

Case Report

The Hidden Threat: Understanding Saccular Cysts

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Abstract

Saccular cysts are extremely rare, but they can pose a significant risk to the airway of a newborn. We describe a case of saccular cyst in a term infant born via emergency Caesarean section for fetal distress, who immediately presented with respiratory difficulties. Multiple provisional diagnoses were made before the definite diagnosis of saccular cyst was confirmed using direct laryngoscopy and surgically treated with marsupialisation. Postoperatively, the infant's condition steadily improved, and was discharged home well. This case highlights the importance of quick recognition and timely intervention in newborns with airway obstruction.

Key words

Airway obstruction; Endoscopic marsupialisation; Larynx; Saccular cyst

Introduction

Saccular cysts of the larynx in newborn infants are of significant concern because they can lead to airway compromise and respiratory complications. They account for about 1.5% of congenital disorders of the larynx.¹ These cysts arise from the saccule, a small structure within the larynx that typically functions as a reservoir for lubricating secretions.² It results from developmental failure to maintain patency of the orifice between the saccule and the ventricle.³ Obstruction of the saccule

causes secretions to accumulate, resulting in a cystic formation that can compromise the airway. This causes symptoms such as stridor, dyspnoea, or acute respiratory distress at birth.^{1,2,4}

Case Presentation

A term male infant was born at 38 weeks via emergency Caesarean section for fetal distress. He was born with a poor APGAR score, weighing 2.57 kg, and had to be intubated due to bradycardia and desaturation despite administration of positive-pressure ventilation and was transferred to the neonatal intensive care unit (NICU) for ventilation support. The intubation was difficult, as a mass was seen pushing the epiglottis and obstructing the vocal cord. Intubation was successful only after two attempts, using a 3.5-mm sized endotracheal tube (ETT).

The patient was referred to the Paediatric Otorhinolaryngology service for further management. He was subsequently planned for direct laryngoscopy, bronchoscopy and marsupialisation of the cyst under general anaesthesia. Intraoperatively, a large round mass was seen at the left false cord, extending posteriorly to the aryepiglottic fold and arytenoid, and medially, covering the ETT and left vocal cord (Figure 1). The mass was cystic with a smooth surface and prominent vessels over the

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surface of the cyst. Upon marsupialisation, there was thick mucinous clear secretion, supporting the diagnosis of saccular cyst. The cyst wall was sent for histopathology examination, and the result returned as a benign laryngeal cyst.

He was extubated after five days and subsequently able to wean off oxygen supplementation on postoperative day 10. He was able to tolerate oral feeding and was discharged home on postoperative day 17. He was followed up one month after the operation and subsequently at a three-monthly interval. During the latest follow-up after one year and three months, he remained well with no episodes of respiratory distress or cyanosis. He was also able to tolerate feeding well with good weight gain. The repeated flexible scope was unremarkable.

Discussion

Saccular cysts are rare congenital lesions of the larynx, representing a small but significant cause of upper airway obstruction in infants as compared with other congenital airway lesions such as laryngomalacia, vocal cord paralysis and subglottic stenosis. However, the lesion can also exist concomitantly with other laryngeal conditions such as laryngomalacia.⁵ Although the saccular cysts are benign, their position in the laryngeal framework may compromise respiration and general development. Sometimes, fatal complications may arise from a misdiagnosis or a treatment delay. In our case, the infant presented with acute respiratory distress and inaudible crying, which precluded a definite diagnosis at the point of presentation. At the time of presentation, it was essential to establish an airway as quickly as possible.

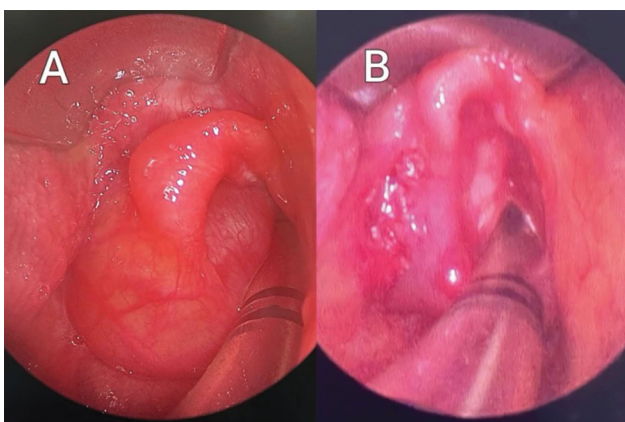


Figure 1. Direct laryngoscopy view showing the saccular cyst before (A) and after (B) marsupialisation.

The symptoms depend on their size and location. A huge cyst may present at birth with severe airway obstruction, as seen in our patient. In the worst-case scenario, the patient may require an immediate tracheostomy if the airway cannot be secured. In our case, the large rounded cyst significantly narrowed the lumen of the larynx and glottis, pushing the ETT to the contralateral side. On the other hand, smaller cysts may be asymptomatic or have milder symptoms like inspiratory stridor, dysphonia and feeding difficulties.^{6,7} The likelihood that a saccular cyst would develop into cancer is between five and 30 percent.⁸ However, malignant transformation in congenital saccular cysts is rare, and the reported literature relates to older patients and smoking.⁹

The diagnosis of a saccular cyst is best made via direct laryngoscopy.¹ The characteristic finding is a smooth, mucus-filled mass protruding into the airway, with no communication to the laryngeal lumen. Unlike laryngoceles, which are air-filled mass that do communicate with the laryngeal lumen.³ The diagnosis and treatment are best performed during the same setting. By using a rigid telescope, direct visualisation of the pharyngolarynx can easily identify the pathology. Magnetic resonance imaging (MRI) and contrast-enhanced computed tomography (CECT) scans can also help to confirm the diagnosis by determining the contents, location, and extent of the cysts.² In a lateral plain radiograph, saccular cysts may appear as a faint hypodensity at the level of the glottis. In a CECT scan, the cyst appears as a well-defined mass with an enhancing lesion, while in an MRI, it appears as a well-defined mass with fluid signal intensity on T2.^{8,10}

Surgical intervention is crucial in preventing severe airway compromise and can be performed by endoscopic or external approaches depending on the size and location of the cyst.^{2,4,8} Currently an endoscopic approach with a carbon dioxide (CO₂) laser is thought to be the preferred method of treatment, in view of its ability to provide precise ablation and haemostasis through its control of tissue penetration depth. This can avoid rupture of the cyst wall that can potentially lead to recurrence.^{1,2,8} The minimally invasive approach of this procedure allows for patients' rapid recovery. Joo et al. published a single-institution experience in managing seven patients with anterior-type saccular cysts with CO₂ laser without recurrence. This study also suggests that this type of treatment is only best for cysts equal to or less than 3 cm.²

As the CO₂ laser is not available at our centre, we opted for endoscopic marsupialisation, which is also widely

accepted as the first-line treatment for saccular cysts.^{3,6,7} Prowse and Knight published a case series of 10 patients with ductal and saccular cysts and found that single-stage endoscopic marsupialisation was an effective intervention of treatment with minimal risk of recurrence.⁷ This technique allows for adequate drainage of the cyst while preserving normal laryngeal structures. The use of cold instruments in marsupialisation minimises thermal damage to the delicate surrounding tissues, reducing the risk of postoperative scarring or airway stenosis. Our goal was to minimise tissue handling and anaesthesia time in order to reduce post-operative surgical site oedema. In our case, the infant tolerated the procedure well and experienced no postoperative complications.

The treatment of saccular cysts remains controversial and a subject of debate, as some paediatric otorhinolaryngologists believe that cysts treated endoscopically are more prone to recur, and as such, close continuous follow-up is mandatory.^{1,7} Recurrence is the most frequent complication of treatment, accounting for 24%, and is more often observed in older studies, where most of them are treated conservatively.¹ Several case series report recurrences within three months after treatment; thus, it has been proposed that patients have endoscopic surveillance after one month of surgery, followed by three monthly surveillances in the first year of follow-up, and every six months for subsequent years.¹ This case highlights the critical role of the paediatric otorhinolaryngologist in managing congenital airway anomalies. With early surgical management, the prognosis for saccular cysts is excellent, as seen in this case, where the patient remained asymptomatic at one year and three months follow-up.

Conclusion

Even though saccular cysts are rare, they are a critical and significant aspect of paediatric airway management. This case highlights not only the importance of establishing an airway but also the use of diagnostic laryngoscopy and bronchoscopy to determine an early diagnosis. Management strategies continue to evolve with technical advancements and refinements, with a recent trend towards minimally invasive endoscopic techniques. Although saccular cysts have good prognoses, long-term monitoring is important to detect potential recurrence.

Further research is necessary to establish more definitive guidelines and improve clinical outcomes.

Declaration of Interest

All authors have disclosed no conflicts of interest.

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