Early Tracheostomy Tube Change in Children

Ellen S. Deutsch, MD

Objective: To review the safety of early tracheostomy tube change in children.

Design: Retrospective case series.

Setting: Pediatric tertiary care hospital.

Patients: Twenty-one consecutive pediatric patients undergoing routine tracheotomy.

Intervention: First tracheostomy tube change performed at patient's bedside at 3 (n = 15) or 4 (n = 5) days after surgery.

Outcome Measure: The ability to safely change a tracheostomy tube at the patient's bedside 3 or 4 days after surgery.

Results: The first tracheostomy tube change was safely performed at 3 or 4 days after surgery in 20 patients. All changes were accomplished without complication or difficulty on the first attempt. The patients' ages ranged from 4 days to 16 years. The smallest child weighed 1.6 kg. Early tracheostomy tube change was not attempted in one obese 10-year-old girl whose pediatric tracheostomy tube became dislodged and formed a false tract 2 days after surgery.

Conclusions: Most pediatric tracheostomy tubes can be safely changed at the patient's bedside approximately 3 days after surgery. Clinical applications of early tracheostomy tube change may include facilitating better hygiene, earlier completion of family caregiver tracheotomy education, and shorter hospital stays. It appears safe and advantageous for surgeons to consider early initial tracheostomy tube change for pediatric patients.


The decision of when to perform the first tracheostomy tube change after tracheotomy in children is often based on tradition and the surgeon's convenience. Determining the shortest postoperative interval necessary before the first tracheostomy tube change can be safely undertaken may facilitate shorter hospital stays, earlier family caregiver training, and better hygiene. Typically, the first tracheostomy tube change is performed by the surgeon, to confirm that the stoma has healed sufficiently so that nurses or other trained personnel can safely perform interval tracheostomy tube changes without the operating surgeon's direct supervision. Often, surgeons allow fresh tracheotomy stomas to heal for 5 to 7 days before performing the initial change.1,2 Some perform the first tube change in the operating room with a bronchoscope in place.3

The first tracheostomy tube change was safely performed at 3 (n = 15) or 4 (n = 5) days after routine tracheotomy procedures in 20 of 21 consecutive pediatric patients (Figure). The patients ranged in age from 4 days to 16 years. The average age at tracheotomy was 49 months, and 10 of the children were younger than 1 year. The smallest child weighed 1.6 kg, and the youngest child was 4 days old at the time of surgery. Most children underwent tracheotomy for ventilator dependence or to alleviate chronic or acute airway obstruction.

Early tracheostomy tube change was not attempted in 1 patient, an obese, severely developmentally delayed 10-year-old girl who underwent tracheotomy for chronic upper airway obstruction. A pediatric tracheostomy tube (Shiley Pediatric 5, old size designation, Mallinckrodt Medical TPI Inc, Irvine, Calif) was placed, but 2 days after surgery the tube became dislodged and formed a false tract. The patient developed subcutaneous air, pneumothorax, and respiratory distress. Her tracheostomy tube could not be replaced at bedside, so she was taken to the operating room, where a general anesthetic was administered and a longer tracheostomy tube (Shiley Adult 4, Mallinckrodt...
PATIENTS AND METHODS

The records of 21 consecutive patients who had undergone routine tracheotomy were reviewed. Data collected included the date of surgery, date of first tracheostomy tube change, and occurrence of complications related to the tracheostomy tube change. The age of the patient at the time of surgery was recorded in days for children younger than 1 month and in months for children older than 1 month. The weight of the smallest patient was determined.

A standard pediatric tracheotomy was performed with a horizontal skin incision, a vertical tracheal incision, and placement of bilateral perichondrial stay sutures, which were taped to the chest. Tracheal cartilage was not excised, nor were cartilage flaps or tracheostomy flanges sutured to the skin.

Patients were kept in the neonatal, pediatric, or step-down intensive care unit at least until the first tracheostomy tube change. Tracheostomy tube changes were performed at bedside, with a nurse or resident physician assisting with positioning and restraint of the patient. Suction equipment and a spare tracheostomy tube were available at bedside. Patients were suctioned as needed prior to the tube change, and positioned with neck extension. New tracheostomy tubes of the same brand, model, and size as the original tubes were inserted with the tracheostomy tube obturator in the lumen of the new tube; the obturator was removed immediately after successful insertion of the tube. Tracheostomy tubes were not changed over a catheter, although equipment for this was available at bedside. Stay sutures were removed after the tube change. Feedings were not restricted before the procedure.

Medical TPI Inc) was easily placed. The tube was electively changed uneventfully 7 days later, without complication.

COMMENT

Determining the shortest interval after surgery for a safe tracheostomy tube change offers several benefits. If the patient is to be cared for at home, it will take less time before the parents can begin to practice changing the tube themselves. If the child is to be transferred to a rehabilitation or chronic care facility, it will take less time before the nurses can change the tube. In both circumstances, decreasing the time interval before the first tube change may decrease the duration of the hospitalization.

Also, the original tracheostomy tie, whether twill tape or an elasticized Velcro strap, is often not changed until the first tube change. Some institutions allow the ties to be changed before the first tube change; however, accidental decannulation can occur. Frequently, the original ties are left intact until the first tube change, and postoperative oozing of blood or secretions makes the ties unsanitary as well as unsightly after a few days. Changing the tube early may allow fresh, clean ties to be placed sooner.

CONCLUSIONS

Most pediatric tracheostomy tubes can be safely changed approximately 3 days after surgery, facilitating shorter hospital stays, earlier family caregiver tracheotomy education, and better hygiene. There may be individual considerations, such as anticipated wound healing deficits, that may lead the surgeon to delay the change. It appears safe and advantageous for surgeons to consider early initial tracheostomy tube change for pediatric patients.

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Corresponding author: Ellen S. Deutsch, MD, Division of Pediatric Otolaryngology, Department of Surgery, Alfred I. duPont Hospital for Children, 1600 Rockland Rd, Wilmington, DE 19899.

REFERENCES