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Case Report

Overcoming Diagnostic and Surgical Barriers in Rural - Airway Obstruction: A Case of Infantile Laryngomalacia in Zanzibar

Fatma S. Mohammed[1], Khalid Y. Alawy[2], Rashid A. Said[3], Mohammed R Khamis[4], Naufal Kassim Mohammed[2]*

[1]Department of Obstetrics and Gynecology, Abdulla Mzee Hospital, Pemba – Zanzibar, P.O. Box 193, Pemba, Tanzania
[2]Department of Otorhinolaryngology, Mnazi Mmoja Hospital – Zanzibar, P.O. Box 672, Zanzibar, Tanzania
[3]Department of Pediatrics, Mnazi Mmoja Hospital – Zanzibar, P.O. Box 672, Zanzibar, Tanzania
[4]Department of Anasthesia, Mnazi Mmoja Hospital – Zanzibar, P.O. Box 672, Zanzibar, Tanzania

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Abstract: ***Background*:** Laryngomalacia is a congenital or, less commonly, acquired condition characterized by dynamic collapse of the supraglottic structures during inspiration. It is the leading cause of inspiratory stridor in infants, accounting for approximately 60%–75% of cases globally. The pathophysiology involves flaccid laryngeal tissues particularly the arytenoid cartilages, aryepiglottic folds, and epiglottis leading to airway obstruction when negative intrathoracic pressure increases during inhalation. The condition is generally classified as mild, moderate, or severe, based on symptom severity, impact on feeding and growth, and respiratory compromise. While the majority of mild cases resolve spontaneously by 18 to 24 months, more severe forms may result in significant complications including hypoxia, feeding difficulties, gastroesophageal reflux, failure to thrive, obstructive sleep apnea, and developmental delays. In such cases, conservative approaches like anti-reflux therapy and positional feeding may prove inadequate, necessitating surgical interventions such as supraglottoplasty or tracheostomy. In low-resource settings like Zanzibar, timely diagnosis and access to specialized surgical interventions are often limited. This increases the risk of progression from mild to life-threatening forms due to diagnostic delays, lack of equipment such as flexible laryngoscopes, and inadequate neonatal monitoring systems. Additionally, healthcare worker training in neonatal airway disorders is often insufficient in remote areas. This case report illustrates how prompt recognition, referral, and surgical management in such a setting led to a successful outcome, despite initial challenges. ***Case Summary*:** We present the case of a 3-month-old male infant from a rural region of Pemba Island, Zanzibar, who was diagnosed with acquired laryngomalacia after experiencing worsening inspiratory stridor, feeding difficulties, sleep disturbances, and failure to gain weight. The patient was born at term through spontaneous vaginal delivery, with an unremarkable neonatal period. At around 4 weeks of age, he began displaying characteristic symptoms including noisy breathing, increased effort during feeding, choking episodes, and persistent irritability. These symptoms were initially misattributed to common neonatal infections or feeding intolerance. Despite multiple visits to peripheral healthcare centers, his condition progressively worsened. His weight fell below the expected growth percentile, raising concern for failure to thrive. During a multidisciplinary outreach camp held at Micheweni District Hospital, he was examined by pediatricians and ENT specialists, who suspected upper airway obstruction. Subsequent referral to Mnazi Mmoja Hospital in Unguja enabled advanced evaluation. Flexible laryngoscopy revealed a dynamic collapse of supraglottic structures during inspiration consistent with severe laryngomalacia. Given his deteriorating condition and the unsuccessful attempts at intubation, a tracheostomy was performed under local anesthesia and sedation to secure the airway. The procedure led to immediate clinical improvement. Postoperatively, the patient demonstrated reduced stridor, improved feeding efficiency, better sleep, and steady weight gain. Follow-up over three weeks confirmed sustained recovery and positive developmental progress. This case underscores the importance of early multidisciplinary intervention and highlights the feasibility and efficacy of tracheostomy in low-resource environments when timely supraglottoplasty is not an option.

Keywords: Acquired Laryngomalacia, Stridor, Tracheostomy, Local Anesthesia, Sedation, Remote Area, Infant Airway Obstruction.

***Corresponding Author:** Naufal Kassim Mohammed
Department of Otorhinolaryngology, Mnazi Mmoja Hospital – Zanzibar, P.O. Box 672, Zanzibar, Tanzania

INTRODUCTION

Laryngomalacia caused by the inward collapse of the soft tissues in the voice box during inhalation, is the most common reason infants struggle with noisy breathing (inspiratory stridor), accounting for well over half of all cases. While most babies outgrow this condition naturally within the first two years, it's not always benign.

For about 20-30% of affected infants, the condition becomes severe, leading to serious complications. These can include difficulty feeding, chronic lack of oxygen, sleep apnea, and failure to gain weight. When these severe symptoms appear, medical intervention is essential. The preferred treatment in well-equipped hospitals is a minor surgical procedure called supraglottoplasty, but if the airway is critically blocked, a tracheostomy may be necessary to save the baby's life.

This case study is important because it highlights the reality of managing severe laryngomalacia in places with limited resources, like rural Zanzibar. It details how a 3-month-old boy, whose condition was escalating and causing him to fail to thrive, was successfully treated. Despite the lack of immediate access to specialized equipment, a collaborative team made a life-saving decision to perform a tracheostomy. This case underscores that with prompt recognition, teamwork, and an adaptive surgical approach, even the most challenging infant airway issues can be successfully managed in resource-limited settings.

CASE PRESENTATION

A 3-month-old male infant was referred by a pediatrician with complaints of difficulty breathing and intermittent inspiratory stridor since birth. Otologic and nasal examinations were unremarkable. The infant, born at 37 weeks gestation via spontaneous vaginal delivery at Micheweni Hospital, Pemba, weighed 3 kg at birth and had a good Apgar score. He was discharged two days later and continued immunizations as per Tanzania's national schedule.

One month after delivery, the patient began exhibiting intermittent inspiratory stridor a high-pitched sound that worsened during feeding, crying, or when the infant was in a supine position. The mother reported difficulty in breastfeeding, characterized by frequent choking, coughing, and episodes of regurgitation. The infant also showed signs of sleep-disordered breathing, including restless sleep, snoring, and occasional pauses in breathing (apneas). Over time, there was noticeable poor weight gain, despite adequate feeding attempts, indicating a feeding-related dysfunction. Mild chest retractions and nasal flaring were observed during breathing efforts, reflecting increased respiratory effort. Additionally, the baby exhibited excessive sweating during feeding and general irritability, likely due to oxygen desaturation. Despite multiple visits to local healthcare centers, the symptoms persisted and progressively worsened. During a multidisciplinary specialist camp at Micheweni District Hospital, the child was evaluated and referred to Mnazi Mmoja Hospital, Zanzibar, for advanced care. Laryngoscopy confirmed dynamic collapse of the supraglottic structures during inspiration, consistent with severe laryngomalacia, and intubation was unsuccessful due to airway obstruction. A tracheostomy was performed under local anesthesia and sedation to secure the airway. Postoperatively, the infant showed marked improvement in respiratory function, reduced stridor, improved feeding, and a steady increase in weight, indicating a positive clinical outcome. As shown in figure 1 and 2.

Figure 1: Before intervention

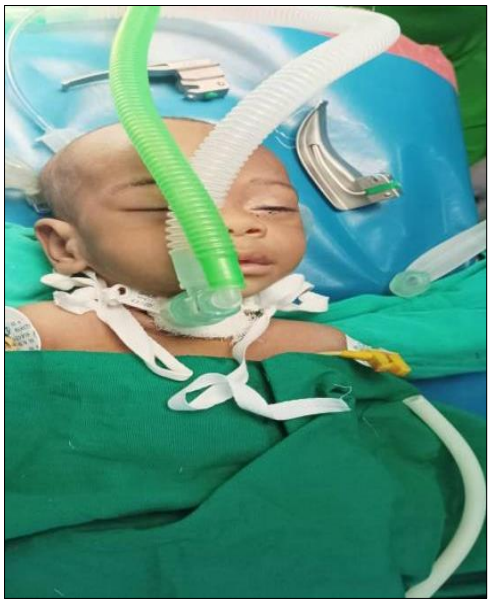

Figure 2: Trachelectomy insitu

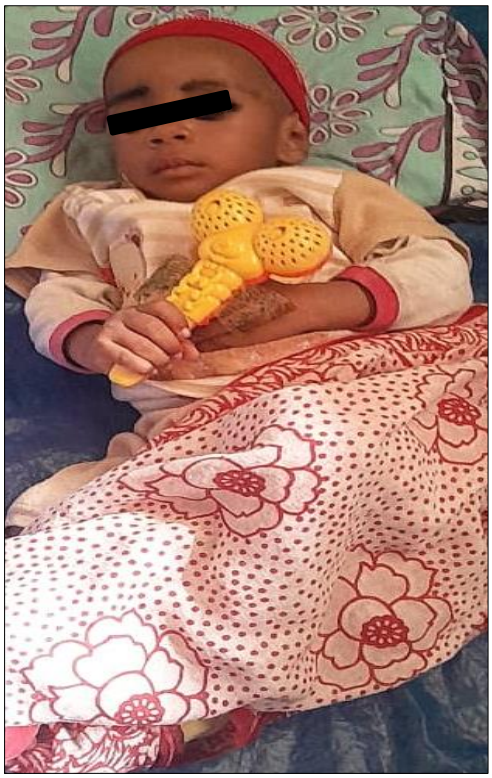

Figure 3: Post operative follow up after 3 month

DISCUSSION

Laryngomalacia is the most frequent cause of congenital stridor in infants, representing approximately 60%–75% of all cases [1]. The condition arises due to the dynamic collapse of supraglottic airway structures during inspiration, which leads to intermittent upper airway obstruction. While congenital laryngomalacia typically presents within the first few weeks of life, acquired forms—though rare—have been documented and may arise due to neuromuscular compromise, underlying inflammation, or delayed anatomical maturation [2]. Our case is notable for its early onset and progression in a resource-limited setting, highlighting unique challenges in diagnosis and intervention.

According to the World Health Organization (WHO), neonatal respiratory disorders account for a significant proportion of infant morbidity and mortality globally, particularly in low-resource settings where diagnostic tools such as flexible laryngoscopy are often unavailable [3]. This underscores the importance of early clinical recognition of stridor and prompt referral in settings such as rural Zanzibar, where specialist access is limited.

The infant in this report was initially well-appearing, discharged after spontaneous vaginal delivery with good Apgar scores, and received routine immunizations as per Tanzanian guidelines. However, the progressive onset of stridor, feeding difficulty, poor weight gain, and signs of sleep-disordered breathing were consistent with severe laryngomalacia. The clinical features were exacerbated by the lack of early airway imaging and specialist evaluation, which is a common barrier in many sub-Saharan African regions.

Importantly, while many mild cases of laryngomalacia resolve spontaneously by 18–24 months, 20%–30% may progress to a severe form requiring intervention. This group typically presents with a “failure to thrive” profile due to the combined effects of poor feeding, chronic hypoxia, and increased respiratory effort [4]. In our case, these complications were evident and led to a delay in growth milestones despite adequate caloric intake. Of note, poor weight gain is considered one of the strongest clinical indicators warranting surgical evaluation.

Multidisciplinary involvement was key in managing this case. Pediatricians, ENT specialists, and anesthesiologists collaborated during a visiting outreach camp—a strategy increasingly adopted in under-resourced areas to bridge gaps in specialized care. The definitive diagnosis was made via flexible laryngoscopy, revealing inspiratory collapse of the arytenoid cartilages and epiglottis, confirming the diagnosis [5].

While supraglottoplasty is the standard surgical treatment in high-resource settings, a tracheostomy was chosen in this case due to logistical constraints, limited anesthesia capacity, and airway compromise severity. Tracheostomy under local anesthesia was successfully performed and demonstrated excellent outcomes: reduced stridor, improved feeding, and subsequent weight gain. This aligns with existing evidence that tracheostomy, though more invasive, remains a lifesaving alternative when endoscopic supraglottoplasty is not feasible.

Interestingly, no gastroesophageal reflux symptoms were reported in this case, although reflux is present in up to 60% of infants with laryngomalacia. Reflux exacerbates laryngeal inflammation and may worsen airway collapse. Absence of such symptoms in our patient suggests an isolated form of the disease, simplifying the management approach [6].

In reviewing similar cases from East Africa, delays in referral, misdiagnosis as bronchiolitis or asthma, and reliance on symptomatic treatment are frequently noted. This case illustrates the critical need for clinical education about stridor’s etiology and the value of including airway pathology in differential diagnoses, especially when standard respiratory treatments fail.

Furthermore, this case serves as an example of how context-specific decisions such as choosing tracheostomy over supraglottoplasty can yield positive results when guided by clinical acumen and teamwork. Postoperative monitoring, caregiver education, and plans for decannulation or future surgery are essential components of long-term care in such patients.

In summary, the successful outcome of this infant illustrates the importance of early recognition, multidisciplinary collaboration, and adaptable surgical strategies in the management of severe laryngomalacia. The case further emphasizes the need for strengthening pediatric airway care services and diagnostic capacity in remote and underserved regions like Zanzibar.

CONCLUSION

Laryngomalacia affects roughly 1 in 2000–3000 infants and remains the most frequent cause of congenital stridor, accounting for about two-thirds of cases in infants less than two years. Although most resolve spontaneously by 24 months, up to 30% develop severe disease with associated feeding and respiratory complications. In such instances particularly among low birth weight or preterm infants in resource-limited settings early referral and surgical intervention like tracheostomy or supraglottoplasty may be lifesaving.

Patient's Perspective

The family appreciated the timely intervention, thorough explanation of the diagnosis and prognosis, and the structured follow-up plan.

Acknowledgments

We extend our sincere appreciation to all individuals and institutions involved in the successful management of this case. In particular, we acknowledge the Zanzibar Outreach Program (ZOP) for its crucial role in delivering specialized services to remote areas. The outreach camp held at Micheweni District Hospital, organized by ZOP, was instrumental in the early diagnosis and referral of this infant.

Through its multidisciplinary approach, ZOP brought together pediatricians, ENT specialists, and anesthetists, enabling life-saving interventions in a resource-limited setting. The program continues to serve as a model for bridging healthcare gaps across the islands of Zanzibar, especially for rural and underserved communities.

We also thank the teams at Abdulla Mzee Hospital – Pemba and Mnazi Mmoja Hospital – Unguja for their collaborative care, and the patient's family for their trust and cooperation throughout the process.

Timeline

The patient was assessed, referred, and underwent intervention over a 6-month period. Postoperative care and follow-up were conducted over 3 weeks.

Author Contributions

All authors contributed to the management of the patient and preparation of the manuscript. All authors reviewed and approved the final version.

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Ethical Approval and Consent to Participate: Written informed consent was obtained from the patient's guardian for participation and publication.

Consent for Publication

Written consent was obtained for the publication of the case and accompanying images. Copies are available upon request from the Editor-in-Chief.

Competing Interests: The authors declare no competing interests.

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