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A Rare Presentation of a Type IV Branchial Cleft Cyst in an 11-Year-Old Male

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Abstract | **Case Report**

Background: Branchial cleft cysts (BCCs) are congenital epithelial cysts resulting from developmental anomalies of the branchial apparatus. Type IV BCCs are extremely rare, especially in children. ***Case Presentation:*** We report the case of an 11-year-old male presenting with a right-sided neck swelling for 1.5 years and foreign body sensation in the throat for 1 year. Clinical and radiological evaluation confirmed a large Type IV branchial cleft cyst causing significant airway compression. The cyst was excised via a transcervical approach following elective tracheostomy. Postoperative recovery was uneventful, and histopathology confirmed the diagnosis. ***Conclusion:*** Type IV branchial cleft cysts are rare in the pediatric population. Accurate diagnosis through imaging and meticulous surgical excision are essential for optimal outcomes and prevention of recurrence.

Keywords: Branchial Cleft Cyst (BCC), Type IV Branchial Cleft Cyst, Congenital Cyst, Pediatric Neck Mass, Branchial Apparatus Anomaly, Lateral Neck Swelling.

INTRODUCTION

Branchial cleft cysts (BCCs) are congenital epithelial cysts that arise due to incomplete obliteration of the branchial apparatus between the 2nd and 6th weeks of embryonic development. They account for approximately 17% of pediatric cervical masses [1]. Although most BCCs present in early adulthood, type IV cysts are exceedingly rare [2] and may pose diagnostic and surgical challenges due to their close proximity to vital structures such as the carotid vessels and pharyngeal wall.

CASE PRESENTATION

An 11-year-old male from Uttar Pradesh presented with a right-sided neck swelling for 1.5 years and a foreign body sensation in the throat for 1 year. The swelling was insidious in onset and gradually progressive, increasing from the size of a lemon to that of a tennis ball. There was no history of pain, discharge, fever, dysphagia, respiratory difficulty, weight loss, or tuberculosis contact.

On examination, a globular, firm, non-tender, mobile swelling measuring approximately 5×4 cm was noted on the right side of the neck. The mass extended 2 cm below the angle of the mandible superiorly, 4 cm above the clavicle inferiorly, 1 cm lateral to the midline medially, and up to the anterior border of sternocleidomastoid laterally. Overlying skin was free; no bruit, discharge, or sinus was present. Intraorally, a slight bulge was seen in the right tonsillar fossa.

Figure 1: Clinical image relevant to the presentation of the Type IV branchial cleft cyst, demonstrating key diagnostic or surgical features

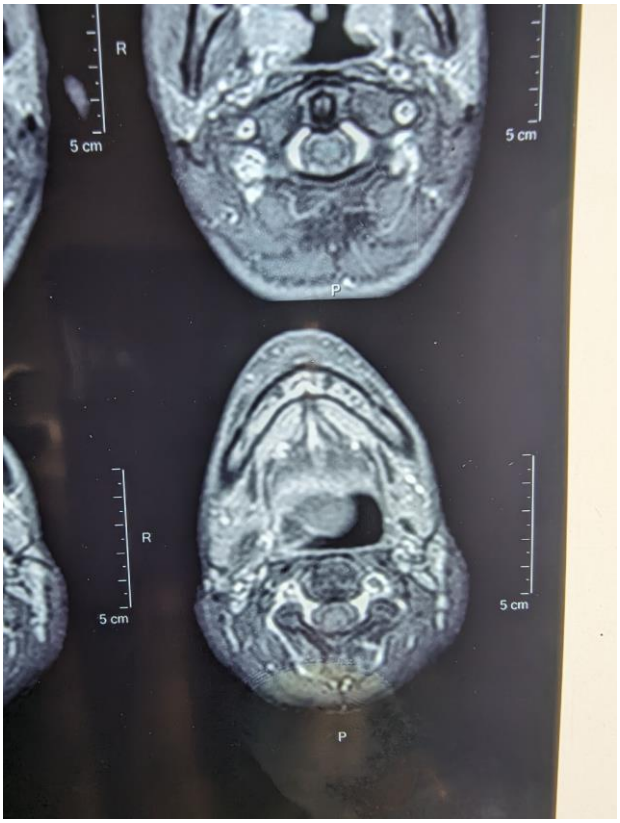

Figure 2: Radiological image relevant to the presentation of the Type IV branchial cleft cyst, demonstrating key diagnostic or surgical features

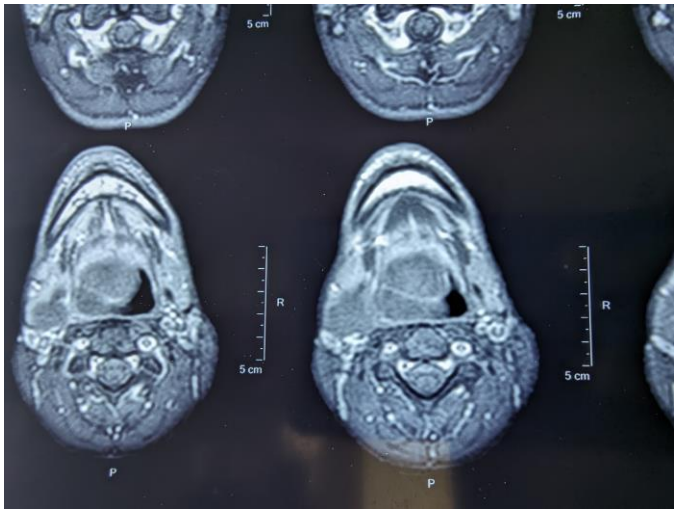

Figure 3: Radiological image relevant to the presentation of the Type IV branchial cleft cyst, demonstrating key diagnostic or surgical features

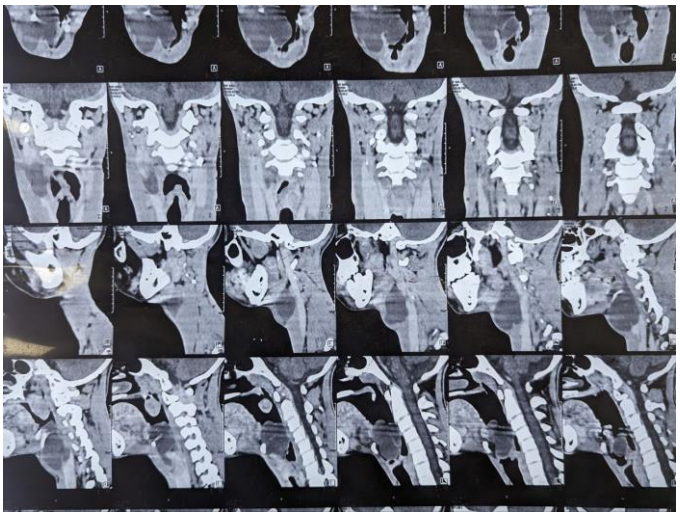

Figure 4: Radiological image relevant to the presentation of the Type IV branchial cleft cyst, demonstrating key diagnostic or surgical features

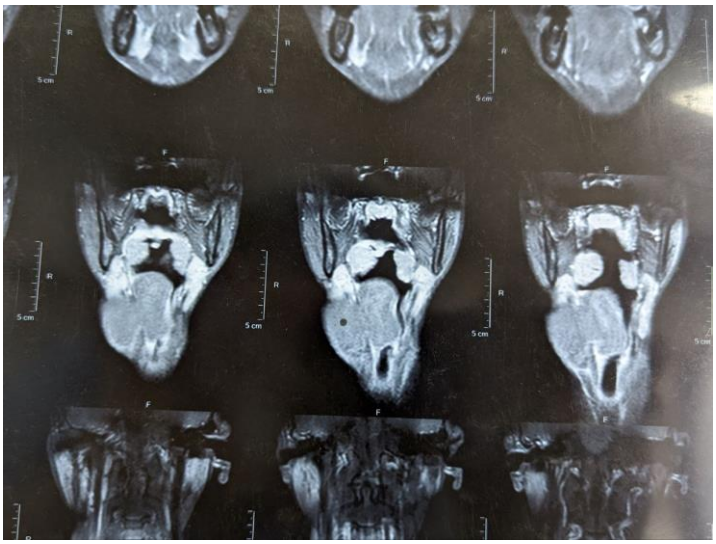

Figure 5: Radiological image relevant to the presentation of the Type IV branchial cleft cyst, demonstrating key diagnostic or surgical features

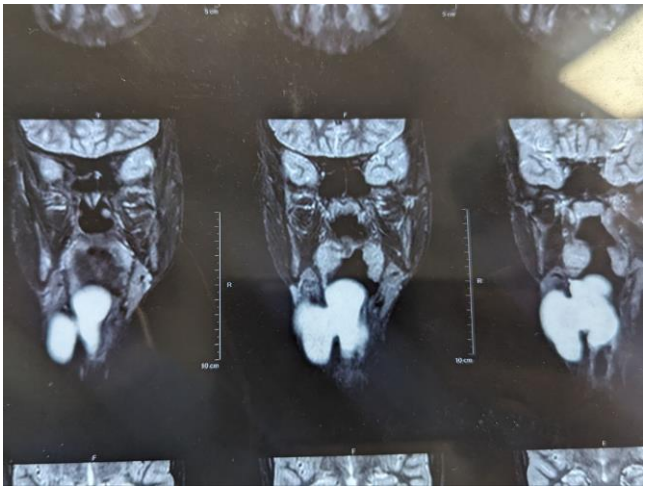

Figure 6: Radiological image relevant to the presentation of the Type IV branchial cleft cyst, demonstrating key diagnostic or surgical features

Figure 7: Pre-operative laryngeal endoscopy showing pushed epiglottis and laryngeal framework to left by the swelling

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Figure 8: Pre-operative image showing marking of incision

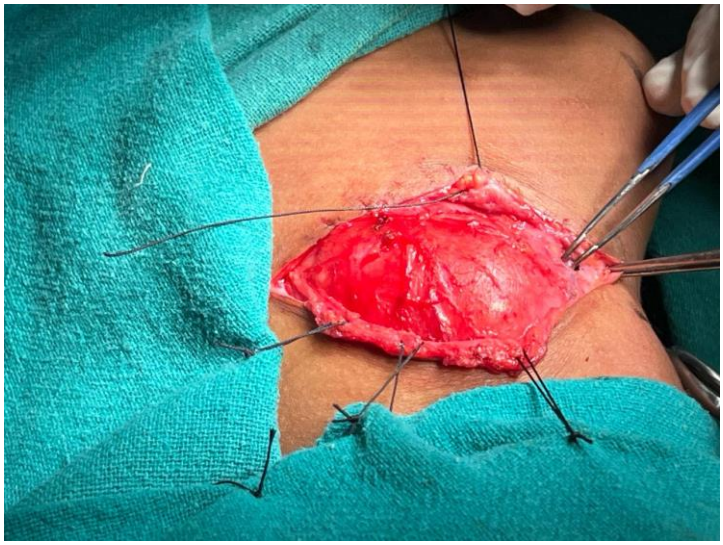

Figure 9: Intraoperative image relevant to the presentation of the Type IV branchial cleft cyst, demonstrating key diagnostic or surgical features

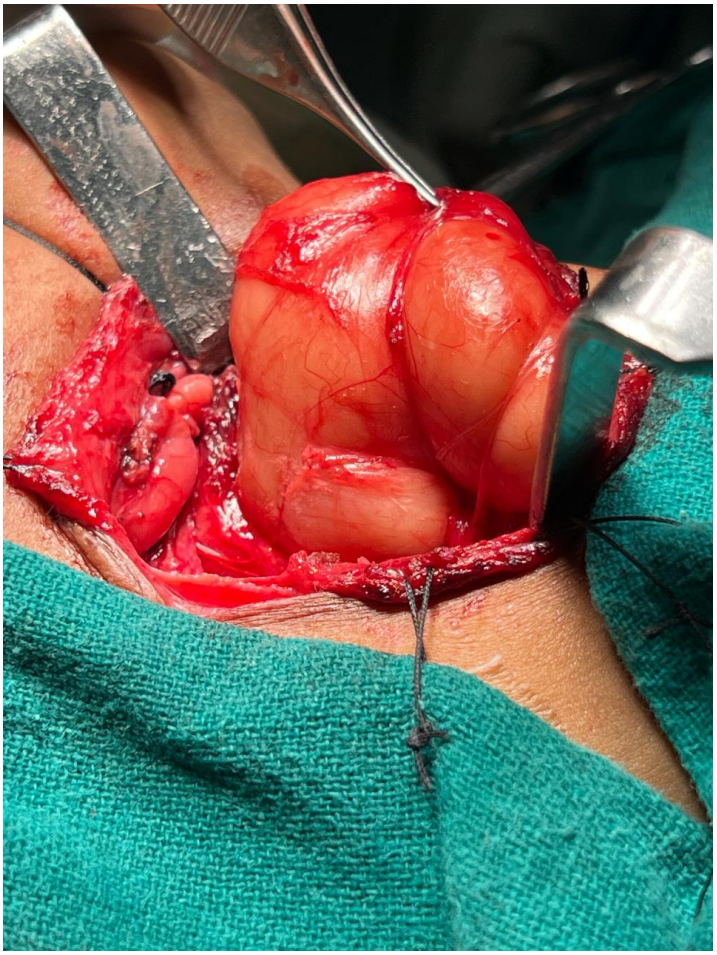

Figure 10: Intraoperative image relevant to the presentation of the Type IV branchial cleft cyst, demonstrating key diagnostic or surgical features

Figure 11: Clinical post-operative image

Figure 12: Post-operative picture

Figure 13: Post-operative laryngeal endoscopy showing normal anatomy

Investigations

Diagnostic 70º endoscopy revealed a large swelling on the right side compressing the vallecula and epiglottis towards the left; vocal cords were bilaterally mobile. FNAC was suggestive of a branchial cyst. CEMRI of the neck showed a 5 × 5.3 × 3 cm cystic lesion, T1 hypointense and T2 hyperintense with thin internal septations, located in the right supraglottic and paralaryngeal region. The lesion caused marked airway narrowing and displaced the epiglottis and vallecula to the left. It abutted the common carotid artery up to its bifurcation but showed no solid component or vertebral communication.

MANAGEMENT

An elective tracheostomy was performed, followed by transcervical excision of the cyst. Blunt dissection was used to delineate the cyst, preserving the greater auricular, superior laryngeal, and hypoglossal nerves. The omohyoid muscle was divided, and the greater cornu and part of the hyoid bone were resected for better visualization. The cyst was removed in toto and sent for histopathological examination. Intraoperatively, the pharyngeal wall, thyrohyoid membrane, and thyroid cartilage were intact. The periosteum of the hyoid was sutured. The postoperative course was uneventful, and the patient has been on regular follow-up for two months, showing no recurrence.

Histopathology

Grossly, the specimen was a dark brown cystic structure measuring 6.3×3×1 cm. Microscopy revealed a cyst lined by stratified squamous and pseudostratified columnar epithelium with congested blood vessels and inflammatory infiltrate, consistent with a branchial cleft cyst.

DISCUSSION

The branchial apparatus develops between the 2nd and 6th weeks of embryogenesis [3]. The second to fourth clefts normally form the cervical sinus, which subsequently obliterates. Failure of this process results in branchial anomalies, including cysts, sinuses, and fistulae [4].

Four major theories explain their etiology: (A) Branchial apparatus theory – remnants of pharyngeal pouches or clefts; (B) Cervical sinus theory – persistence of the cervical sinus of His; (C) Thymopharyngeal duct theory – remnants of the thymus–third pouch connection; (D) Inclusion theory – epithelial inclusions within lymph nodes.[5]

Though congenital, Type IV BCCs often become symptomatic later in life due to infection or gradual enlargement [6]. Their deep paralaryngeal and supraglottic location can cause airway compromise, making early diagnosis crucial [7]. CEMRI plays a pivotal role in defining the lesion's extent and its relation to vital structures [8]. Complete surgical excision remains the treatment of choice, with excellent prognosis when performed meticulously [9].

CONCLUSION

Type IV branchial cleft cysts are rare congenital lesions, especially in the pediatric age group. Detailed imaging and careful surgical dissection are essential for safe excision and prevention of recurrence. Early recognition and multidisciplinary management ensure favorable outcomes.

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