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Abstract

Posterior glottis stenosis (PGS) represents an interesting dilemma to the airway surgeon. Diagnosis of this rare condition can be difficult, often mimicking bilateral vocal fold paralysis. Management can also be challenging, with several potential therapeutic options. After receiving IRB approval, pediatric Otolaryngology patient records at a single institution in Memphis, TN were reviewed from 1/1/2013 to 7/1/2014 and 4 patients were identified with PGS. Serendipitously, each these 4 patients represented a distinct grade, I-IV, of PGS. Our case series presents these pediatric patients, all with confirmed PGS on operative direct laryngoscopy that were treated with Kenalog 40 mg/ 1mL injectable solution a variable number of times, based on therapeutic response. All 4 patients showed improvement or resolution of synechiae causing the PGS on subsequent laryngoscopy. Kenalog injection has previously been shown to be a viable first-line therapeutic option for the treatment of low-grade (type I-II) PGS. Based on our limited series, a trial of steroid injection may represent a standalone therapeutic option worth trial for higher grade (type III-IV) PGS prior to more aggressive surgical treatment such as cartilage grafting, which is the standard practice at this time.

Introduction

Posterior glottis stenosis (PGS) represents an interesting dilemma to the airway surgeon. Diagnosis of this rare condition can be difficult, often mimicking bilateral vocal fold paralysis. Management of this scar band at the posterior third of the vocal cords can be challenging, with several potential therapeutic options, including steroid injection, which has traditionally been used for low-grade stenosis.

Use of the classification system developed by Bogdasarian et al.¹ (Table 1) has become a helpful guide when determining the treatment method to employ. More advanced levels of PGS have traditionally required more complex therapeutic interventions.² Modalities are categorized into intralesional injections, endolaryngeal procedures, open surgical procedures. Corticosteroids have traditionally been injected as a sole treatment of low grade stenosis, or to augment the effects of laser excision of synechiae.^{3,4}

Our case series presents 4 pediatric patients with interarytenoid synechiae causing PGS. We pose that a trial of Kenalog injection represents a viable first-line therapeutic option for the lysis of all stages (Bogdasarian and Olson Stage I-IV) of interarytenoid synechiae.

Methods and Materials

Study Design
Case series

After obtaining IRB approval, we performed a retrospective review of pediatric patients with PGS due to interarytenoid synechiae treated with Kenalog injection from 1/1/2013 to 7/1/2014. Inclusion criteria: age less than 18 years, confirmed PGS on operative direct laryngoscopy with images, treated with Kenalog 40 mg/ 1mL injectable solution. All patients that received multiple injections of Kenalog received therapeutic treatment within 1-2 months intervals.

Results

Four patients were identified that met inclusion criteria. All 4 Bogdasarian and Olson stages of PGS were represented. Three patients had tracheostomy tubes at time of evaluation and diagnosis. Causes of stenosis included prolonged intubation in all 3 tracheotomy patients, and intubation trauma in the remaining patient (Table 2).

Each patient was treated with varying amounts of Kenalog 40 mg/ 1 mL injectable solution, based on synechiae extent and the area treated (Figure 1). All 4 patients showed improvement of synechiae on subsequent laryngoscopy (Figure 2, Table 3). Patient 1 showed improvement of the type I adhesion. Patients 2-4 experienced resolution of types II-IV synechiae. There were no post-operative complications encountered in this series.

Table 1. Classification of Posterior Glottic Stenosis (Bogdasarian et al.⁸)

Type I	Glottis- interarytenoid scar, normal posterior commissure
Type II	Interarytenoid scar and posterior commissure scar
Type III	Posterior commissure scar involving a cricoarytenoid joint
Type IV	Posterior commissure scar involving both cricoarytenoid joints

Figure 1. Kenalog Injection
Posterior larynx pictured with Kenalog injection needle placed at posterior glottis interarytenoid scar band.



Figure 2. Kenalog Pre-injection and Post-injection Comparison Images
(A) Patient 1: initial, stage I, (B) Patient 1: final showing improved/stable, (C) Patient 2: initial, stage II, (D) Patient 2: final showing improved/resolved, (E) Patient 3: initial, stage III, (F) Patient 3: no image exists due to flexible fiberoptic laryngoscopy use for final exam which showed resolution of scar band, (G) Patient 4: initial, stage IV, (H) Patient 4: final showing improved/resolved.

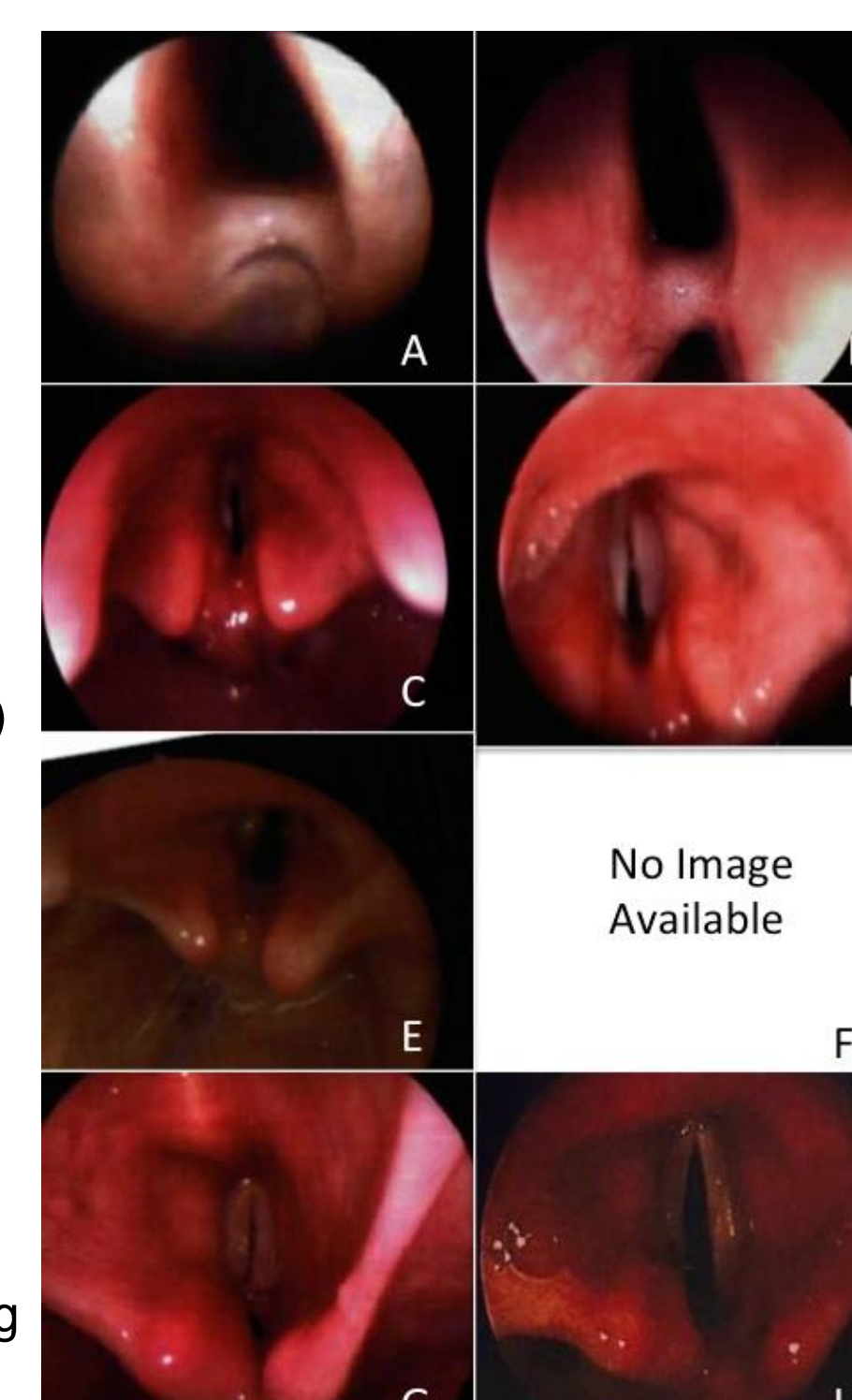


Table 2. Causes and Severity of PGS

Patient	Age at Diagnosis	Cause	Severity	Location	Tracheostomy
1	20 months	Prolonged intubation at 4 months due to respiratory failure	Type I	1-2mm posterior interarytenoid scar band, normal posterior commissure	Yes, respiratory failure at 4 months
2	23 months	Ex-26 week premature infant, prolonged intubation	Type II	Subglottic stenosis extending to and involving posterior commissure	Yes, subglottic stenosis at 4 months
3	35 months	Traumatic intubation due to respiratory failure (RSV and vascular ring)	Type III	Posterior commissure scar involving left cricoarytenoid joint, left true vocal cord immobile	No
4	13 years	Ex-26 week premature infant, previous tracheostomy tube	Type IV	Posterior commissure scar involving both cricoarytenoid joints	Yes, prolonged intubation Decannulated 2004, replaced 6/12/13.

Discussion

All 4 patients were treated conservatively with a trial of Kenalog injection before embarking on more extensive PGS lysing procedure. All 4 showed improvement or resolution on subsequent examination. All 3 patients with tracheostomy tube remain tracheostomy tube dependent. Two of these patients require supplemental oxygen due to their pulmonary status, and the final patient's treatment for posterior glottis stenosis revealed neurologically inert vocal cords. The patient that did not have a tracheostomy tube, patient 3, improved after one treatment and was found to have normal mobility of the previously immobile left true vocal cord on bedside examination using a flexible laryngoscope.

Conclusions

Kenalog injection represents a viable first-line therapeutic option for the treatment of all stages (I-IV) of interarytenoid synechiae causing posterior glottis stenosis. It is a useful therapeutic option for monotherapy of low-grade PGS, and a useful adjunct, or possible monotherapy, in the treatment of higher stage PGS.

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References

- Bogdasarian RS, Olson NR. Posterior Glottic Laryngeal Stenosis. *Otolaryngology Head and Neck Surgery*. 1980;88:765-772.
- Meyer TK, Wolf J. Lysis Of Interarytenoid Synechia (Type I Posterior Glottic Stenosis): Vocal Fold Mobility and Airway Results. *The Laryngoscope*. 2011;121:2165-2171.
- Hoasjoe DK, Franklin SW, Aarstad RF, Day TA, Stucker FJ. Posterior Glottic Stenosis Mechanism and Surgical Management. *The Laryngoscope*. 1997;107:675-679.
- Gaboriau H, Laccourreye O, Laccourreye H, et al. CO₂ laser posterior transverse cordotomy for isolated type IV posterior glottic stenosis. *Am J Otolaryngol* 1995;16:350-353.