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BRANCHIAL CLEFT CYST: WHAT REALLY MATTERS? – CASE REPORT

ABSTRACT: Introduction: Branchial cleft anomalies are considered to develop from the branchial apparatus that did not completely obliterate during the embryogenesis of the head and neck. These anomalies pose a significant challenge in terms of surgical management, particularly followed by misdiagnosis due to its rarity. The aim of this case report was to present the review of literature and treatment of a rare anomaly such as a second branchial cleft cyst with a particular focus on clinical as well as histopathological aspects.

Case report: A 24-year-old woman was admitted to the otolaryngology department with a three-month history of painless right-sided neck swelling, following a previously resolved upper respiratory infection. The patient underwent complete excision of the cystic mass, with excellent cosmetic results and no signs of recurrence after a one-year follow-up.

Conclusion: Therefore, surgery should always be the gold standard of treatment. In patients aged over 40 years, cystic metastasis from the occult head and neck primary carcinoma must be considered.

Keywords: Branchial cleft cyst, cervical cyst, branchial anomaly, neck mass

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Introduction

Branchial cleft anomalies are considered to develop from remnants of branchial apparatus which has a fundamental role in the development of head and neck structures during early embryonic life. During embryogenesis, the second branchial arch fuses with the third and fourth arches to form the cervical sinus and disappears afterward. Therefore, a profound understanding of the developmental abnormalities is essential to recognize entities such as cysts, sinuses, and fistulas as well as various combinations of these [1]. Second branchial cleft cyst is the most common type of branchial anomaly and the second most common congenital cystic anomaly of the neck after the thyroglossal duct cyst. Ascherson was the first one to describe the branchial fistulas in 1832 as a result of the incomplete obliteration of branchial pouches [2, 3]. The exact annual incidence in general population is unknown, and most cases are diagnosed in patients between the age of 20 to 40 years [4, 5]. There is no strong evidence for hereditary predisposition, as well as gender or ethnic predilection, although cases of familial clustering have been described [4, 6, 7]. They usually become apparent in young adulthood as a painless neck mass located alongside the anterior border and the upper third of the sternocleidomastoid muscle (SCM). Branchial cleft cysts are histopathologically benign, but with the potential for significant morbidity in cases of infection, mass effect, cosmetic appearance, and potential surgical complications. Therefore, these rare anomalies pose various clinical challenges, including correct preoperative diagnostics, treatment of the possible infection, and complete surgical excision. The main treatment for this disease includes meticulous cyst removal and follow-ups after surgery. The aim of this report was to present a case of a rare anomaly such as a second branchial cleft cyst.

Case report

A 24-year-old female patient was admitted to our department with a three-month history of painless right-sided neck swelling, following a previously resolved upper respiratory infection. Her medical history was unremarkable, and there was no history of smoking or alcohol consumption. Clinical examination revealed a soft, ovoid, mobile, and well-defined neck mass just anterior to the upper third of the right sternocleidomastoid muscle, which was measuring 3.5cm, with the intact overlying skin (Figure A). She underwent fiberendoscopy of the upper aerodigestive tract which was normal and neck ultrasonography that showed a hypoechoic thin-walled cystic mass. Based on these findings, the patient was taken to the operative room and the mass was completely excised under general anesthesia. The cyst was exposed and subsequently dissected through the right-sided lateral cervicotomy (Figures B and C). Following complete hemostasis, the wound was closed in layers and an active suction drain was

inserted. The histopathological examination of the specimen confirmed the diagnosis of a branchial cyst. Microscopically, the cystic cavity was surrounded by squamous epithelium with dense lymphoid infiltrate, which formed germinal centers (Figure D). The postoperative period was uneventful and there were no signs of recurrence after one-year follow-up.

Discussion

Branchial cysts are congenital encapsulated, epithelial-lined cavities resulting from incomplete obliteration of the branchial apparatus during embryogenesis in the lateral part of the neck [8]. There are several theories about the origin of branchial cysts. The most accepted one is the theory of failure of involutionof the cervical sinus, which is formed by the second, third and fourth branchial arches, and persisting of ectodermal epithelial cells within these rudimentary structures. Pockets of these persisting ectodermal cells may form branchial cysts later in life [9]. Second branchial cleft cysts are most commonly located along the anterior border in the upper third of the sternocleidomastoid muscle, although various atypical localizations in the neck have been described, including the parotid gland [10]. The presence of the lymphoid tissue in the cyst wall suggests the inclusion theory, which postulates that branchial cysts result from epithelial inclusions within a cervical lymph node [11]. Furthermore, this theory explains why most branchial cysts have no internal opening, are almost unknown in neonates, and the peak age of presentation is much later in life than in other congenital neck lesions. The lymphoid tissue response in the cyst lining may explain the sudden enlargement of the cyst during an episode of the upper airway infection.

A typical clinical finding is of a soft, painless and compressible neck mass, situated at the anterior border of the sternocleidomastoid muscle, between the mandibular angle and the clavicle. The patient may report swelling of long duration with periods of waxing and waning. An acute increase in size can occur during an upper respiratory tract infection, while cyst infection and overlying skin inflammation may also occur [12]. Differential diagnoses include lymphangioma, thyroglossal duct cyst, dermoid cyst, cystic hygroma, laryngocele, lymphadenitis, and various mesenchymal tumors. Special attention should be given to the patients aged over 40 years, in whom cystic metastasis from the occult head and neck primary carcinoma must be considered [13, 14].

The diagnosis is primarily based on the history and the clinical examination. Ultrasonography as an initial imaging method will usually demonstrate the anechoic, thin-walled cyst, while computed tomography may be used in more extensive lesions, specifically to assess the relationship of the cyst to the major neural and vascular structures in the neck [15]. The treatment of choice for branchial cyst is complete surgical excision [16]. The dissection can be relatively straight-forward in previously

non-infected cysts, and the surgeon must dissect completely around the cyst bed to exclude any associated fistula or tract [17]. If identified, the tract should be followed, dissected and excised in 'en bloc' manner with the cyst [18]. Thorough knowledge of the neck anatomy is mandatory to avoid injury to the surrounding neck structures [9]. Wider skin incision facilitates cyst removal and identification of the major cervical neurovascular structures, but will eventually leave a larger scar. Therefore the surgeon must carefully consider the visually pleasing cosmetic outcome but without compromising the surgical radicality, as the majority of the patients are young adults.

Stulner et al. have noted that appropriate investigation and management by a team of experienced head and neck surgeons are necessary if a satisfactory outcome is to be achieved [19]. Additionally, cystic metastases from occult head and neck primaries, especially squamous cell carcinoma (SCC) of the palatine tonsil, can clinically and radiographically mimic branchial cleft anomalies [13, 14, 20]. Physicians must remain vigilant in obtaining data on excessive smoking or alcohol consumption, especially in older male patients, as these are all known risk factors for upper airway malignancy. Additionally, a substantial proportion of cystic neck metastases arise from human papilloma virus-related oropharyngeal carcinoma which, unlike traditional SCC, occurs in a younger population who are frequently non-smokers and not heavy drinkers [21]. Therefore all patients aged 40 years and over should be thoroughly examined by an ear, nose and throat specialist, including endoscopy of the upper aerodigestive tract in general anesthesia. If the endoscopy proves non-diagnostic, bilateral tonsillectomy is recommended [22].

Conclusion

Knowledge of the head and neck embryonic development, early diagnosis, as well as appropriate surgical treatment, are the key steps for a satisfactory outcome in the management of the branchial cysts. Complete cyst removal by careful surgical dissection is the current practice standard and must be performed by a skilled neck surgeon. In patients over 40 years, the possibility of cystic lymph node metastasis from the occult head and neck primary carcinoma should be excluded.

FIGURES:

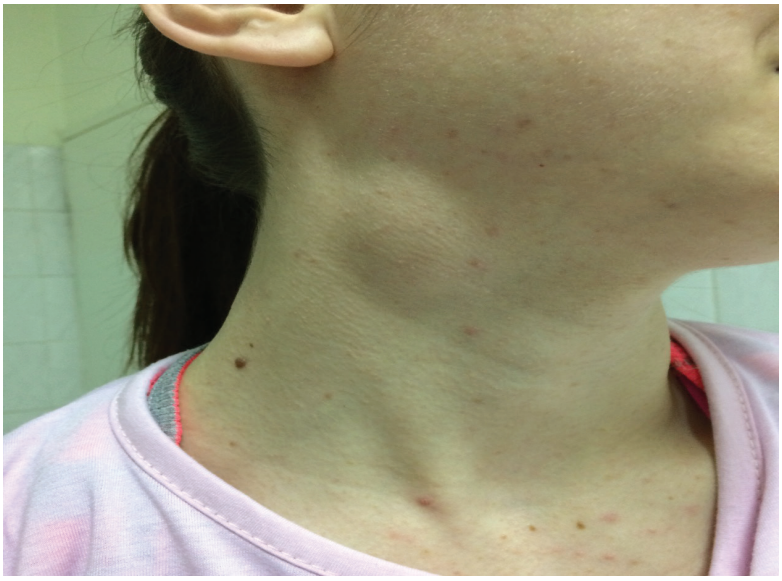

FIGURE A. Clinical examination revealed a soft, ovoid, mobile, and well-defined neck mass just anterior to the upper third of the right sternocleidomastoid muscle, which was measuring 3.5-cm with the intact overlying skin.

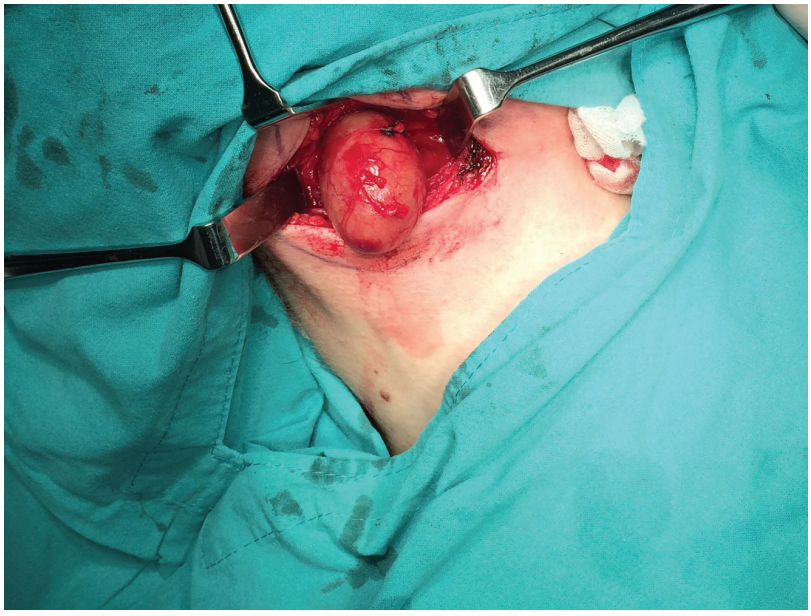

FIGURE B. Cyst exposed and dissected through the overlying skin crease incision of the right side of the neck.

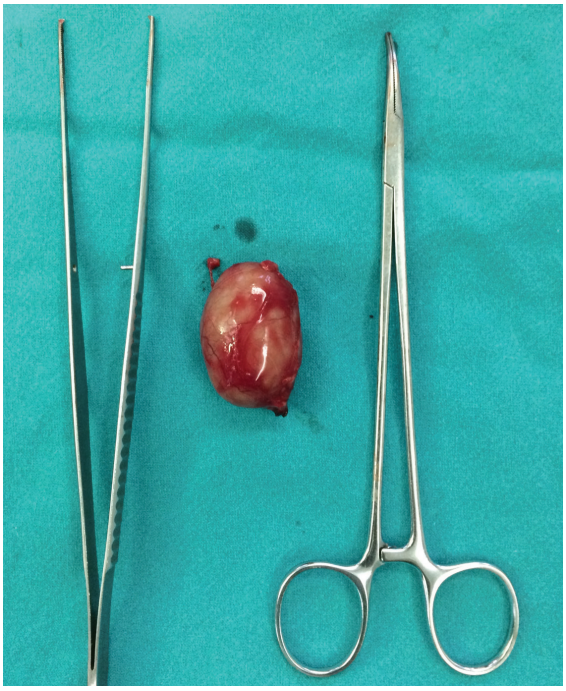

FIGURE C. Macroscopic appearance of the specimen.

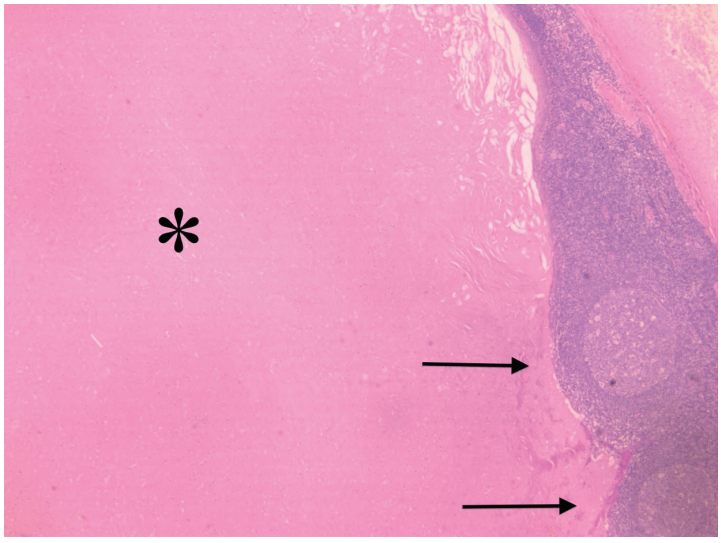

FIGURE D. Histologically, the cystic cavity (asterisk) is surrounded by squamous epithelium with dense lymphoid infiltrate, which forms germinal centers (arrows; hematoxylin and eosin staining).

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