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A Perfect Storm of Complexity: Open Nissen Fundoplication as the Surgical Turning Point in a Multimorbid Child With Severe GERD-A Case Report

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ABSTRACT **Published Online: June 05, 2026**

Background: Gastroesophageal Reflux Disease (GERD) is one of the most common gastrointestinal disorders seen in pediatric clinical practice, affecting an estimated 26.9% of infants aged 0 to 18 months. Children with severe neurologic impairment (NI) are especially at risk for failure to thrive, dysphagia, and GERD. For pediatric patients unresponsive to conservative treatments, fundoplication has become a widely accepted surgical option, with success rates ranging from 70% to 80%.

Case Presentation: A 21-month-old boy was brought in with intractable vomiting, recurrent laryngeal swelling, severe failure to thrive, and dependence on a tracheostomy tube. His condition was further complicated by global neurodevelopmental delay and suspected mitochondrial disease. Over 18 months, he underwent procedures including supraglottoplasty, epiglottopexy, airway stenting, and laser debulking, none of which provided lasting relief. Ultimately, a definitive diagnosis of severe grade III–IV GERD was confirmed via barium contrast imaging. He then underwent open Nissen fundoplication with Stamm gastrostomy; postoperatively, vomiting stopped immediately, enteral feeding was successfully initiated and gradually increased, and his nutritional status steadily improved during follow-up.

Discussion: Surgical treatment, such as gastrostomy and fundoplication, is generally reserved for children unresponsive to medication or those with potentially life-threatening complications. Nissen fundoplication has demonstrated consistent safety and effectiveness in controlling symptoms and enhancing the quality of life in affected children.

Conclusion: This case underscores the often-overlooked yet critical role of GERD in recurrent laryngeal issues and confirms that open fundoplication with gastrostomy is a safe, effective, definitive treatment, even in complex pediatric cases.

KEYWORDS:
Gastroesophageal Reflux, Laryngomalacia, Fundoplication (Nissen), Pediatric.

INTRODUCTION

Gastroesophageal Reflux Disease (GERD) is one of the most common gastrointestinal issues in children, affecting roughly 2% to 8%, depending on age and diagnostic criteria.[1] An earlier study found that 26.9% of infants aged 0 to 18 months exhibited symptoms of GERD, with prevalence ranging from 23.1% to 40.0%.[2] This rate decreased over time, dropping to 7.7% at three months, 2.6% at six months, and 1.1% at twelve months. Among older children, especially those under ten, the weekly symptoms of GERD were much less common. [3]

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Children with severe neurological impairments face increased risks of nutritional deficits that can lead to failure to thrive, as well as aspiration of pharyngoesophageal contents due to dysphagia and GERD.[4] While medication is the primary initial treatment, some patients do not respond adequately and require surgery. Fundoplication has become a widely accepted surgical option in children for cases unresponsive to medications. Success rates reported in studies range from 70% to 80%, with a minority experiencing postoperative issues such as dysphagia and wrap migration.[5]

CASE REPORT

A 21-month-old boy was referred to the pediatric surgery department for definitive surgical management of persistent vomiting, recurrent laryngeal swelling, and progressive failure to thrive. He was a firstborn child, delivered at term via cesarean section with a birth weight of

2,780 grams and no complications in the immediate perinatal period. His mother had no personal history of chronic illness, pregnancy-related complications, smoking, medication use, or family history of genetic or hereditary disorders. At approximately two weeks of life, the parents began noticing progressive noisy breathing alongside intermittent episodes of cyanosis during crying. The infant was able to feed exclusively through breastfeeding. Still, volume was severely limited; he could tolerate no more than approximately 30 ml per feed, and any attempt to exceed this consistently provoked choking and coughing. There was no drooling, and bowel and bladder function remained normal. Weight gain was markedly poor from birth, raising an early alarm for failure to thrive. Developmental milestones were also clearly delayed.

A pediatric pulmonologist initially assessed the patient at a regional hospital in Pekanbaru, Riau Province, Indonesia, where laryngomalacia was clinically suspected. He was subsequently referred to an otolaryngologist, and flexible office laryngoscopy (FOL) confirmed type 1 laryngomalacia. Given an initial severity that was judged to be mild-to-moderate, watchful waiting was recommended, and the infant was monitored conservatively for one month without surgical intervention. At five months of age, echocardiography performed by a pediatric cardiologist identified a small patent ductus arteriosus (PDA), which was considered hemodynamically insignificant and managed without intervention. Routine laboratory work, including complete blood count and urinalysis, was unremarkable; however, arterial blood gas analysis revealed elevated serum lactate, raising clinical suspicion for an underlying mitochondrial disorder. Further metabolic investigations were initiated but yielded no definitive diagnosis at that stage.

At six months of age, the patient returned to otolaryngology with worsening stridor and continued feeding intolerance. The decision was made to proceed with surgical airway intervention, and the infant underwent supraglottoplasty in January 2025. Rather than showing improvement, frequent vomiting occurs more than ten times per day. The infant was subsequently admitted to Arifin Achmad General Hospital, the regional tertiary care center in Pekanbaru. Repeat FOL at this admission revealed severe laryngomalacia with prominent epiglottic swelling, reclassified as type 1 and type 2 laryngomalacia. Contrast-enhanced CT of the neck and thorax showed no evidence of tracheoesophageal fistula, a prominent thymic shadow, and bilateral lower lobe opacities consistent with bronchopneumonia.

In March 2025, the infant underwent a second airway procedure comprising repeat supraglottoplasty, epiglottopexy, and tracheostomy, requiring a 22-day admission to the PICU. While stridor and respiratory distress showed transient improvement, vomiting persisted throughout the hospitalization and continued after discharge. Given the concurrent neurodevelopmental delay, neurology was consulted. Brain MRI demonstrated bilateral frontotemporo-parietal subdural hygromas and features consistent with global developmental delay, the etiology of which was considered multifactorial — likely attributable to a combination of recurrent hypoxic episodes from airway compromise, aspiration pneumonia, and the suspected underlying mitochondrial condition. Repeat FOL revealed the same, and the infant underwent a third airway intervention consisting of supraglottoplasty, epiglottopexy, balloon dilatation, and airway stent placement. Two intralaryngeal anti-inflammatory injections were administered at monthly intervals to suppress recurrent edema, yet the clinical response remained minimal and short-lived. Vomiting continued unabated.

The patient was then referred to Rumah Sakit Cipto Mangunkusumo (RSCM), the national tertiary referral center in Jakarta. Flexible laryngoscopy confirmed persistent supraglottic edema with redundant arytenoid changes, reflecting cumulative tissue remodeling from the multiple preceding laryngeal procedures. In December 2025, the infant underwent laser-assisted laryngeal debulking at RSCM. Postoperative FOL demonstrated partial edema reduction; however, vomiting remained unresolved. A repeat barium contrast study by the pediatric gastroenterology team at RSCM this time yielded a conclusive finding: severe gastroesophageal reflux reaching the upper esophagus, consistent with grade III–IV GERD.

Following discharge from RSCM, the patient returned to Riau, where both laryngeal edema and vomiting promptly recurred. The patient was subsequently referred to the pediatric surgery department for definitive anti-reflux surgical management. On admission, the infant was 21 months of age. Anthropometric assessment confirmed severe underweight (weight-for-age z-score < -3 SD) and severe stunting (height-for-age z-score < -3 SD). He remained tracheostomy-dependent with very limited oral intake due to persistent vomiting. Physical examination revealed a cachectic infant breathing comfortably through the tracheostomy tube. The abdomen was soft, non-distended, and free of organomegaly; therefore, an open Nissen fundoplication with concomitant Stamm gastrostomy represented the most appropriate definitive surgical strategy in this patient (Fig. 1).

The postoperative course was uneventful. Gastrostomy feeding was initiated on the second postoperative day, beginning at 30 cc of formula and gradually advancing to full enteral volume by day five. Cautious oral feeding in small amounts was reintroduced on the fourth postoperative day. Notably, vomiting ceased on the first postoperative day and did not recur during the admission or at subsequent follow-up visits. The gastrostomy tube was retained to ensure dependable nutritional delivery during the anticipated rehabilitation period. At follow-up, parents

reported no recurrence of vomiting, and serial measurements confirmed consistent weight gain with gradual improvement in nutritional status.

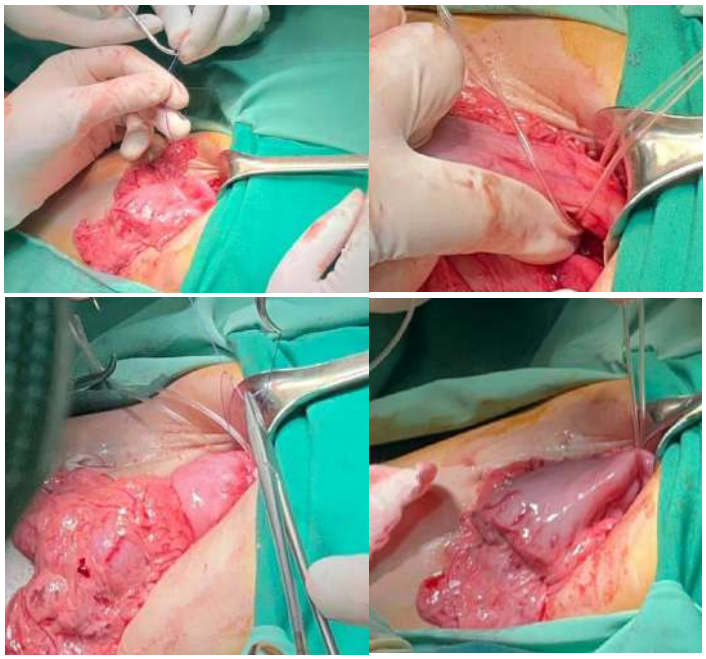

Fig. 1 Nissen Fundoplication Surgery

DISCUSSION

Gastroesophageal reflux disease is defined by the retrograde flow of gastric contents into the esophagus. The term refractory GERD is applied when symptoms fail to respond to optimal medical therapy after eight weeks.[2] GERD is capable of producing a broad range of gastrointestinal manifestations, including vomiting, dysphagia, choking, and failure to thrive.[6] In a prospective study by Giannoni et al., the incidence of severe laryngomalacia was found to be significantly associated with the degree of gastroesophageal reflux ($p = 0.0163$). Among patients with severe laryngomalacia, as many as 65% (11 of 17) had high-grade GERD, compared with only 20% (2 of 10) in those with uncomplicated mild laryngomalacia. While this does not necessarily establish causality, the association between GERD and complicated laryngomalacia has important implications for both assessment and management.[7] Polonovski et al. reported an association with GER in 50% of their cases.[8] Zalzal further identified GERD as a factor associated with failure of supraglottoplasty.[9]

GERD is substantially more common in neurologically impaired children than in the general pediatric population. It is associated with respiratory complications, particularly recurrent pulmonary infections. The pathophysiological mechanisms underlying GERD in this population are not fully understood.[10] Mitochondrial disorders arise from dysfunction of the electron transport chain enzymes involved in oxidative phosphorylation. Their clinical presentations are highly variable. Dysphagia is reported by more than 10% of patients with gastrointestinal features of mitochondrial disease, and upper gastrointestinal symptoms are frequently described in children diagnosed with this condition.[11] Chitkara et al. reported on six patients who showed symptoms of poor sucking, feeding refusal, choking with feeds, or vomiting in the first two weeks of life and went on to develop persistent GER, feeding intolerance, vomiting, or food aversion in later childhood.[12] In our patient, the suspicion of mitochondrial disease remained unconfirmed. However, the elevated serum lactate was consistent with impaired mitochondrial oxidative phosphorylation. Neuromuscular hypotonia attributable to mitochondrial dysfunction likely contributed directly to the development of laryngomalacia and reduced LES tone, creating additional predisposition to GERD.[12]

Diagnosis of GERD in infants and children rests primarily on the clinical picture and is supported by targeted investigations. Upper gastrointestinal contrast studies are indicated when alarm signs are present, when symptoms have not responded to standard therapy, or when structural abnormalities must be excluded. This imaging modality effectively rules out conditions that can mimic or predispose to GERD, including hiatal hernia, malrotation, pyloric stenosis, duodenal web, duodenal stenosis, antral web, esophageal narrowing, achalasia, and esophageal stricture. It also helps differentiate an obstructing fundoplication associated with esophageal stasis from a slipped or mechanically failed wrap.[2]

The decision to pursue surgical management of GERD in infants carries inherent complexity. Operative intervention is generally reserved for infants in whom medical therapy has clearly failed or who present with life-threatening GERD-related complications.[13] Many children with mitochondrial disease who experience dysphagia, poor gastrointestinal motility, or significant malnutrition ultimately require long-term tube feeding, which may be delivered via endoscopically placed gastrostomy (PEG) or surgical gastrostomy. When gastric emptying is compromised or when the risk of GERD-related aspiration is considered high, jejunostomy placement may be an appropriate alternative. Fundoplication in children with suspected mitochondrial disease is not contraindicated and may offer meaningful benefit by reducing aspiration-related pulmonary morbidity, which carries a particularly elevated risk in this group.[11]

The fundamental goals of surgical therapy for GERD include elongating the intra-abdominal segment of the esophagus, accentuating the angle of His, reinforcing the pressure barrier at the esophagogastric junction, and approximating the diaphragmatic crura.[14] Among the available wrapping techniques, Nissen fundoplication (complete posterior wrap) is the most widely performed, followed by Toupet fundoplication (partial posterior wrap) and Thal fundoplication (partial anterior wrap).[15] The choice of open Nissen fundoplication in this case was both deliberate and well-justified. In view of the patient's severe underweight, the overall complexity of his condition, and the institutional constraints regarding laparoscopic access, the open approach was determined to be the most appropriate and safest option. Nissen fundoplication has a well-established record of safety and efficacy in controlling symptoms and improving quality of life, with a very low rate of recurrence within the first decade following surgery.[16]

CONCLUSION

This case draws attention to the critical and frequently underappreciated contribution of GERD as a primary driver of recurrent laryngeal disease in infants with laryngomalacia. The complete resolution of vomiting following fundoplication clearly demonstrated that surgical anti-reflux therapy was able to address the underlying cause of this child's compounding aerodigestive morbidity. Fundoplication is rarely performed in Indonesia, and this case represents the first such procedure performed in a child with severe GERD at Arifin Achmad General Hospital.

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DISCLOSURE

The authors declare no conflict of interest. Written informed consent was obtained from the patient's parents for publication of this case report and any accompanying images.

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