

A Rare Case of Communicating Neck Cyst in a 28-Day-Old Neonate

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Abstract

Congenital neck anomalies in neonates often present diagnostic dilemmas, particularly when they communicate with the aerodigestive tract. This report describes a rare case of a large, compressive neck cyst in a 28-day-old neonate. Initially presenting as a progressively enlarging cervical mass, the lesion's potential for airway communication was identified by the presence of intralesional air-fluid levels on computed tomography and magnetic resonance imaging. Advanced diagnostic techniques, including virtual bronchoscopy and intraoperative laryngoscopy, were utilized to successfully localize a direct communication between the cyst and the left false vocal cord. This finding confirmed the diagnosis of a rare branchial apparatus anomaly rather than a simple cervical abscess or cystic hygroma. The patient underwent definitive management through complete surgical excision and ligation of the communicating tract, resulting in a full recovery without recurrence. This case highlights the importance of recognizing specific radiological markers, such as air-fluid levels, as indicators of airway communication. It further emphasizes that while these lesions may mimic infectious processes, successful outcomes rely on a high index of clinical suspicion, precise anatomical localization through multimodal imaging, and definitive surgical intervention over simple drainage procedures.

Categories: General Surgery, Medical Education, Pediatric Surgery

Keywords: branchial anomaly, communicating neck cyst, cyst neck ligation, difficult laryngoscopy, head and neck cyst, laryngocele, pediatrics and neonatology, virtual bronchoscopy

Introduction

Congenital neck anomalies, including communicating cysts and sinuses, represent a diverse group of pathologies that arise from the complex embryological development of the branchial apparatus and the thyroglossal duct. While common midline masses, such as thyroglossal duct cysts, are frequently encountered, anomalies originating from the third and fourth branchial pouches are exceptionally rare, typically manifesting on the left side of the neck. These lesions often present diagnostic challenges, as their communication with adjacent aerodigestive structures can result in recurring symptoms or acute respiratory distress in neonates [1]. These anomalies are frequently misidentified as more common conditions, such as simple neck abscesses or cystic hygromas, leading to inappropriate initial management [2]. Incision and drainage provides temporary alleviation of acute infections but is associated with high recurrence rates and risks of sinus-to-fistula transformation if the underlying communicating tract is not addressed [3]. A multimodal diagnostic strategy is therefore imperative for the precise characterization of these anomalies. Ultrasonography, although frequently utilized as the initial imaging modality, offers limited diagnostic accuracy in detecting communicating tracts in neonates when compared to advanced techniques [4]. Contrast-enhanced computed tomography and magnetic resonance imaging provide superior delineation of anatomical boundaries and identification of intralesional air bubbles or air-fluid levels. These radiographic features constitute essential indicators of potential direct communication with the airway or pharynx, thereby mandating additional investigative measures. This report delineates a rare instance of a large, compressive neck cyst in a 28-day-old neonate, determined to communicate directly with the left false vocal cord. We highlight the efficacy of virtual bronchoscopy as a non-invasive modality for evaluating airway patency and the pivotal role of intraoperative laryngoscopy in precisely localizing the communicating tract [5]. In essence, complete surgical excision-encompassing meticulous ligation of the communicating sinus-remains the definitive intervention to avert recurrence and safeguard the long-term patency of the neonatal airway.

Case Presentation

A 28-day-old female neonate was brought with a solitary swelling on the left side of the neck since day 3 of life. There was no respiratory distress and no difficulty in deglutition. Swelling was initially small and gradually grew in size. Aspiration of the cyst was done elsewhere on day 10 of life, which led to the initial decrease in size, followed by recurrence. Clinical examination showed a solitary, soft, and cystic swelling of size 7 x 7 cm over the left side of the neck from the base of the ramus of the mandible to the superior border of the clavicle. It was a globular swelling with a smooth surface and well-defined margin (Figure 1).

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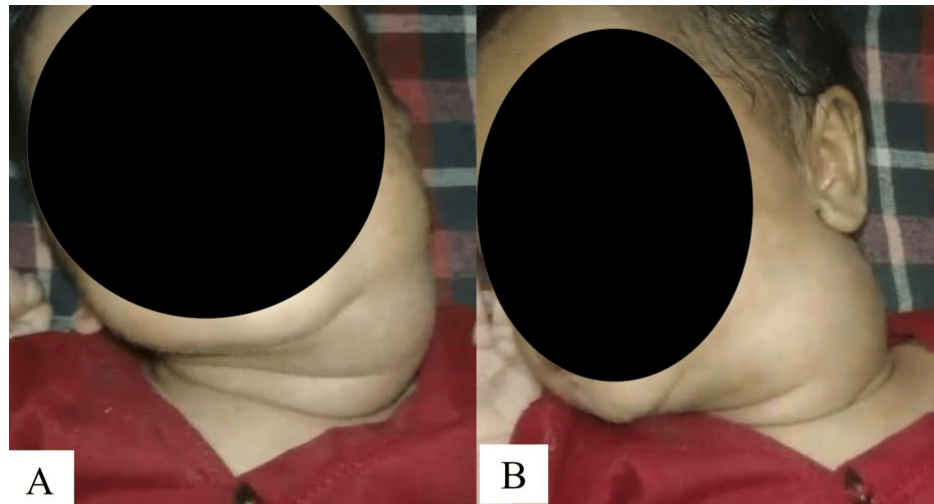


FIGURE 1: Single cystic swelling over the left side of the neck in the antero-posterior (Figure 1A) and right lateral rotation (Figure 1B) positions.

No scar, venous prominence, pigmentation, or ulceration was seen. There was also no expansile cough impulse. Transillumination was present (Figure 2).

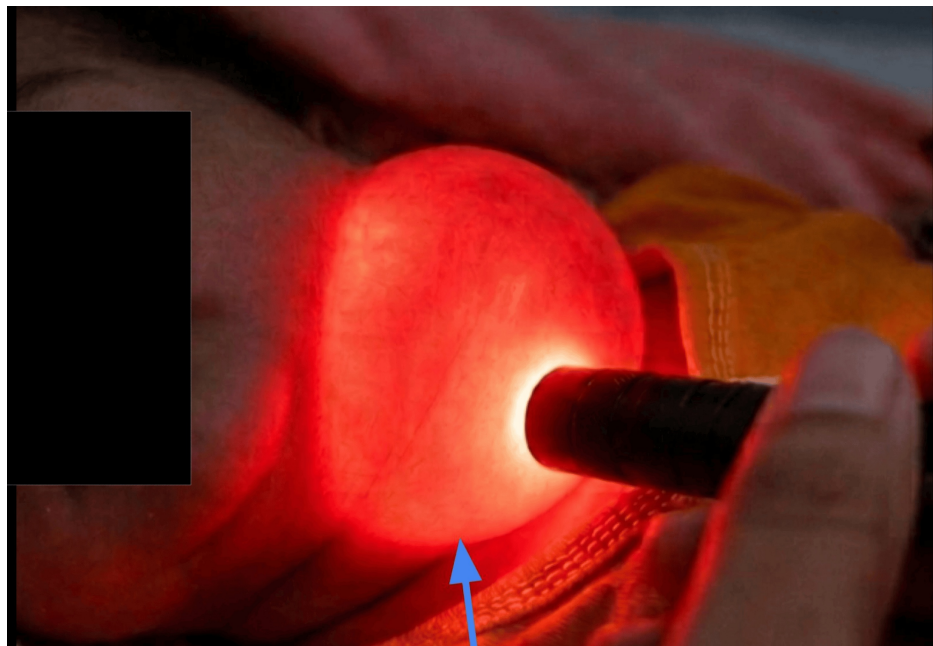


FIGURE 2: Positive transillumination of the neck swelling in the 28-day-old neonate, confirming its cystic nature (blue arrow). Illumination by a handheld clinical torch.

Swelling was compressible but not completely reducible. The swelling became tense three days after admission without any intervention. Ultrasonography was suggestive of an anechoic fluid-filled lesion on the left side of the neck. The lesion did not show any significant vascularity on colour Doppler (Figure 3).

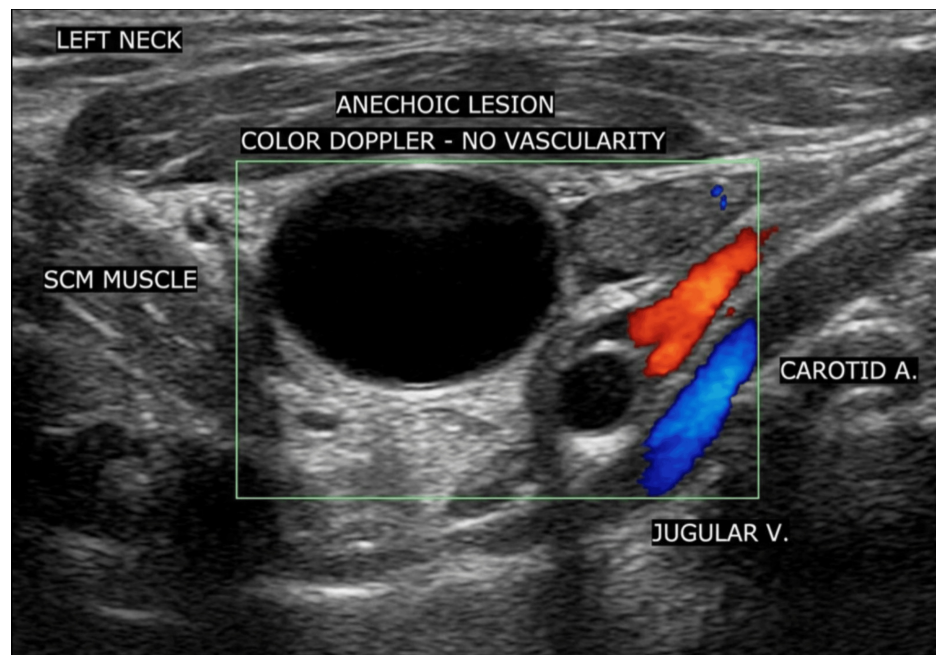


FIGURE 3: Ultrasonography of the left side of the neck showing anechoic fluid filled lesion without any significant vascularity.

Magnetic resonance imaging was suggestive of a cystic swelling on the left side of the neck showing a large fluid level within. Laryngopharyngeal structures were mildly displaced toward the right side due to the pressure effect of the swelling. The lesion was also seen insinuating along the posterior aspect of the pharynx and larynx, causing a pressure effect over the prevertebral soft tissue. This was suggestive of an infective or inflammatory cystic swelling (Figure 4).

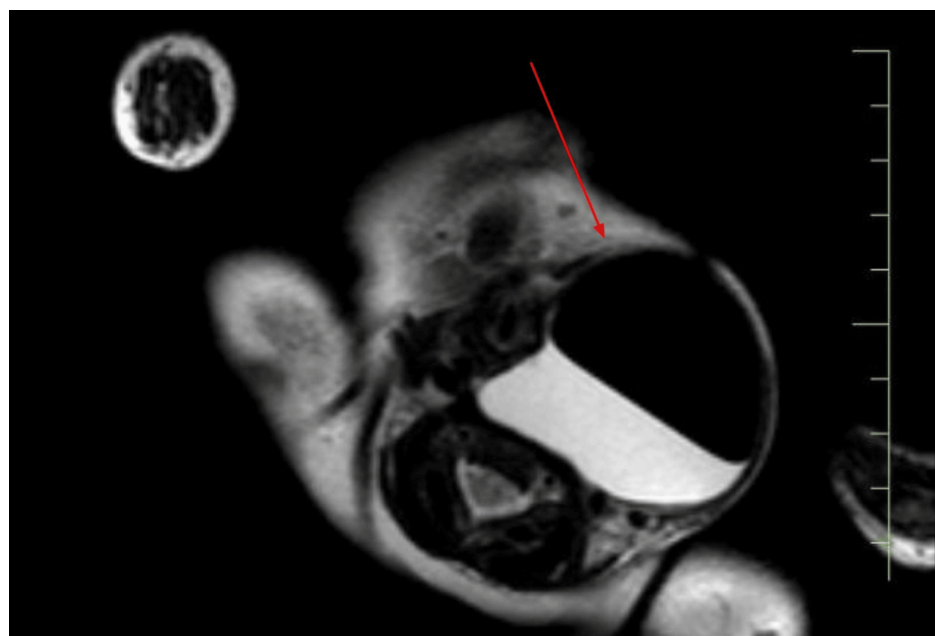


FIGURE 4: Magnetic resonance imaging: Cystic swelling in the left side of the neck (red arrow) with a large air-fluid level causing pressure effect. Laryngopharyngeal structures and prevertebral soft tissue mildly displaced toward the right side. The lesion seen insinuating along the posterior aspect of the pharynx and larynx.

In view of the uniloculated tense cystic swelling, the differential diagnosis of *infected uniloculated lymphangioma or neck abscess* was made. Incision and drainage were done on day 5 of admission. Intraoperatively, pale-yellow fluid was drained (Figure 5), and the cavity was packed with betadine-soaked gauze. Fluid cytology revealed acellular granular necrotic material and degenerated inflammatory cells.

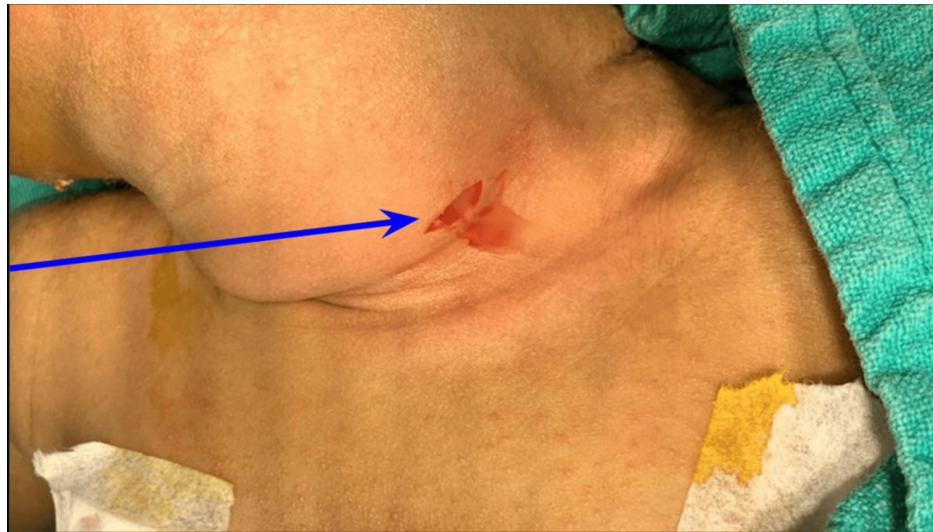


FIGURE 5: Incision and drainage: day 5 of admission. Intraoperatively pale-yellow fluid drained (blue arrow).

The postoperative course was uneventful for the next five days. There was a slow regain in size from the sixth postoperative day, which increased to the preoperative size by the 10th postoperative day (Figure 6).



FIGURE 6: Slow regain in the size of the neck swelling (blue arrow) noted on the sixth postoperative day after incision and drainage.

Repeat USG again revealed uniloculated swelling. X-ray of the neck and thorax revealed a huge air pocket on the left side of the neck (Figure 7).

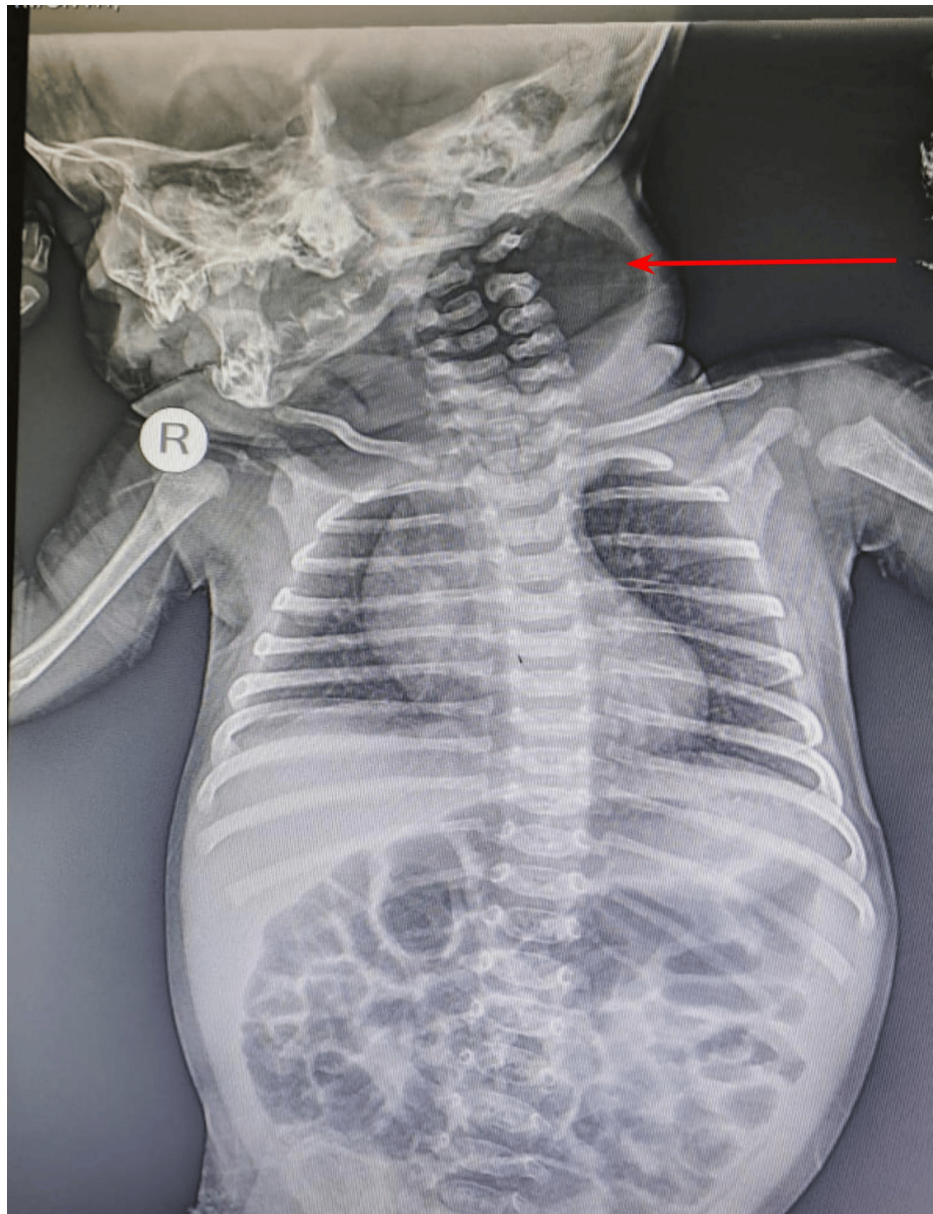


FIGURE 7: X-ray of the neck and thorax, done on the 10th postoperative day after incision and drainage, revealed a huge air pocket in the left side of the neck (red arrow).

CT scan of the neck with local insertion of contrast into the cyst revealed an uniloculated cyst with an air-fluid level and showed no communication of the cyst to the oesophagus, trachea, or larynx (Figure 8).



FIGURE 8: CT scan of the neck with the local insertion of contrast into the cyst revealed a uniloculated cyst with air-fluid level and close proximity to the trachea (red arrow). No communication with the esophagus, trachea, or larynx.

A bulge of the cyst was seen inside the lumen of the trachea on Virtual Bronchoscopy (Figure 9). The cyst was found to be located in close proximity to the trachea.

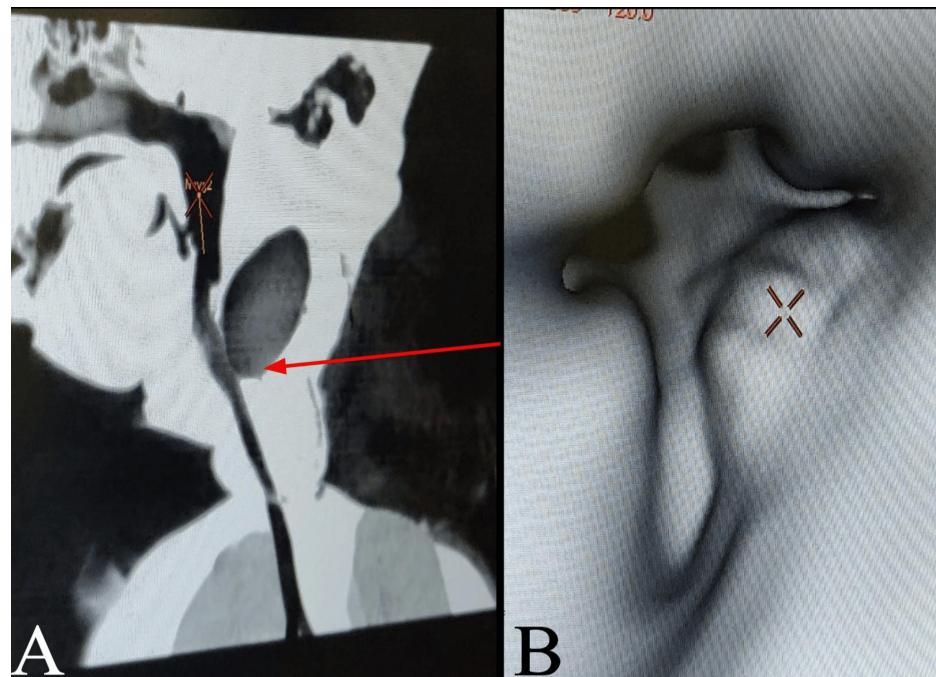


FIGURE 9: Virtual bronchoscopy showing the cyst (Figure 9A) being located in close proximity to the trachea (red arrow). Bulge of the cyst (Figure 9B) was seen inside the lumen of the trachea (brown cross).

In view of the above findings, excision of the cyst was planned. Routine pathological and biochemical investigations were normal. Necessary paediatric fitness, due consent, and pre-op preparation were done. Preoperatively, laryngoscopy was done for endotracheal intubation, which revealed a small dimple-like opening on the left false vocal cord, giving a clue to communication of the neck cyst (Figure 10).

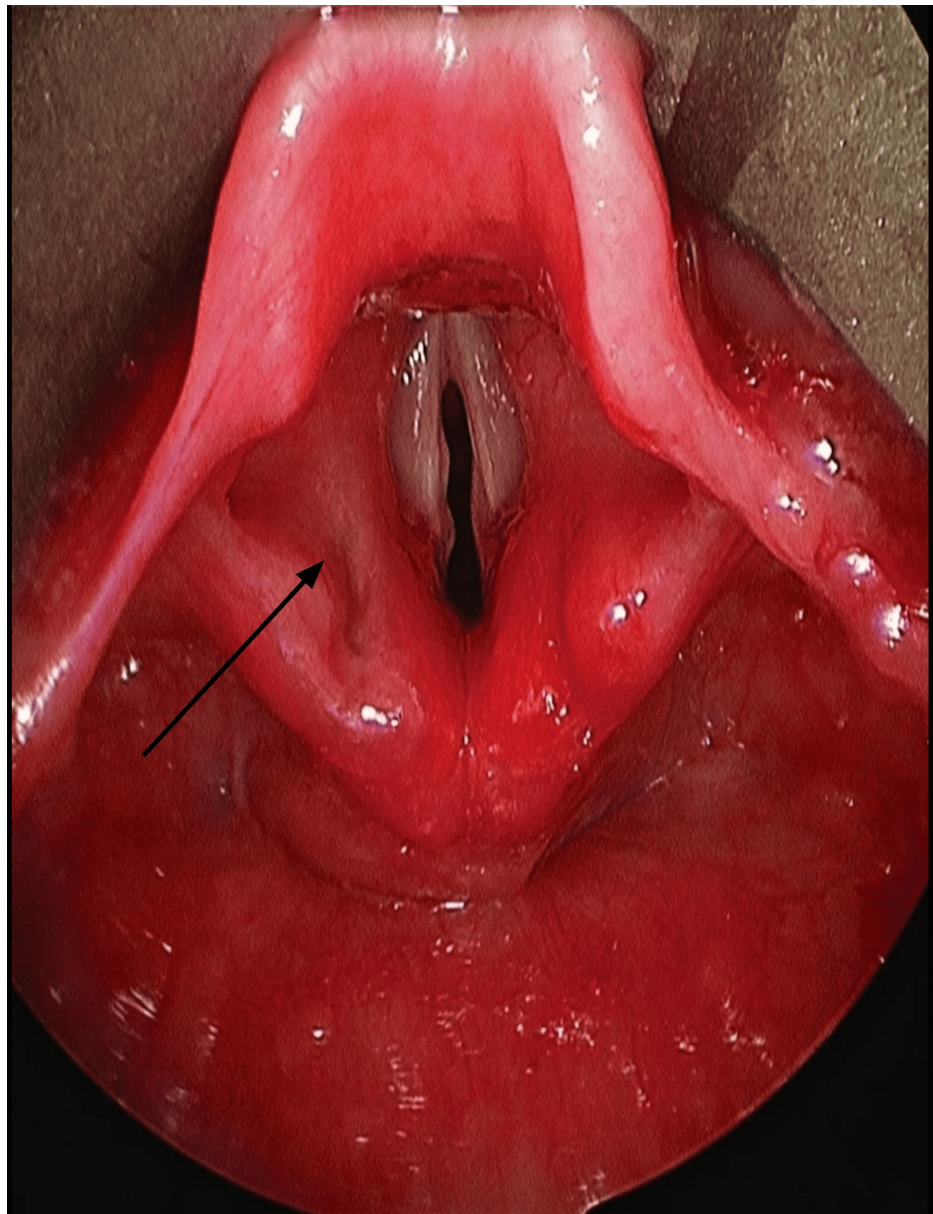


FIGURE 10: Preoperative endotracheal intubation showed a small dimple-like opening (black arrow) on the left false vocal cord, implying communication of the neck cyst.

A transverse incision was made in the neck over the swelling (Figure 11).



FIGURE 11: Transverse incision over swelling in the left neck. Wound retracted by means of hemostatic forceps applied over superior, inferior, and medial edges.

The cyst was enucleated on all sides from surrounding soft tissue and opened at the dome (Figure 12).

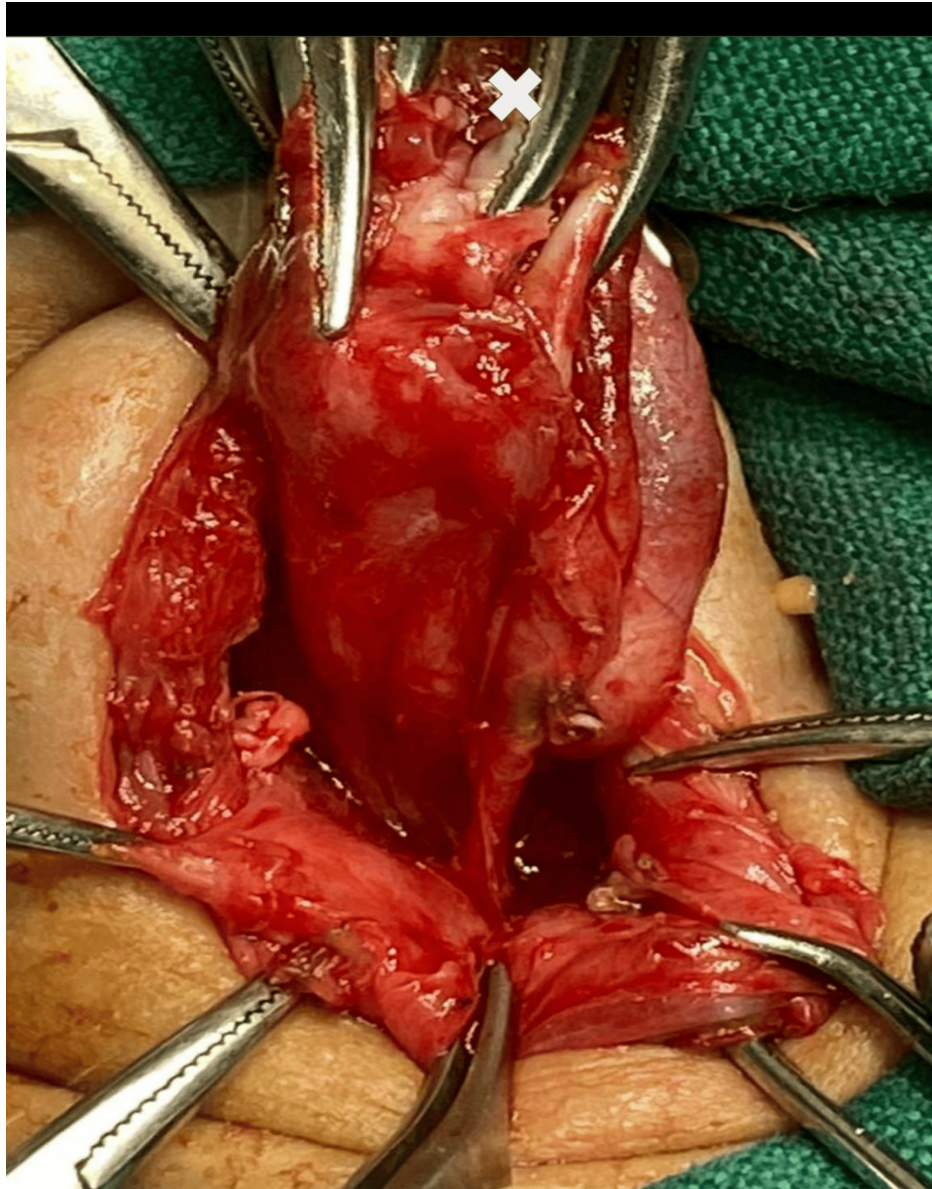


FIGURE 12: Cyst enucleated on all sides from surrounding soft tissues. Traction given at the edges of dome by hemostatic forceps. Tip of another forcep (white cross) being inserted in the opening created over the dome.

An opening was identified superio-medially (consistent with the laryngoscopy), which was transfixed, ligated, and divided (Figure 11).

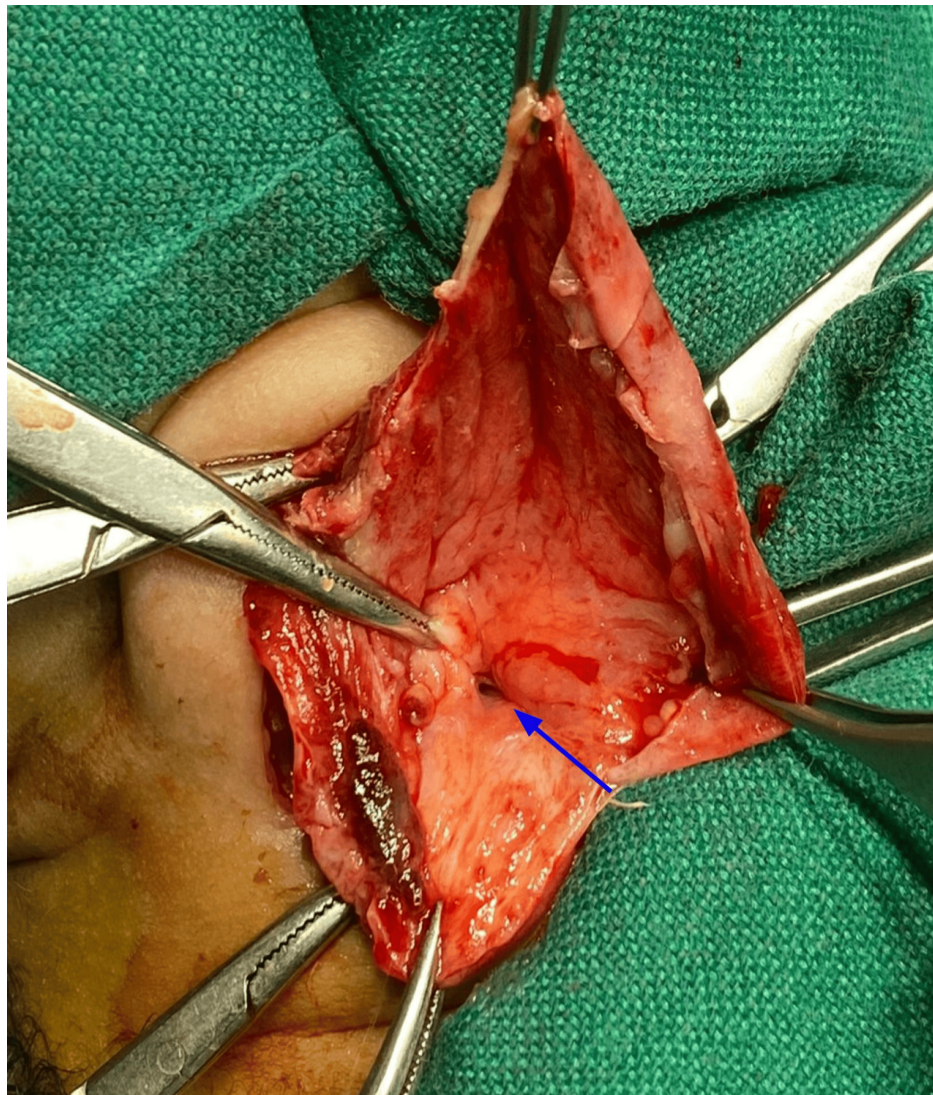


FIGURE 13: Communication (blue arrow) identified superio-medially after opening the enucleated cyst.

Postoperatively, the dimple-like opening near the vocal cord also disappeared. Complete resolution of the swelling was achieved after the excision of the cyst (Figure 12).

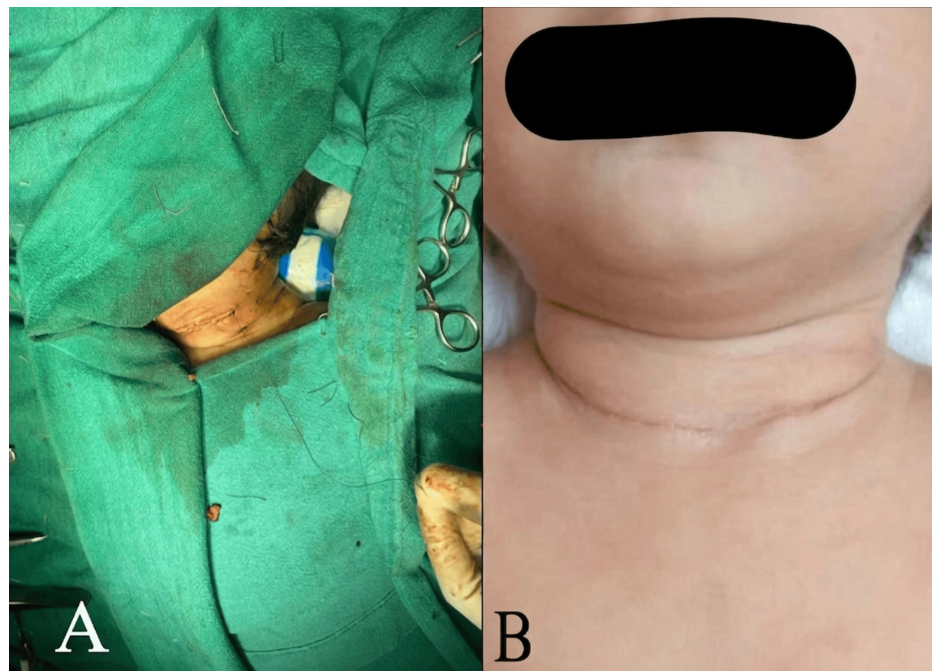


FIGURE 14: Complete resolution of swelling at as seen at the time of closure (Figure 14A) after excision of cyst and on postoperative day 10 (Figure 14B).

Recovery was uneventful, and the patient was discharged after one week. No recurrence was reported in the follow-up period of two years.

Discussion

The clinical entity traditionally described as a cystic hygroma is now categorized under the International Society for the Study of Vascular Anomalies classification as a macrocystic lymphatic malformation [6]. These lesions represent benign congenital anomalies that originate from a failure of the embryonic lymphatic sacs to establish a functional connection with the central venous system [7]. As a result of this developmental sequestration, lymphatic fluid accumulates within the non-draining spaces, leading to the formation of progressively enlarging cystic structures [8]. While approximately 50–60% of these malformations are identifiable at birth, clinical data suggest that nearly 90% become symptomatic by the age of two years [9].

In this case, the 28-day-old neonate presented with a rapidly enlarging mass that initially raised suspicion of an acute infectious process. Although lymphatic malformations typically grow in proportion to the child, sudden expansion is often triggered by intralesional hemorrhage or secondary infection [10]. Such presentations frequently mimic a cervical abscess, which can pose a significant diagnostic dilemma in the neonatal period. The presence of inflammatory clinical signs in this patient further complicates the initial assessment, as neonatal neck abscesses are rare but present with similar localized swelling [11]. However, the expansive nature of the lesion, which spanned from the mandibular ramus to the clavicle, suggested a more complex developmental malformation [12].

The discovery of a direct communication between the cystic lesion and the larynx is the most critical and rare finding of this report. Laryngeal involvement in cervical lymphatic malformations is an uncommon complication that creates an immediate and life-threatening airway emergency [13]. Such communication can lead to impending airway obstruction, often manifesting clinically as neonatal stridor [14]. In infants, even minimal narrowing of the laryngeal lumen can result in severe respiratory distress due to the small baseline diameter of the airway [15]. Furthermore, large multi-septated lesions of this nature have a propensity to encase vital neurovascular structures, including the carotid sheath and internal jugular vein [16].

To ensure safe management, a precise anatomical diagnosis is required through advanced imaging. While ultrasonography is a valuable first-line tool for confirming the cystic nature of the mass, Magnetic resonance imaging (MRI) is considered the definitive gold standard for management planning [9]. MRI provides superior soft-tissue resolution, which is essential for visualizing the infiltration of the lesion into the laryngeal framework or parapharyngeal spaces [7]. This detailed visualization allows surgeons to

differentiate the malformation from other potential differentials, such as branchial cleft cysts or deep-seated hemangiomas [6].

Management of these complex lesions must be individualized, balancing the risks of radical surgery against more conservative interventions. While surgical excision remains a primary treatment modality, intralesional sclerotherapy is increasingly utilized as a salvage therapy for giant malformations with airway involvement [14]. The anatomical location of the cyst in the infrahyoid region is a significant prognostic factor. Historical clinical studies indicate that infrahyoid lesions have a significantly lower recurrence rate of approximately 15% following surgical intervention. By contrast, suprahyoid lesions are associated with a much higher recurrence rate, often exceeding 80% due to the complexity of the surrounding anatomy [17]. Despite the favorable location in this patient, the laryngeal communication necessitated a multidisciplinary approach involving pediatric otolaryngologists and surgeons to achieve optimal long-term outcomes [18].

Conclusions

This case illustrates the diagnostic complexity of neonatal neck masses, which may be erroneously managed as simple abscesses if potential airway communication is overlooked. A high index of suspicion is essential when imaging reveals air-fluid levels, as this finding serves as a critical red flag for a communicating cyst. The integration of advanced diagnostics, specifically virtual bronchoscopy and intraoperative laryngoscopy, is indispensable for localizing the communicating tract and guiding precise surgical planning. Definitive management must prioritize complete surgical excision and ligation of the communication over simple incision and drainage, which is frequently associated with recurrence and secondary infection. Ultimately, this report emphasizes that a meticulous diagnostic workup and targeted surgical intervention are paramount for ensuring complete resolution and mitigating the risk of airway compromise in neonates presenting with complex cervical anomalies.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Yash Shrivastava, Nitin Vyas

Acquisition, analysis, or interpretation of data: Yash Shrivastava, Nitin Vyas

Drafting of the manuscript: Yash Shrivastava, Nitin Vyas

Critical review of the manuscript for important intellectual content: Yash Shrivastava, Nitin Vyas

Supervision: Nitin Vyas

Disclosures

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