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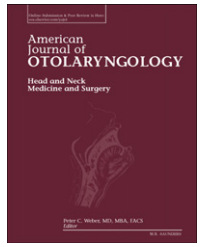

Pediatric otolaryngology: Principles and practice

Endoscopic surgical management of inspiratory stridor in newborns and infants☆

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ABSTRACT

Objective: Compare the incidence of endoscopic surgical treatment of patients with laryngomalacia to other aerodigestive pathology who may present with similar symptoms.
Methods: Consecutive case series with chart review of endoscopic surgical intervention in infants, aged 12 months or less, presenting with inspiratory stridor, in the absence of syndromic condition or prior history of intubation.
Results: A total of 30 patients were identified. The average age at the time of surgical intervention was 2.7 months. Endoscopic surgical management was directed at laryngomalacia (70%), vallecular cysts (23.3%), and anterior glottic webs (6.7%). All patients had nearly immediate resolution of the stridor and feeding difficulties. None required revision surgery, modified diets, or alternative means of enteric nutrition.
Conclusions: Laryngomalacia was the most commonly encountered surgical indication for stridulous newborns and infants with severe symptoms. Like most previous descriptions, patients responded well to supraglottoplasty. Vallecular cysts accounted for about one-quarter of the infants treated. Clinicians should carefully consider the presence of other airway pathology, which may mimic laryngomalacia, in non-syndromic infants without a previous history of intubation. Endoscopic surgical management may be safe and effective.

1. Introduction

Evaluation of the newborn or infant presenting with noisy breathing, dysphagia and failure to thrive starts with a detailed history and physical examination. Bedside laryngoscopy often adds a critical and integral component to the clinical assessment. Noisy breathing in infants is most often attributed to laryngomalacia. Unless there are severe symptoms, such as failure to thrive or dysphagia, most patients do well with expectant management, with only approximately less than 15% requiring surgical intervention [1]. Those with severe symptoms are usually treated with supraglottoplasty, which has a high success rate [2].

However, there are several other airway pathologies that can be encountered causing symptoms that may mimic laryngomalacia, such as vallecular cysts or anterior glottic webs and should be carefully considered when evaluating these newborns and infants. Several authors have reported and described their experiences with individual pathologies but these may have overlapping symptoms that mimic each other [3–7]. Our aim is to compare the incidence of endoscopic surgical treatment in patients with laryngomalacia to other

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aerodigestive pathology in a pediatric otolaryngology practice with who may present with similar symptoms and hope to provide a frame of reference for consideration of pathology other than laryngomalacia that can respond well to endoscopic surgery and should be considered when evaluating infants with inspiratory stridor. When the stridor is associated with severe symptoms, such as dysphagia and failure to thrive, surgical management is often indicated and usually helpful in resolving symptomatology.

2. Methods

After institutional review board (IRB) approval was obtained, the operative records of both authors were reviewed between July 1, 2009 and December 22, 2014 for infants, aged 12 months or less, who underwent endoscopic surgery for failure to thrive, stridor, and/or dysphagia. Patients were identified using current procedural terminology (CPT) codes: 31535, 31536, 31540, 31541, 31560, 31561, and 31588. Infants with ICD-9 diagnoses of dysphagia (787.2x), stridor (786.1), laryngomalacia (748.3), or failure to thrive (783.41 and 779.34) and were non-syndromic, full term (>35 weeks gestation) without prior history of intubation were included. Infants with prior history of intubation and/or craniofacial abnormality were excluded. Microsurgical approach was surgeon dependent.

3. Results

A total of 30 patients were identified, 13 (43.3%) boys and 17 (56.7%) girls (Table 1). The average age at the time of surgical intervention was 2.7 months [range 1 week to 7 months]. Endoscopic surgical management was directed at laryngomalacia in 21 (70%) (Fig. 1), vallecular cysts in 7 (23.3%) (Fig. 2), and anterior glottic webs in 2 (6.7%) (Fig. 3) patients. Surgical indications in cases of laryngomalacia, anterior glottic webs included significant feeding difficulties/dysphagia limiting oral intake or failure to thrive. All vallecular cysts were able to be diagnosed preoperatively on bedside, awake fiberoptic indirect laryngoscopy. All patients had nearly immediate resolution in the stridor and feeding difficulties.

None required revision surgery, modified diets, or alternative means of enteric nutrition. All patients were able to start an oral diet within the first postoperative day. Dysphagia requiring further swallowing evaluation or therapy was not encountered. The average length until last follow up was 24.0 months [range 1–60 months]. In one newborn who underwent a vallecular cyst excision, the immediate perioperative period was complicated by postoperative respiratory distress, necessitating re-intubation. The patient was able to be extubated the following day, and the remainder of his hospital course was uneventful.

Table 1 – Summary of newborns and infants that underwent endoscopic surgical management for inspiratory stridor.

	No. (%)
Gender	
Females	17 (56.7)
Males	13 (43.3)
Endoscopic surgical procedures	
Supraglottoplasty	21 (70)
Excision of vallecular cyst	7 (23.3)
Division of anterior glottic web	2 (6.7)

4. Discussion

Inspiratory stridor in newborns and infants commonly presents to the otolaryngologist, and consideration is often directed at laryngomalacia, given the rarity of other clinical entities in these patients. Factors such as severity of symptoms, coexisting medical problems, and/or failure to thrive are calculated in the decision-making process for management recommendations. As demonstrated by Chen et al., who described seven children over a seven year experience with vallecular cysts, other lesions or pathology mimicking the inspiratory stridor of laryngmalacia are uncommon. The authors emphasized that vallecular cysts, although rare, should be considered in children with stridor and dysphagia. We also agree that awake, beside flexible fiberoptic laryngoscopy should be performed on stridolous infants and would like to emphasize that particular attention should be directed at the base of tongue and vallecula in newborns and infants to evaluate for a vallecular cyst, as this diagnosis may be missed and mistakenly attributed to laryngomalacia. Our surgical approach and outcomes also echo and confirm their success [8].

Other rare aerodigestive pathology may also present with similar symptoms to laryngomalacia. We reviewed our experience with endoscopic surgical management of infants with stridor and dysphagia to examine the presence of other aerodigestive pathology, which may present with similar and overlapping symptoms to emphasize careful consideration of awake, fiberoptic laryngoscopy evaluation of these infants. Also, in our experience and other authors' reports, these processes may be endoscopically managed successfully with minimal associated morbidity.

Inspiratory stridor in newborns and infants is often attributed to laryngomalacia, and in severe cases, benefit is achieved with supraglottoplasty. Supraglottoplasty is relatively safe with minimal associated risks [9]. Swallowing dysfunction has been reported but is transient, usually resolving within one month postoperatively [10]. We have experience using both cold steel and CO2 LASER techniques with similar results, with the chosen technique, primarily surgeon preference. For microsurgical excision of vallecular cysts, our preferred surgical approach is for complete excision, as opposed to marsupialization, with either cold steel or utilizing a bipolar radiofrequency plasma ablation (RFA) device [11]. Congenital anterior glottic webs are an infrequently encountered pathology, and our preferred surgical approach is for endoscopic lysis with cold steel and balloon dilation [7]. A complete review of the various methods and reports for management of these lesions that may present with inspiratory stridor is beyond the scope of our intended report, but we briefly introduce some of the surgical techniques utilized.