Cricotracheal Resection with Hilar Release for Pediatric Airway Stenosis

Joseph C. Taylor, MD; Ryan M. Collar, MD; Kevin F. Wilson, MD; Lauren Heise; Richard G. Ohye, MD; Glenn E. Green, MD

Departments of Otolaryngology and Surgery, University of Michigan, Ann Arbor, MI

Abstract

Objective: To describe the use of intratracheal release as an adjunct to cricotracheal resection for long-segment airway stenosis. Method: Retrospective review of 15 patients who have undergone this procedure with emphasis on preoperative findings, operative techniques, postoperative course and results. Results: Patients had stenosis from 4 to 11 cm in length with 5 grade III stenosis, 5 grade IV stenosis, and 5 grade III and IV stenosis. Complication rates were low with 8 patients developing transient vocal cord paralysis, 2 patients requiring gastric tube placement, and 3 patients requiring reintubation. Conclusion: This technique is a useful tool to aid in the surgical correction of severe airway stenosis in the pediatric patient.

Introduction

Subglottic stenosis (SGS) remains a challenging surgical problem for the pediatric otolaryngologist. To treat SGS, pediatric airway reconstruction has evolved rapidly over the previous 30 years. Cricotracheal resection (CTR) has been described as an alternative and complimentary technique to laryngotracheal reconstruction (LTR). Anastomotic dehiscence remains a frequent complication of CTR not associated with LTR. Even when using traditional release techniques, the air of required tracheal resection is greater than about 5 rings of tracheal cartilage, a two-staged procedure is typically required to achieve ultimate decannulation. A principle to increase surgical success is creation of a tension-free anastomosis. To this end, epithelialized infrahyoid and hilar releases have been developed. Despite its ability to increase mobilization, hilar release has not been tested to be reliably used in the thoracic surgery literature.1,2 To address these limitations, the current series pursues the utilization of routine hilar release in long segment, high grade CTR as a means to diminish risk of dehiscence and make single-stage procedures permissible in most cases with an acceptable margin of added risk.

Methods

We reviewed the medical records of 16 children who underwent cricotracheal resection with hilar release by our pediatric airway team. The variables that were analyzed included age, sex, grade of stenosis, comorbidities, necessity of infrahyoid release, length of stay, complication status, and complications. Our surgical approach for cricotracheal resection with hilar release is via a right posterolateral thoracotomy with division of the pulmonary ligaments and pericardium. The right and left main bronchi, carina, and distal tracheas are mobilized on their anterior and posterior surfaces, while preserving the lateral vascular attachments. Once these maneuvers have been accomplished, it is generally possible to advance the carina several centimeters. The cricotracheal portion is then performed as previously described. The trachea is separated from the esophagus and dissected into the thorax where the dissection will come in continuity with the intrathoracic approach. The trachea is then divided and the stenotic portion of the trachea is resected from the ventral surface. Atraumatic vascular clamps are placed on the distal and proximal trachea and the anastomosis is created. A self-extending stitch is used to create a tension-free anastomosis. We now routinely avoid infrahyoid release. In addition, we have developed an anchoring stitch which tacks the distal tracheal segment to the manubrium to prevent tracheal retraction into the chest, minimizing the benefit from the intrathoracic release, and facilitates closure of the anastomosis. The use of fibrin glue provides additional insurance against anastomotic leak. With these measures, we had no anastomotic leak or dehiscence in our series.

Results

We had a low complication rate with the use of the hilar release, though we did have several patients with post-operative swallowing dysfunction and chest pain. One complication that has been described by others is temporary post-operative swallowing dysfunction. All of our patients had nasogastric tube placed in the immediate postoperative period. However, prolonged swallowing dysfunction was uncommon, with only one patient requiring gastrostomy tube placement for silent aspiration of thin liquids.

Discussion

We routinely

References