CLINICAL VIGNETTE

Congenital Laryngomalacia: Is Outpatient Surgery Safe?

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Introduction

Congenital laryngomalacia is the most common cause of stridor among newborns. This form of dynamic airway obstruction complicates many aspects of anesthetic management, from securing the airway to selecting the appropriate level of postoperative care. This case report illustrates the uncertainty in proceeding with surgery in a toddler with laryngomalacia and other comorbidities within a facility of limited resources for pediatric care.

Case Report

The patient is a 2-year-old female with a history of Cri-Du-Chat Syndrome requiring revision of a gastrostomy stoma due to frequent tube displacements, leakage from the stoma, and surrounding granulation tissue. During the preoperative evaluation, the patient exhibited loud inspiratory stridor, although her breathing was unlabored with normal vital signs. The child's parents noted that this breathing was typical. Review of her history revealed that molecular genetic studies confirmed a deletion of 5p consistent with Cri-Du-Chat Syndrome and she exhibited several of the common physical syndromic features. In addition to having the distinctive facial features, developmental delay, and hypertonia, she had stridorous, but unlabored breathing at birth. The child was diagnosed with congenital laryngomalacia following flexible laryngoscopy evaluation and continued to have regular follow-up with ENT. She had prior general anesthesia procedures for inguinal hernia repair, anal dilation, and gastrostomy tube placement at age 1. These surgeries were done at other facilities, where she was observed in an ICU postoperatively for these procedures given her respiratory condition and presumed need for continuous cardiorespiratory monitoring.

A care plan was formulating among the anesthesiologist, surgeon, and pediatrics unit. Postoperative ICU admission would require transfer of the patient's care to another facility, as the patient's planned facility did not have a pediatric inpatient unit with continuous cardiorespiratory monitoring. Therefore, to obviate the need for transfer, the care plan was modified to promote a rapid recovery with minimal risk for postoperative hypoventilation or laryngotracheal edema. This included using an opioid-sparing technique with local anesthetic and NSAIDs, avoiding endotracheal intubation, minimizing surgical time, and prolonging monitoring in the postanesthetic care unit.

On the day of the procedure, the patient presented with 100% SpO2 and continued inspiratory stridor without tachypnea. She underwent inhalation induction of general anesthesia. A laryngeal mask airway was placed uneventfully with good tidal volume return during spontaneous respiration. The anesthetic lasted 45 minutes. Local anesthetic was infiltrated around the surgical wound at the end of the case. The patient was monitored uneventfully for three hours in the recovery room and was then discharged home with full return of alertness.

Discussion

Congenital laryngomalacia results from the inward collapse of supraglottic structures during inspiration. This dynamic obstruction often is caused by several anatomic mechanisms, including redundant mucosa, short aryepiglottic folds, and a long, tubular epiglottis. The negative pressure during inspiration triggers laryngeal obstruction by causing cuneiform and arytenoid cartilages to collapse inward or the epiglottis to curl on itself.[1] Signs of inspiratory obstruction include tachypnea, nasal flaring, chest retraction, stridor, and when sufficiently severe, cyanosis. In addition, these respiratory symptoms are frequently accompanied by gastroesophageal reflux, feeding difficulties, and failure to thrive.[2] Swallowing studies diagnosed dysphagia in over 50% of children with laryngomalacia in a retrospective review at a single institution.[3] Respiratory symptoms often present at birth or shortly afterwards, peak at approximately 6 to 9 months, and generally resolve in the first few years of life.[4]

Surgical treatment for laryngomalacia is necessitated in approximately 20% of cases due to the severity of respiratory obstruction.[5] Surgical options range from tracheostomy to various types of supraglottoplasty, in which redundant and prolapsing tissue is removed. The excision of these tissues may be performed with conventional microsurgical instruments or with a CO_2 laser. A single center retrospective review of 31 patients who underwent supraglottoplasty noted an 87% success rate.[6] Surgical failures were more common in patients with congenital syndromes and in cases where neurologic anomalies contributed to respiratory symptoms.

Given the anesthetic risks of airway instrumentation and respiratory depression for further impairing ventilation, significant consideration was given to transferring the patient's surgical care to a higher acuity facility. Ultimately, because the

severity of obstruction from laryngomalacia lessens with age, the surgery would be short, with low anticipated opioid requirements, the surgery was performed without readily available ICU or high acuity postoperative monitoring. Instead, a prolonged recovery room stay prior to same day discharge was planned to monitor respiratory status and improve patient safety. Though there are numerous studies regarding outcomes of supraglottoplasty surgery for correction of congenital laryngomalacia, there is a lack of studies quantifying the anesthetic and postoperative complications of non-airway surgery in these patients. In a different circumstance with more worrisome surgical or patient risk factors, a more cautious approach may be warranted, though there are little data to guide decision making or stratify risk.

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