

Collaboration of Disciplines Key to Successful Tracheoplasties

The following case study was written in collaboration with:

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At Cincinnati Children's Hospital Medical Center, our team of otolaryngologists is leading the way in developing and improving procedures leading to successful airway reconstruction, including the collaboration between medical disciplines. Following is a case study highlighting such efforts.

Clinical History and Presentation

A 2-month-old infant boy had a cyanotic event associated with an upper respiratory tract infection, and was taken to the emergency room of a hospital facility in his native Dominican Republic in September 2007. After an initial examination determined no issues, he was sent home. One month later, the boy presented with bronchiolitis. The treating physician noted the patient's airway was stenotic, which prompted that the child be sent to a US hospital for further management.

On November 17, 2007, the patient was admitted to a hospital in the US and diagnosed with a pulmonary artery sling and congenital tracheal stenosis due to complete tracheal rings. Surgery to correct the sling was successful; however, each of three pericardial patch tracheoplasties performed over a two-week period failed to resolve the congenital tracheal stenosis.

After the first surgery, he was intubated and ventilated for approximately 1 1/2 months; the second surgery resulted in the patient's near-death as mediastinitis and tracheal dehiscence caused his CO2 levels to rise higher than 100. This prompted a third emergency tracheal repair.

*Cincinnati Children's
 is pioneering the use of
 balloon dilation in the
 treatment of laryngeal
 and tracheal stenosis.*

On January 27, 2008, a tracheal stent was inserted to manage severe tracheomalacia from the pericardial patch. This was complicated by granulation tissue, necessitating removal of the stent. The patient was able to leave the hospital, but still required bronchoscopies and dilations every 1-2 weeks. During an examination in early summer 2008, severe airway stenosis and tracheal granulation were noted.

At this time, the patient's pulmonologist contacted Cincinnati Children's Airway Team. After a phone consultation, the physician in charge felt it best to transfer the patient to Cincinnati Children's for treatment due to our extensive experience in airway reconstruction. Prior to transfer, a second tracheal stent was placed despite advice to the contrary, and the patient again required intubation and ventilation.

The patient presented at Cincinnati Children's on July 3, 2008, intubated and ventilated, with severe congenital tracheal stenosis despite previous attempts at repair. He was also weak and significantly underweight as a result of many months previously spent in the ICU.

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Future Speaking Engagements

Dr. Cotton
*Trilogical Society
112th Annual Meeting
May 2009–Phoenix, Arizona*

Dr. Rutter
*American Society of Pediatric Otolaryngology
May 2009–Seattle, Washington*

Dr. de Alarcon
*American Broncho-Esophagological Association meeting
In conjunction with the Combined Otolaryngology Spring Meetings
May 2009–Phoenix, Arizona*

Dr. Elluru
*Combined Otolaryngology Spring Meetings
May 2009–Phoenix, Arizona*

Dr. Elluru
*Academy of Otolaryngology Head Neck Surgery
Sep 2009–San Diego, California*

Dr. Cotton
*American Academy of Otolaryngology
Oct 2009–San Diego, California*

Our Approach

Upon arrival, the patient underwent a bronchoscopy and the stent was removed. On July 7, he was extubated. His condition markedly improved, with no more granulation forming and a weight gain of 4 pounds.

After a month his distal tracheal stenosis was worsening. A balloon dilation of the distal tracheal airway, performed by Michael Rutter, MD, pediatric otolaryngologist, stabilized his airway, allowing him to stay out of the hospital.

A further complicating factor was the patient's portal hypertension, a result of many months of total parenteral nutrition, and resultant liver disease. Nada Yazigi, MD, a pediatric gastroenterologist, was one of the many physicians at Cincinnati Children's who collaborated in this child's care under the direction of Dr. Rutter.

On August 18, 2008, the patient underwent a successful slide tracheoplasty on cardiopulmonary bypass by Dr. Rutter and Peter Manning, MD, Director of the Cardiothoracic Surgery Division. The three previous operations had made mobilizing the trachea for this procedure much more complicated.

Drs. Rutter and Manning have collaborated on more than 70 surgeries for severe tracheal stenosis, and this team approach has greatly benefited the outcomes for these complicated and challenging cases.

The patient was extubated the next day, and was able to be discharged a week later.

Results and Follow-Up

The patient was treated successfully at Cincinnati Children's by tracheal reconstruction with a slide tracheoplasty, an operation that has been performed more at Cincinnati Children's than any other hospital in the world. Upon a follow-up examination and bronchoscopy on October 31, 2008, the patient's tracheal stenosis had resolved, and he had virtually no airway symptoms whatsoever.

Discussion and Lessons Learned

The airway team has learned from this challenging case, and many like it, that innovative thinking is required to find solutions for patients needing airway reconstruction. Physicians at Cincinnati Children's are pioneering the use of balloon dilation in the treatment of laryngeal and tracheal stenosis.

In addition, by convening physicians from all affected disciplines for pre-operative planning and care, physicians can optimize the results for patients. This type of integrated care planning can result in fewer surgeries and faster recovery time. Utilizing multidisciplinary teams for tracheal reconstruction can also promote significant reduction in cost and duration of stay, both in the intensive care unit and the hospital.

Contact our Airway Reconstruction Team at 513-636-6711.

Email us at ent@cchmc.org and reference Airway Case Study in the subject line. Or visit us at www.cincinnatichildrens.org/airway.

References

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- "Tracheal Stenosis and Reconstruction." *Surgical Directives: Pediatric Surgery*, Rutter, MJ., Cotton, RT., Editor: Peter Mattei, M.D., Section IV;24:151-156, 2003.