



Contents lists available at ScienceDirect

International Journal of Pediatric Otorhinolaryngology

journal homepage: www.elsevier.com/locate/ijporl

Impact of supraglottoplasty on parental preception of swallowing using a 10 question swallowing index

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ABSTRACT

Introduction: Laryngomalacia can have a significant impact on swallowing function. Most of the studies in literature have focused on evaluating swallowing dysfunction in children with Laryngomalacia using clinical assessment and swallowing studies i.e. functional endoscopic evaluation of swallowing or videofluoroscopic evaluation of swallowing.

Objective: The objective of the current study was to evaluate the parental perception of swallowing using a newly devised 10-point swallowing index before and after supraglottoplasty.

Material and methods: This was a prospective study performed at a tertiary care Aerodigestive center over a period of 18 months. A total of 51 supraglottoplasties were performed by a single surgeon over an 18-month period. Parents were asked to fill a non validated 10-point questionnaire before and after supraglottoplasty. Of the 51 surgeries, 34 surveys were completed, and 28 surveys were included in the study. All the patients were classified in to mild, moderate and severe laryngomalacia based on the established criterion. Each point in the index was graded on the Likert scale.

Results: A total of 28 patients who underwent supraglottoplasty were included in the study. There was a significant improvement in the overall parental perception in the swallowing of children with laryngomalacia following supraglottoplasty. There was statistically significant improvement in 9 out of 10 indices on the questionnaire.

Conclusion: Supraglottoplasty has an overall positive impact on parental perception of swallowing in children with Laryngomalacia. Caregivers had fewer concerns postoperatively, with fewer choking spells and breathing issues during feeds, and a greater satisfaction with the amount consumed at each feed. This Index adds a valuable subjective component to pediatric swallowing assessments pre and post supraglottoplasty. This tool could be used in conjunction with MBSS and FEES measures to provide a more comprehensive assessment.

1. Introduction

Laryngomalacia is a congenital airway anomaly causing collapse of the supraglottis during inspiration leading to airway obstruction and stridor. Infants often present with stridor during the first few weeks of life which peaks around 6 months and gradually resolves by two years. Aside from airway symptoms, children with Laryngomalacia tend to have recurrent choking episodes, feeding difficulties, aspiration and failure to thrive. Swallowing dysfunction is common in infants with

Laryngomalacia with a reported incidence of 50% [1–3]. The possible causes of dysphagia in infants with laryngomalacia include airway obstruction leading to difficulty coordinating sucking, swallowing, and breathing, decreased laryngeal sensation secondary to GERD, and altered sensorimotor integrative function of the larynx [1–4].

Supraglottoplasty is indicated in infants with Laryngomalacia with significant stridor causing breathing difficulties during sleep and at rest; feeding problems, including choking and or aspiration; failure to thrive; oxygen desaturations; and apneic events [5]. Supraglottoplasty has

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<https://doi.org/10.1016/j.ijporl.2018.03.037>

Received 24 January 2018; Received in revised form 28 March 2018; Accepted 28 March 2018

Available online 06 April 2018

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	Very Rarely 1	Rarely 2	Occasionally 3	Frequently 4	Very Frequently 5
Q1. Are you concerned about your Child's Swallowing?					
Q2. How often does your child Choke during feeding?					
Q3. Does your child have breathing issues while feeding?					
Q4. How often does your child spit up?					
Q5. How often do you have to modify the diet to feed the child?					
Q6. Does your Child's Swallowing problems cause financial issues?					
Q7. Does your Child's swallowing problems affect your ability to do your daily activities?					
Q8. How often are you satisfied with the amount of feed per session?					
Q9. Are you anxious about your child's swallowing problem?					
Q10. Is your child's weight a source of concern for you?					

Fig. 1. The Swallowing index consisting of 10 questions rated on a Likert scale from 1 to 5 signifying very rarely – very frequently. Questions 1–5 deal with clinical symptoms of dysphagia, questions 6 and 7 deal with the social impact of dysphagia while questions 8–10 are concerned with the psychological aspect.

been shown to improve respiratory symptoms in children with moderate to severe Laryngomalacia, however, the effect of supraglottoplasty on swallowing dysfunction is variable. Due to the alteration of supraglottic anatomy during supraglottoplasty, aspiration has been proposed as a risk of the surgery, further contributing to the feeding difficulties. However, multiple studies have now shown that even though, there might be a transient feeding dysfunction following supraglottoplasty, there are long term improvement in feeding difficulties [2,5].

Pediatric oropharyngeal dysphagia, is assessed by clinical dysphagia evaluation, modified barium swallow studies (MBSS) and fiberoptic endoscopic evaluation of swallowing (FEES). These approaches evaluate the safety of the swallow, however they do not provide an assessment of the impact of dysphagia on the physical or emotional well-being of the child and the care giver [6]. One of the major quality of life issues in children with laryngomalacia is the swallowing issues encountered by the care giver. Even though various quality of life indices have attempted to address this problem, there have been no studies to date investigating the parental reported effect of supraglottoplasty specifically on swallowing issues [7–9].

The objective of the current study is to evaluate the parental perception of swallowing before and after supraglottoplasty using a newly devised 10-point swallowing index.

2. Material and methods

This was a retrospective case series review, of patients undergoing Supraglottoplasty performed at a tertiary care Pediatric hospital over a period of 18 months period from April 2015–Nov 2016. An institutional review board (IRB No:9673) approval was obtained.

All patients being considered for Supraglottoplasty underwent an

evaluation in the aerodigestive clinic by a Pediatric Otolaryngologist and a Speech language pathologist. The evaluation consisted of an in office awake fiberoptic Laryngoscopy and a Functional Endoscopic Evaluation of swallowing (FEES). Modified Barium Swallow Study (MBSS) is reserved for children with laryngeal penetration on FEES or with associated comorbidities including hypotonia.

Laryngomalacia was classified into mild, moderate and severe according to already described criterion [3]. Patients with mild laryngomalacia had inspiratory stridor with or without coughing during feeds. Moderate laryngomalacia was defined as the presence of inspiratory stridor with choking during feeds, frequent regurgitation, brief apnea or cyanotic episodes or intermittent dyspnea and retractions not requiring medical attention. Patients with severe laryngomalacia had inspiratory stridor with life-threatening complications including failure to thrive, apnea, cyanosis or dyspnea requiring medical intervention, pectus excavatum, pulmonary hypertension or cor pulmonale [3]. All patients with moderate to severe laryngomalacia were started on anti-reflux therapy consisting of an H2- blocker and Proton pump inhibitor and dietary modifications in the form of thickening of the feeds. The primary indications of surgery were moderate to severe Laryngomalacia as documented by failure to thrive, severe respiratory issues, increased work of breathing, sleep apnea and pectus excavatum.

Supraglottoplasties were done under spontaneous ventilation. Surgeries were performed either with Cold steel instrumentation or with the use of Flexible CO2 Laser (Omniguide, Inc, Cambridge, MA) and consisted of either removal of redundant tissue over the arytenoids or release of the aryepiglottic fold with or without excision of the cuneiform cartilages. Care was taken to preserve mucosa in the interarytenoid region to prevent supraglottic stenosis. Postoperatively the infants were started on twice daily proton pump inhibitor and were

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