www.jpnim.com Open Access eISSN: 2281-0692
Journal of Pediatric and Neonatal Individualized Medicine 2024;13(2):e130202
doi: 10.7363/130202
Received: 2023 Oct 29; revised: 2024 Apr 20; rerevised: 2024 May 04; accepted: 2024 May 28; published online: 2024 Aug 27

Case report

Laryngomalacia and failure to thrive – A case report

Rita Barroca Macedo[1], Maria Sousa Dias[1], Luís Salazar[2], Pedro Alexandre[3,4], Catarina Viveiros[5], Marco Pereira[1], Jorge Spratley[3,4,6]

[1]Paediatrics Department, Hospital Pedro Hispano, Matosinhos, Portugal
[2]Paediatrics Department, Centro Materno-Infantil do Norte, Porto, Portugal
[3]Otorhinolaryngology Department, Centro Hospitalar Universitário de S. João, EPE, Porto, Portugal
[4]Department of Surgery and Physiology, University of Porto, Porto, Portugal
[5]Neonatology Department, Hospital Pedro Hispano, Matosinhos, Portugal
[6]Center for Health Technology and Services Research, CINTESIS, University of Porto, Portugal

Abstract

Introduction: Laryngomalacia (LGM) is the most common congenital anomaly of the larynx and the most frequent cause of stridor in the newborn. Even though it can be a source of concern and anxiety to parents, a large majority of cases usually resolve spontaneously within 18 months of life. However, in infants with signs of severity, a multidisciplinary approach and surgical intervention might be necessary.

Case report: We report the case of a full-term 7-week-old infant girl, previously hospitalized in the Neonatal Intensive Care Unit and diagnosed with type II LGM (Olney's classification). She presented to the Paediatric Emergency Department with stridor at rest, vigorous chest wall retractions and poor weight gain (increase of 10 g/day, weight under the 3rd percentile). The infant was admitted to monitor respiratory symptoms and investigate her failure to thrive. However, irrespective of feeding modifications, and after exclusion of other causes of failure to thrive, the infant maintained an insufficient weight gain. Additionally, respiratory symptoms remained exuberant and surgical intervention was determined as the optimal treatment. At 3 months old, supraglottoplasty was performed. At 18 months, she has a weight in the 3rd-15th percentile range (WHO curves) and is clinically asymptomatic.

Conclusion: LGM is a remarkably frequent cause of stridor in infants, but only a rare number of cases require other interventions beyond symptomatic measures. In this report, surgical intervention was of paramount importance to ensure normal growth, emphasising the impact of a multidisciplinary approach in such cases.

Keywords

Laryngomalacia, failure to thrive, stridor, flexible fibreoptic laryngoscopy, supraglottoplasty, gastro-oesophageal reflux.

Corresponding author

Rita Barroca Macedo, Department of Paediatrics, Hospital Pedro Hispano, R. de Dr. Eduardo Torres, 4464-513 Senhora da Hora, Matosinhos, Portugal; email: ritabarrocamacedo@gmail.com.

How to cite

Barroca Macedo R, Sousa Dias M, Salazar L, Alexandre P, Viveiros C, Pereira M, Spratley J. Laryngomalacia and failure to thrive – A case report. J Pediatr Neonat Individual Med. 2024;13(2):e130202. doi: 10.7363/130202.

Introduction

Laryngomalacia (LGM) refers to the collapse of supraglottic structures during inspiration, causing inspiratory stridor [1, 2]. It is the most common congenital anomaly of the larynx and the most frequent cause of stridor in the newborn [3]. Even though it can be a source of concern and anxiety to parents, a large majority of cases usually resolve by the 12th to 18th months of age with conservative measures, requiring only surveillance by the paediatrician [2, 3].

Diagnosis of LGM is usually suspected upon history and physical examination and confirmed with flexible fibreoptic laryngoscopy [2, 4, 5]. This procedure also allows for classification according to Olney's classification system [1]. In infants with signs of severity, such as apnoea, tachypnoea, feeding difficulties or failure to thrive, a more urgent evaluation by an otorhinolaryngologist is warranted [4]. In fact, in up to 20% of patients, airway obstruction is severe enough to cause laboured breathing, apnoea, among other consequences requiring a multidisciplinary approach and surgical intervention [5, 6].

Case report

A full-term 7-week-old infant girl was admitted to the Paediatric Emergency Department due to laboured breathing, fatigue while breastfeeding and worsening inspiratory stridor.

Her medical history included a 7-days long hospitalization in the Neonatal Intensive Care Unit (NICU), on the 2nd day of life. In fact, within the first 20 hours after birth, she presented inspiratory stridor and experienced 2 episodes of vomiting, prompting additional investigation (blood analysis, chest radiography and venous gasometry), all of which yield normal results. Upon NICU admission, she underwent examination by the otorhinolaryngology specialist, who conducted a flexible fibreoptic laryngoscopy and subsequently diagnosed her with type II LGM (Olney's classification, **Tab. 1** [1]). During hospitalization, anti-reflux measures were implemented, including the introduction of anti-reflux formula and therapy with esomeprazole (1 mg/kg/day). On the 8th day of life, with a weight loss of 3% from birth weight, she was discharged, with instruction to attend neonatology and otorhinolaryngology consultations.

Upon admission to the Paediatric Emergency Department, she presented with stridor at rest, vigorous chest wall retractions and inspiratory stridor on cardiopulmonary auscultation. Additionally, poor weight gain was documented, with an increase of 10 g/day since the 12th day of life. The endoscopic report by the on-call otorhinolaryngologist confirmed an omega-shaped epiglottis, shortened aryepiglottic folds and oedema surrounding the arytenoid region. The infant was admitted to monitor respiratory symptoms and investigate her failure to thrive. Arterial blood gas test showed hypercapnia (pCO_2 50 mmHg) and compensatory elevation of HCO_3 (28.3 mmol/L), without acidosis. Initial haemogram and biochemistry analysis were normal.

During inpatient care, irrespective of feeding modifications such as supplementation with high-calorie formula, texture augmentation and acid suppression therapy, and after exclusion of other causes of failure to thrive, the infant maintained a weight gain of only 5 g/day over the 7 days of hospitalization. Since respiratory symptoms remained exuberant, surgical intervention was determined as the optimal treatment. At the Paediatric Otorhinolaryngology Referral Centre, surgery was performed at 3 months old. The supraglottoplasty was performed with cold instruments by sectioning the extremely shortened

Table 1. Olney's classification of laryngomalacia (LGM) [1].

Type 1	Arytenoid mucosa prolapse into the laryngeal lumen
Type 2	Shortened aryepiglottic folds
Type 3	Epiglottis backward colapse

aryepiglottic folds that kept the arytenoid and epiglottic cartilages too close, and the laryngeal inlet space was further increased by trimming redundant mucosa overlying the arytenoid cartilages. During the surgical intervention, anaesthesia was managed with balanced general anaesthesia in a state of spontaneous ventilation, as per our usual protocol during endolaryngeal paediatric airway surgery. The child was discharged after an uneventful post-operative surveillance at the Paediatric Intensive Care Unit.

At the paediatric appointment 15 days after surgery, a very positive clinical evolution was registered, with a weight gain of 64 g/day and complete resolution of respiratory symptoms. At 18 months, she has a weight in the 3rd-15th percentile range (**Fig. 1** [7]) and is clinically asymptomatic.

Discussion

LGM is a remarkably frequent cause of stridor in infants, but only a rare number of cases have significant clinical impact.

Aetiology of LGM is not yet clearly defined, and different mechanisms have been proposed, such as a delayed maturation of the supporting cartilaginous structures of the larynx; excess of redundant floppy soft tissues in the supraglottis; or the most prevailing, the neurologic theory, which postulates a neuromuscular dysfunction with consequent abnormal laryngeal tone [3]. Gastro-oesophageal reflux (GOR) has been reported to occur more frequently in children with LGM compared to other children, but it is uncertain whether GOR causes LGM [1-4]. Expert opinion recommends implementation of lifestyle and dietary measures (such as thickened milk, maintenance of posture after feeds, bed elevation to 30 degrees) and anti-reflux treatment [1-4, 6, 8].

In this report, we describe an infant who experienced respiratory distress and failure to thrive due to type II LGM during the initial weeks of life, where symptomatic measures proved inadequate for resolution. In this instance, surgical intervention was of paramount importance to ensure normal growth, emphasising the impact of a multidisciplinary approach in such cases.

Conclusion

In conclusion, flexible fibreoptic laryngoscopy should be routinely performed in symptomatic

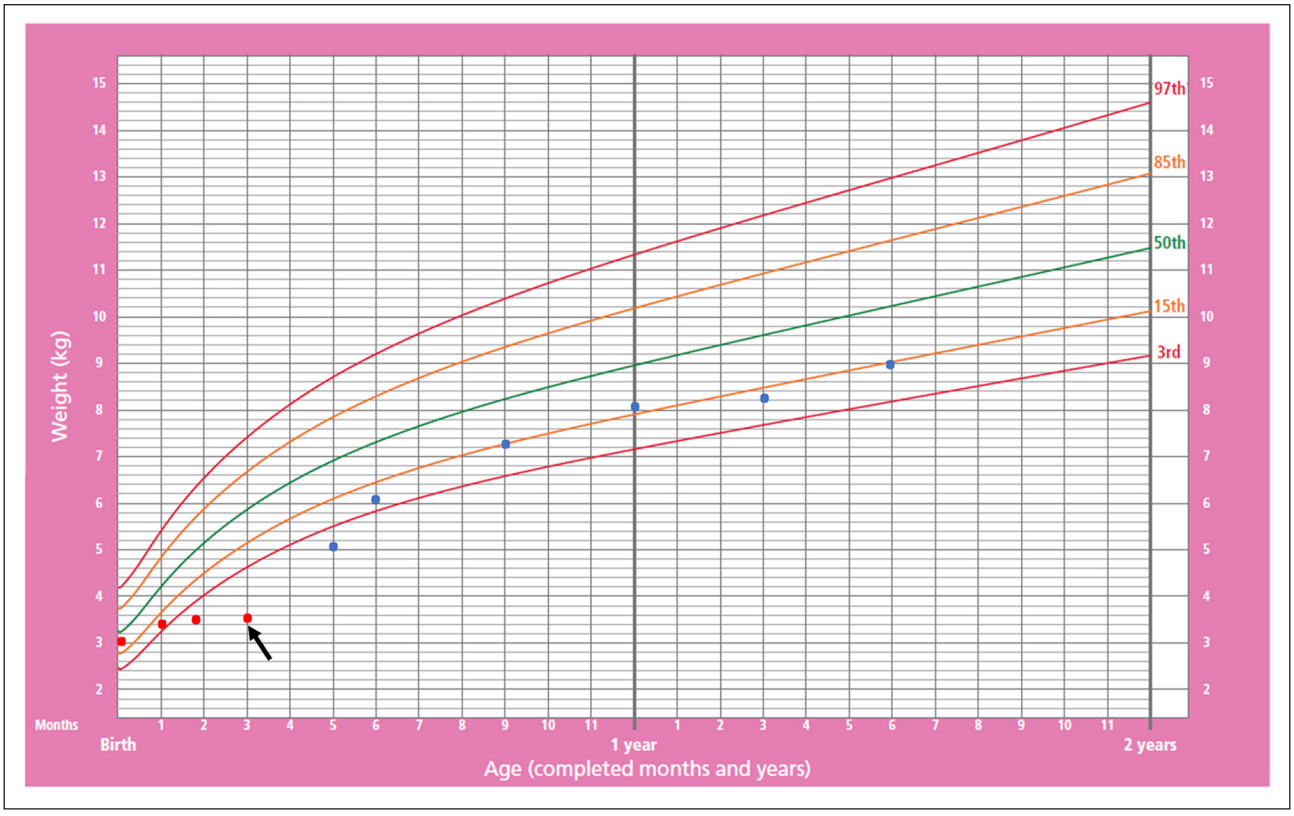

Figure 1. Weight evolution over 18 months of life.
The figure shows the WHO Child Growth Standards (girls chart, weight-for-age: birth to 2 years [percentiles]) [7].
In red, the weight before surgery, and in blue, the weight after the surgical intervention. Surgical intervention is marked with an arrow.

patients and, in case of respiratory distress and/or insufficient weight gain, surgery should be considered, following a comprehensive multidisciplinary approach.

Informed consent

Written informed consent for publication was obtained from the parents of the child.

Declaration of interest

The Authors declare that there is no conflict of interest.

References

1. Olney DR, Greinwald JH, Smith RJH, Bauman NM. Laryngomalacia and its treatment. Laryngoscope. 1999;109(11):1770-5.
2. Jain D, Jain S. Management of Stridor in Severe Laryngomalacia: A Review Article. Cureus. 2022;14(9):e29585.
3. Landry AM, Thompson DM. Laryngomalacia: Disease Presentation, Spectrum, and Management. Int J Pediatr. 2012;2012:753526.
4. Carter J, Rahbar R, Brigger M, Chan K, Cheng A, Daniel SJ, De Alarcon A, Garabedian N, Hart C, Hartnick C, Jacobs I, Liming B, Nicollas R, Pransky S, Richter G, Russell J, Rutter MJ, Schilder A, Smith RJ, Strychowsky J, Ward R, Watters K, Wyatt M, Zalzal G, Zur K, Thompson D. International Pediatric ORL Group (IPOG) laryngomalacia consensus recommendations. Int J Pediatr Otorhinolaryngol. 2016;86:256-61.
5. Richter GT, Thompson DM. The Surgical Management of Laryngomalacia. Otolaryngol Clin North Am. 2008;41(5):837-64.
6. Ayari S, Aubertin G, Girschig H, Van Den Abbeele T, Denoyelle F, Couloignier V, Mondain M. Management of laryngomalacia. Eur Ann Otorhinolaryngol Head Neck Dis. 2013;130(1):15-21.
7. WHO. WHO Child Growth Standards (girls chart, weight-for-age: birth to 2 years [percentiles]). Available at: https://cdn.who.int/media/docs/default-source/child-growth/child-growth-standards/indicators/weight-for-age/cht-wfa-girls-p-0-2.pdf, last access: May 2024.
8. Ribeiro J, Júlio S, Dias C, Santos M, Spratley J. Supraglottoplasty in children with laryngomalacia: A review and parents' appraisal. Am J Otolaryngol. 2018;39(5):613-7.