Abstract

Objective: Endoscopic posterior cricoid split with costal cartilage grafting (EPCSCG) is becoming common in the management of laryngotracheal reconstruction in children. However, this minimally invasive technique poses a risk of graft extrusion and possible subsequent airway obstruction.\(^2\)\(^3\)\(^4\) To mitigate this potential risk, we combine a novel endoscopic suturing technique\(^1\) for graft securement with EPCSCG in a 3 year old male with stridor secondary to subglottic stenosis.

Study Design: Case Report

Methods: A 3 year old male with history of DiGeorge syndrome presented with stridor. Airway evaluation revealed hypomobile true vocal cords bilaterally, left subglottic cyst, and posterior glottic stenosis. He underwent endoscopic laryngotracheal reconstruction with rib grafting. The graft was secured in place using a novel endoscopic suturing technique.

Results: The patient was extubated 3 days following surgery with no complications. One year post surgery, the patient has no stridor even with exertion and direct laryngoscopy revealed no subglottic stenosis and an intact graft.

Conclusion: We propose a novel suturing technique for graft securement with endoscopic posterior cricoid split with costal cartilage grafting that will diminish the risk of graft extrusion, allow for consideration of early or same day extubation, and avoid stenting and need for tracheostomy in these patients.

Introduction

Given the post operative morbidity associated with open procedures, endoscopic posterior cricoid split with costal cartilage grafting (EPCSCG), a minimally invasive surgical option with low morbidity, has become increasingly common for posterior glottic and subglottic airway expansion in pediatric patients. While the endoscopic approach offers several advantages over the open approach including avoidance of a scar, avoidance of potential injury to the anterior commissure and vocal cords by obviating the need for anterior laryngofissure, reduced intensive care utilization and hospitalization, and reduced pain and infection risk, it is not without limitations. As the graft is “locked” into place rather than being secured with sutures, there is a risk of graft extrusion and possible airway obstruction, often resulting in prolonged period of intubation and / or a temporary tracheostomy.\(^2\)\(^3\)\(^4\)\(^7\) We present a case report utilizing a novel endoscopic suturing technique for graft securement during EPCSCG.\(^5\)

A 3 year old male with history of DiGeorge syndrome and Tetralogy of Fallot with absent pulmonary valve who underwent RV-PA conduit and tricuspid valvuloplasty at a age of 3 1/2 months with prolonged intubation post operatively presented to clinic with stridor since extubation after cardiac surgery. On exam, patient was noted to have inspiratory stridor and in office flexible laryngoscopy revealed hypomobile vocal cords bilaterally in paramedian position with minimal abduction. Subsequent airway evaluation in the operating room revealed subglottic / posterior glottic stenosis due to posterior glottic scarring and bilateral vocal cord hypomobility. Endoscopic posterior cricoid split with costal cartilage graft placement was recommended. Informed consent was obtained and patient was brought to the OR.

Materials and Methods

Figure 1. Demonstration of the laryngeal spreader secured in place with rubber bands to the suspension device

Figure 2. Graft secured in place using novel endoscopic suturing technique

Figure 3: Suturing technique for graft securement

Methods/Results

The patient underwent EPCSCG with graft secured in place with endoscopic suturing technique as described. No tracheostomy was needed. The patient was extubated 3 days following surgery with no post operative complications. Resolution of stridor was noted at his 1 month post operative follow up. Repeat airway evaluation 11 months after surgery revealed no evidence of stenosis and a well healed cartilage graft.

Endoscopic suturing technique for cartilage graft securement:

1. A double needle 5.0 PDS suture is passed through the post cricoid mucosa as a U stitch (horizontal mattress) through to the endolarynx where the graft would be placed. The sutures are then passed through the graft which is parachuted into the surgical field and positioned in place (Figure 2, Panel 1)

2. The free edges of the sutures are then tied as described in Figure 3

3. Once at the level of the graft, the right suture is grasped with the microalligator forceps and advanced distally, while providing counter-tension with the opposite (black) suture, tying the knot down and ultimately securing the graft in place (Figure 2, Panel 2)

Figure 4. Preoperative (A) and postoperative (B) photos demonstrate significant posterior glottic expansion after graft placement.

Figure 5. Graft sutured in place intraoperatively (A) and well healed graft site at postoperative follow up (B).

Conclusion

Using the proposed endoscopic suturing technique for graft securement with endoscopic posterior cricoid split with costal cartilage graft placement would greatly mitigate the risk of graft dislodgement, allowing for consideration of early or same day extubation and avoiding stenting and need for tracheostomy in these patients.

References


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