Case report of 24 years old patient with branchial cleft cyst

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Abstract
Branchial cleft cysts are the most commonly encountered congenital anomalies in clinical practice of otorhinolaryngology. Arising on the lateral part of the neck from a failure of obliteration of the second branchial cleft in embryonic development, they can present difficulty in diagnosis and surgical management. In this article, we report a clinical case of a 24 years old patient, who presented with swelling located on the left side of the neck, asymptomatic. The cyst was excised and hystopatholgy showed a characteristic finding of branchial cleft cyst.

Key words: cervical mass, neck cyst, branchial cleft cyst

Introduction

The term „branchial apparatus" refers to the embryologic precursors that develop into the tissue of the neck. Phylogenetically, the branchial apparatus is related to gill slits. In fish and amphibians, these structures are responsible for the development of the gills, hence the name branchial (branchia is Greek for gills). Many developmental anomalies of the branchial apparatus have been identified: cysts, fistulas, sinuses, ectopic glands, and malformations of head and neck structures.

Branchial cleft cysts are congenital benign cervical lymphoepithelial cyst. They can present as a solitary, painless mass in the neck of a child or young adult. Branchial anomalies are sometimes bilateral, but commonly unilateral. Men and women are equally affected. Familial occurrence is reported.

The possibility of carcinoma arising in a branchial remnant is controversial; some authors suggest that branchiogenic carcinoma is possible, but metastatic squamous cell carcinoma to regional lymph nodes that masquerade as a branchial cleft cyst is far more common.

In our clinical case, the branchial cleft cyst is situated on the left side of the neck, and the location corresponds to its origin that is form the second branchial arch.

Case Report

A 24 year old female presented with complaints of an enlarging left sided neck mass of 1 month. There were no associated complaints such as pain, change in voice, or difficulty in breathing. There was no history of discharge during eating or drinking. She reported fluctuation. Her primary care physician prescribed antibiotics but the mass did not decrease in size. On physical examination, the patient was afebrile, with solitary, smooth, well-defined, mobile, nontender cystic mass measuring approximately 4 cm mobile non tender mass in the left neck. The rest of the head and neck physical examination was unremarkable. The CT scan results showed a rounded low density 4 × 4.5 × 3.3 cm cystic mass in the left neck (Fig. 1). The mass was posterior to the sternocleidomastoid muscle with characteristics of abscessed lymph node.

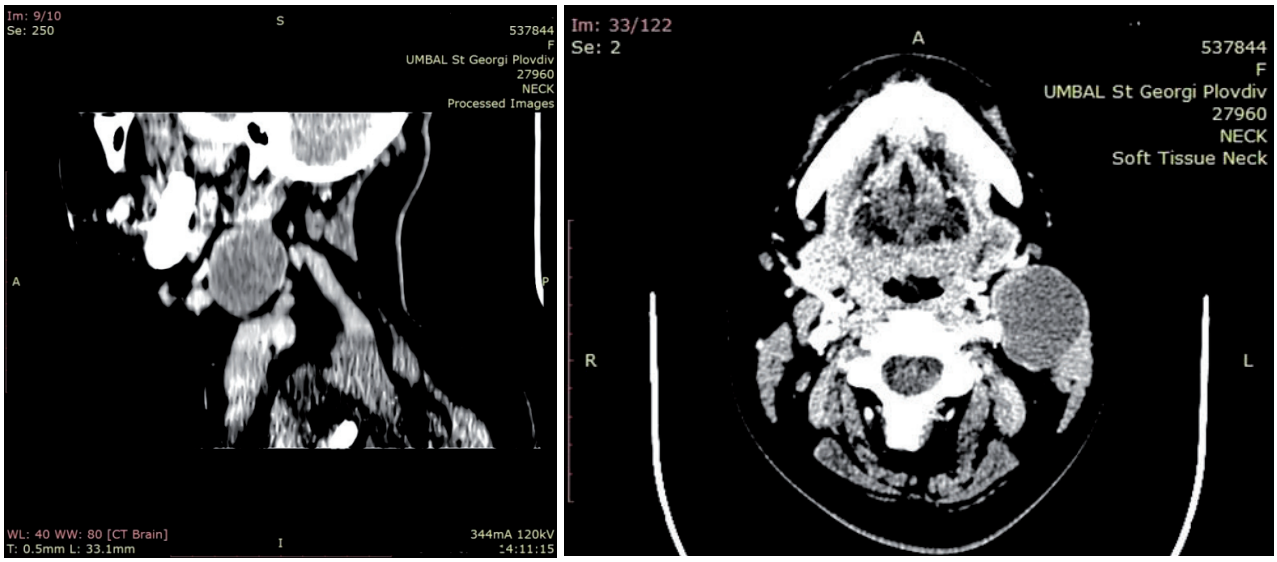

Figure 1

We performed complete excision of the cervical mass, which contained brown mucoid material. The cervical mass was inflammated and difficult to dissect. Fig. 2. The histopathological examination showed a cyst lined by stratified squamous epithelium with keratinaceous debris present in the cyst lumen. The stroma adjacent to the epithelium contained areas of lymphoid tissue with reactive germinal centers but lacked true lymph node architecture. Based on the clinical, radiographic and microscopic findings the final diagnosis was second branchial cleft cyst.

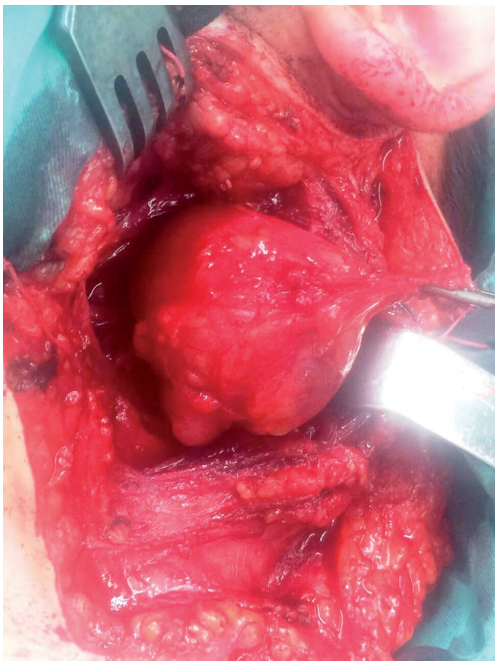

Figure 2. Intraoperative image of the cervical cystic mass in the left side of the neck

Discussion

Branchial cleft anomalies arise from incomplete obliteration of any branchial tract, resulting in either a cyst (75%) or a sinus or fistulous tract (25%). (First branchial cleft anomalies are relatively less common and typically closely related to the parotid gland. These commonly present as fistula and sinus, whereas cysts are least common. The usual appearance is an oval or round cystic mass within, superficial to or deep to the parotid gland or along the external auditory canal. It should always be included in the differential diagnosis of cystic lesion in the parotid or peri-parotid region. (5)

Second branchial anomalies comprise 95% of all branchial cleft lesions, most commonly presenting as cystic masses rather than sinuses or fistulas. (15) has classified second branchial cleft cysts into four types:

Type-I occurs anterior to the sternocleidomastoid muscle just deep to the platysma muscle;

Type-II is the commonest type and occurs deep to the sternocleidomastoid and lateral to the carotid space;

Type-III extends medially between the bifurcation of internal and external carotid arteries to the lateral pharyngeal wall

Type-IV occurs in the pharyngeal mucosal space medial to the carotid sheath.

(Bailey H. London, England: Lewis; 1929. Branchial Cysts and Other Essays on Surgical Subjects in the Facio-Cervical Region.)

A second BCC can occur anywhere in the lateral aspect of neck, but is classically seen as a well-marginated anechoic mass with a thin, well-defined wall at the anteromedial border of the sternocleidomastoid muscle at the junction of its upper and middle third, lateral to the carotid space and at the posterior margin of the sub-mandibular gland. It may show thick walls or internal separations or echoes. On CT it is seen as a well-circumscribed, non-enhancing mass of homogenous low attenuation. Sometimes a beak sign may be seen as a curved rim of the lesion pointing medially between the internal and external carotid. Wall thickening and enhancement may occur due to associated inflammation. When a sinus or fistula is present, the external opening is typically along the anterior border of the sternocleidomastoid muscle at the junction of its middle and lower thirds, its internal opening being in the region of the palatine tonsillar fossa.

Third and fourth branchial cleft anomalies are exceedingly rare and typically present with a long history of neck infections. Both are related to the pyriform sinus with those of the third cleft being above the superior laryngeal nerve and those of the fourth being below the nerve. Third BCCs are located in the posterior 3 cervical space posterior to the common or internal carotid artery and the sternocleidomastoid muscle. They may present as a fistula opening along the anterior border of sternocleidomastoid. Its tract passes posterior to the common carotid artery, and enters the thyroid membrane to reach the pharynx at the piriform sinus.

Fourth branchial cleft anomalies are generally sinus tracts or fistulae and arise from the pyriform sinus, pierce the thyrohyoid membrane, and descend along the tracheoesophageal groove.

Our case represents a second branchial anomalie. We diagnosed it by doing CT scan and hystopathological examination of the resected material. In the diagnostics of this pathologie an ultrasound and magnetic-resonance are commonly used

The differential diagnosis includes lymphadenopathy (reactive, neoplastic, lymphoma, metastasis), vascular neoplasms and malformations, capillary hemangioma, carotid body tumor, lymphatic malformation (cystic hygroma), ectopic thyroid and salivary tissue etc.

The existence of branchiogenic carcinoma has been a strongly debated [10, 11]. Most authorities believe that cystic squamous cell carcinomas located at the cervical levels II or III are metastatic tumors even when a primary tumor is not detectable. Earlier case reports are generally incomplete, lacking panendoscopy evaluation or imaging studies that evaluate the oropharyngeal area.

The treatment for second branchial cleft cysts is surgical resection approached by a transverse cervical incision (11) [The cysts can be located either superficial or deep to the cervical fascia. Careful dissection around the cyst bed and exploration for an associated fistula is required. If there has been a history of infection and/or inflammation, subsequent scarring can make complete surgical excision challenging.

Conclusion

The branchial arches are the embryological precursors of the face, neck and pharynx. Branchial arch anomalies represent 20% of cervical neck masses in children and typically result from incomplete obliteration of branchial clefts with subsequent formation of cysts. Second branchial cleft anomalies represent the most frequent subtype with surgical excision being the most common curative option. The location, clinical symptoms, imaging findings and a high index of suspicion aid the diagnosis of this relatively common diagnosis.

References:

1. Koch BL. Cystic malformations of the neck in children. Pediatr Radiol. 2005 May 35(5): 463–77. [Medline].
2. Goff CJ, Allred C, Glade RS. Current management of congenital branchial cleft cysts, sinuses, and fistulae. Curr Opin Otolaryngol Head Neck Surg. 2012 Dec. 20(6): 533–9. [Medline]
3. Zaifullah S, Yunus MR, See GB. Diagnosis and treatment of branchial cleft anomalies in UKMMC: a 10-year retrospective study. Eur Arch Otorhinolaryngol. 2012 Oct 7. [Medline].
4. Guldfred LA, Philipsen BB, Siim C. Branchial cleft anomalies: accuracy of pre-operative diagnosis, clinical presentation and management. J Laryngol Otol. 2012 Jun. 126(6): 598–604. [Medline].
5. Deane SA, Telander RL. Surgery for thyroglossal duct and branchial cleft anomalies. Am J Surg. 1978; 136: 348–53. [PubMed]
6. Hamilton WJ, Mossman HW. Alimentary and respiratory systems. Hamilton WJ, Mossman HW (eds). Human Embryology. 4th ed. London, UK: Macmillan Press; 1972. 1972: 291-376.

7. Weichert CW, Presch W. Respiratory system and related structures. Elements of Chordate Anatomy. 3rd ed. New York, NY: McGraw-Hill; 1967. 131–61.
8. Som PM, Smoker WRK, Curtin HD. Congenital lesions. Som PM, Curtin HD, eds. Head and Neck Imaging. 4th ed. St. Louis, Mo: Mosby-Year Book; 2002. 1828–64.
9. Benson MT, Dalen K, Mancuso AA, Kerr HH, Cacciarelli AA, Mafee MF. Congenital anomalies of the branchial apparatus: embryology and pathologic anatomy. Radiographics. 1992 Sep. 12(5): 943–60. [Medline].
10. Schoenwolf G, Bleyl S, Brauer P, Francis-West P (2009) Larsen's Human Embryology, 4th edn. Churchill Livingston, New York, Edinburgh
11. Waldhausen J. Branchial cleft and arch anomalies in children. Semin Pediatr Surg. 2006; 15: 64–69. doi: 10.1053/j.sempedsurg.2006.02.002. [PubMed] [Cross Ref]
12. Carlson BM. Human embryology and developmental biology. 4. St. Louis: Mosby; 2009.
13. D'Souza A, Uppal H, De R, Zeitoun H. Updating concepts of first branchial cleft defects: a literature review. Int J Pediatr Otorhinolaryngol. 2002; 62: 103–109. doi: 10.1016/S0165-5876(01)00612-7. [PubMed] [Cross Ref]
14. Tewfik T, Yoskovitch A. Congenital malformations of the neck. eMedicine, Medscape. http://emedicine.medscape.com/article/837477-overview. Accessed 14 March 2015
15. Koeller K, Alamo L, Adair C, Smirniotopoulos J. Congenital cystic masses of the neck: radiologic-pathologic correlation. Radiographics. 1999; 19(1): 121–146. doi: 10.1148/radiographics.19.1.g99ja06121. [PubMed] [Cross Ref]
16. Clevens R, Weimert T. Familial bilateral branchial cleft cysts. Ear Nose Throat J. 1995; 74(6): 419–421. [PubMed]
17. 8.Harnsberger H, Mancuso A, Muraki A, Byrd S, Dillon W, Johnson L, et al. Branchial cleft anomalies and their mimics: computed tomographic evaluation. Radiology. 1984; 152(3): 739–748. doi: 10.1148/radiology.152.3.6463255. [PubMed] [Cross Ref]
18. Bajaj Y, et al. Branchial anomalies in children. Int J Pediatr Otorhinolaryngol. 2011; 75: 1020–1023. doi: 10.1016/j.ijporl.2011.05.008. [PubMed] [Cross Ref]