

Laryngomalacia: Pearls and pitfalls

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Disclosures

- none

Laryngomalacia

- Most common cause of infant stridor
- Generally not present at birth
- Worse when supine, feeding, excited
- Generally worsens for 2-4 months
- Most better by 7-9 months of age

Pathogenesis – mainly unknown

- Clearly anatomic contributions



Pathogenesis- mainly unknown

- Clearly neurologic contributions
- High incidence of laryngomalacia in children with cerebral palsy and hypotonia
- Multiple reports of children developing laryngomalacia after neurologic insult.

Classification

Table 1: Previously described classification systems for laryngomalacia.

Year/Authors	Categories	Description
1977 McSwiney, Cavanagh, Languth [4]	A	Long, curled (omega-shaped) epiglottis which prolapses posteriorly during inspiration
	B	Short AE folds
	C	Bulky arytenoids with collapse anteriorly during inspiration
1989 Holinger, Konior [5]	Type 1	Inward collapse of AE folds and cuneiform cartilage
	Type 2	Long, tubular (omega-shaped) epiglottis
	Type 3	Anterior/medial collapse of arytenoid cartilage
	Type 4	Posterior collapse of epiglottis
	Type 5	Short AE folds
	Type 6	Overly acute angle of the epiglottis at the laryngeal inlet
1995 Roger, Denoyelle, Triglia, Garabedian [6]	Complete form	Omega-shaped epiglottis, short AE folds, and redundant supraglottic mucosa
	Predominately posterior form	Anterior displacement of supra-arytenoid mucosa
	Isolated anterior form	Posterior-medial displacement of the epiglottis
1999 Olney, Greinwald, Smith, Bauman [7]	Type 1	Anterior/medial collapse of supra-arytenoid mucosa
	Type 2	Short AE folds
	Type 3	Posterior collapse of epiglottis
2006 Kay, Goldsmith [8]	Type 1	Short AE folds
	Type 2	Redundant tissue in the supraglottis
		Refers to cases with a neuromuscular dysfunction etiology
2007 Lee, Chen, Yang, Chen [9]	Type A	Short AE folds or collapse of redundant cuneiform/corniculate cartilage and soft tissue
	Type B	Long, tubular, curled epiglottis
	Type C	Posterior collapse of epiglottis

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Variants



Figure 1 Endoscopic operative images of select patients with varying types of laryngomalacia
 1a – Patient 1 (LM1a (R>L))
 1b – Patient 2 (LM1b, LM3b)
 1c – Patient 3 (LM1b, LM2, LM3a*)
 1d – Patient 4 (LM1b, LM2, LM3b, LM3c, LM4)
 1e – Patient 5 (LM1b, LM2, LM3a, LM3b, LM4)



Abnormal Sensorimotor Integrative Function of the Larynx in Congenital Laryngomalacia: A New Theory of Etiology

Dana Mara Thompson, MD, MS

- Looked to investigate laryngeal sensation in patients with laryngomalacia
- Sensory testing of larynx and showed that in kids with laryngomalacia, laryngeal sensation was decreased.
- This was associated with GERD but also neurologic comorbidities
- As GERD improved so did symptoms and laryngeal sensation

TABLE I.
Laryngopharyngeal Sensory Testing (LPST) Thresholds in Congenital Laryngomalacia.

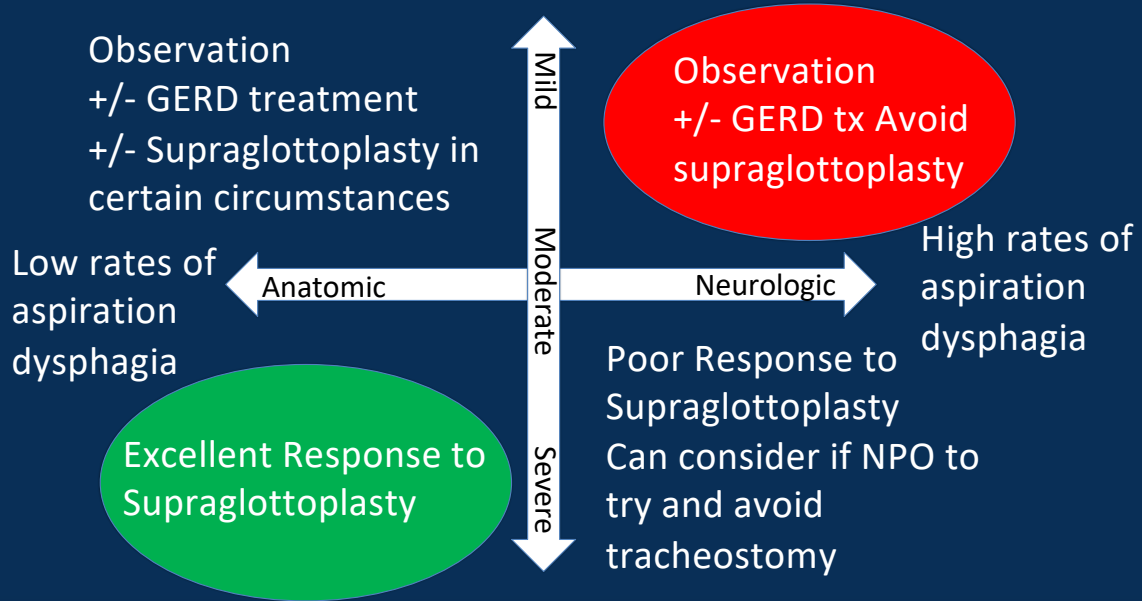
Time	Mean (SD) LPST, mm Hg			P Value*
	Mild (n = 66)	Moderate (n = 50)	Severe (n = 18)	
Baseline	4.1 (1.2), n = 66	6.8 (1.6), n = 50	7.4 (2.5), n = 18	<.001
1 month	4.2 (1.5), n = 54	6.2 (1.9), n = 45	6.5 (1.9), n = 11	<.001
3 months	3.7 (1.1), n = 66	4.7 (1.6), n = 49	5.7 (2.3), n = 18	<.001
6 months	3.4 (0.9), n = 65	3.9 (0.9), n = 47	4.4 (1.2), n = 16	<.001
9 months	3.1 (0.6), n = 54	3.5 (0.8), n = 43	3.5 (0.9), n = 12	.14
P value for LPST change over time	<.001	<.001	<.001	

*P values for mild disease versus moderate or severe disease.

TABLE II.
Baseline Laryngopharyngeal Sensory Testing (LPST) Thresholds in Those With Neurologic and Gastroesophageal Reflux Disease (GERD) Comorbidities Compared With Those With No Medical Comorbidity.

	No. With Baseline LPST	Baseline LPST (mm Hg), Mean (SD)
Neurologic disease and GERD	12	7.3 (2.1)
GERD comorbidity only	75	6.2 (2.0)
Neurologic disease only	1	3
No medical comorbidity	46	3.9 (1.3)

Laryngomalacia spectrum



Applying this framework to management

- Most with laryngomalacia will have mild-to-moderate stridor, GERD symptoms, mild-moderate anatomic findings and only require anti-reflux meds and observation not require surgical intervention.
- Those with severe enough disease to require supraglottoplasty will have minimal complications and good outcomes if anatomic factors predominate and laryngeal sensation is normal.
- Those with altered laryngeal sensation (severe GERD, neurologic comorbidities) have a high risk of supraglottoplasty failure and high rates of dysphagia/ aspiration. Supraglottic surgery should be avoided if possible and conservative if performed.

Pearls

- During flexible laryngoscopy in office- evaluate anatomy but also SENSATION of the larynx
- If sensation normal and anatomic factors predominate, high surgical success rates.
- If sensation is abnormal, even if anatomic factors are present, low chance of surgical success.
 - Treat GERD
 - Get Neurology involved
 - Evaluate swallow function
 - Be conservative

Pitfalls

- Revision supraglottoplasty without further work up
 - If supraglottoplasty fails, look for neuro causes
 - Often times patients are too young to have missed many milestones
- Forgetting to evaluate for aspiration in a patient with decreased sensation
 - Sometimes those floppy arytenoids are the only thing keeping saliva out of the lungs
- Aggressive arytenoid surgery in a patient with decreased sensation

