these concerns a short fat neck, copious secretions, and the excessive movement of an agitated infant, and the risk factors for a disaster are multiplied.

Depending on how recently the study was made and considering varying factors in the population investigated, a mortality rate of zero percent to 40 percent has been reported for tracheostomized infants. Occlusion and accidental decannulation are implicated in all of the studies as being the most significant cause of mortality. Centers with better caregiver education and more experience tend to fare better.1–8

There are no real cures to the difficulties encountered in a tracheostomized infant, but knowledge about the potential problems and peculiarities of the equipment is the best weapon to prevent a tragedy. This two-part series of “Clinical Perspectives” examines some of the issues related to infant tracheostomy. This article concentrates on monitoring and factors related to the anatomy of the neck. Part 2 will examine issues related to tube construction, other factors related to tube occlusion, and some other issues.

Monitoring

Good hygiene, vigilance, and supervision are the important ingredients to assure the best outcome. An apnea monitor may be beneficial. The general notion is that some form of monitor is better than no monitor. However, vigorous abdominal movements are often present during airway occlusion that will prevent the monitor from alarming when no airflow is present. Once significant oxygen desaturation has already occurred, the bradycardia alarm will sound.

Another helpful monitor is a pulse oximeter with alarms. Remember though, once bradycardia or oxygen desaturation has dropped sufficiently to alert the caregiver, there was a significant period of no airflow preceding the alarm. A capnometer with an alarm may be helpful; and as technology makes it more portable, this offers an alarm for no airflow. However, the attachment hardware may be cumbersome.
Monitors are prone to false alarms from excess activity or agitation frequently seen in babies. It is critical to emphasize that persistent agitation is an important sign of partial airway occlusion, and an infant should never be ignored or sedated without first assessing the airway.

**Neck anatomy and hygiene**

The anatomy of an infant’s neck and airway presents several challenges. An infant with poor head control can occlude the tracheostomy tube opening with its chin or a roll of fat from its neck when the head is tilted forward. A tracheostomy mask or some other device, like a heat and moisture exchanger or oxygen tubing adapter, may be used to shield the tracheostomy tube from this type of occlusion. There is a device specifically designed for this purpose, the Tilson Trach Guard (Beevers Manufacturing and Supply, McMinnville, OR). It is a plastic cage-like structure that fits over the trach adapter to prevent objects occluding or being inserted into the trach. If not applied properly, or securely, the devices mentioned above may also cause occlusion. Good positioning and watchful supervision help prevent this from happening.

In addition to occlusion, the short neck of an infant also makes it difficult to secure the tube. Generally, caregivers are taught that it is too tight if they can slide two fingers under the ties. This may not always be appropriate for an infant’s neck. The ties should be tied securely enough to prevent the tube from moving without pinching or binding the neck. Always remember to check the posterior neck or under any hair on the back of the neck. In addition to this possibility, the construction of some infant tracheostomy flanges allows the tracheostomy tube to curl out of the stoma site by twirling on the ties. This is especially true if the caregiver substitutes shoestrings or some other material thinner than twill tape.

Hygiene is another concern, especially if the infant is prone to secretions. The anatomy of the neck causes the area to stay wet and traps secretions in the skin folds of the neck. Irritation and skin breakdown causes infection and pain. In addition to the discomfort, this problem also creates difficulties in trying to secure the tube. Thorough and frequent cleaning is always indicated. Swabbing the area with antibiotic solutions or a hydrogen peroxide

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**references**

and water mixture keeps the neck clean and prevents skin breakdown. However, these should be used cautiously around the stoma site since hydrogen peroxide mixed with mucus creates a viscous foam that is difficult to remove from the airway. Thorough drying is essential in preventing skin breakdown and stoma irritation.

Fortunately, there are several products on the market that use felt and hook-and-loop fasteners to help secure the tube around the neck. The construction of these products alleviates many of the disadvantages to using conventional twill tape. Though they are not excessively expensive, the safety and hygiene advantages outweigh any increase in cost. Also, clear plastic adhesive and enteral stoma products may also be useful in protecting open wound areas created by friction from the ties or tracheostomy tube.

There are several major vectors for occluding a tracheostomized airway in an infant or child. This article covered two of these issues: monitoring and the peculiarities of the infant neck. Awareness of these problems allows the clinician to properly educate the caregiver. The next part of this series will continue with information on tube construction and other issues that, again, will help educate caregivers to address the less obvious difficulties related to infant tracheostomy. Caregiver awareness of these critical issues has been shown to significantly improve patient outcome.49

Mike Czervinske is a faculty member in the respiratory care education program at the University of Kansas Medical Center in Kansas City, KS.