Case Report

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An unusual presentation of branchial cyst mimicking carotid body tumor

Tharun Ganapathy C.1*, Abinayaah Suresh², Manimaran P.1

¹Department of General Surgery, SRM Medical College and Research Institute, Kattankulathur, Tamil Nadu, India ²Department of ENT, SRM Medical College and Research Institute, Kattankulathur, Tamil Nadu, India

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*Correspondence:

Dr. Tharun Ganapathy C.,

E-mail: drtarunchitrambalam@gmail.com

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ABSTRACT

Branchial cleft anomalies are a common cause of lateral neck masses and may present with infection, cyst enlargement or fistulae. Abscesses and necrotic adenopathy can also be difficult to distinguish from a branchial cyst, particularly if it has previously been infected. Here we report an unusual presentation, a case of a branchial cleft cyst in a 19-year old girl completely encasing the carotid bifurcation and encircling the hypoglossal nerve mimicking a carotid body tumour

Keywords: Branchial cyst, Carotid body tumor, Hypoglossal nerve

INTRODUCTION

Branchial cysts are congenital lesions which typically presents as a painless, mobile and fluctuant neck mass located along the anterior border of the sternocleidomastoid muscle. There is no sex predilection and usually affects young individuals although older age group is not spared. Branchial cysts occur because of a failure of involution of the second branchial cleft. Etiology of branchial cyst is controversial. There are four main theories of origin on branchial cyst. These include incomplete obliteration of branchial mucosa, persistence of vestiges of the pre-cervical sinus, thymo-pharyngeal ductal origin and cystic lymph node origin.

Upto 95% of branchial cleft anomalies originate from the second branchial cleft. Cysts that originate from the second or third cleft are in anatomic intimacy with vital neck structures such as carotid artery, jugular vein and hypoglossal nerve. They may affect any of the nearby neck structures, causing compressive symptoms or vessel thrombosis although rare. Other common benign cystic lateral neck masses that can mimic branchial cysts

include ectopic thymic cysts, lymphangiomas, dermoid and epidermoid cysts, and cystic nerve sheath tumors. Abscesses and necrotic adenopathy can also be difficult to distinguish from a branchial cyst, particularly if it has previously been infected.

Imaging wise an uncomplicated branchial cyst appears as a simple cyst in all imaging modalities. Lack of internal flow in Doppler ultrasound confirms the cystic nature. CT shows a well-defined, fluid attenuated mass, with variable enhancement of the capsule. MR shows a lesion that is hypointense on T1 and hyperintense on T2, however the lesion may have a variable appearance on imaging if there is prior hemorrhage or infection.⁵

Histopathologically, the lining of a branchial cyst is generally stratified squamous epithelium but sometimes it is pseudostratified, columnar and ciliated. The lining may be ulcerated and may contains abundant lymphoid tissue, which shows germinal centers.^{6,7} Branchial cysts are permanently eradicated by surgical excision. Rarely, a recurrence or carcinoma within or associated with the cyst may develop.⁸

CASE REPORT

A 19-year-old female presented with painless swelling in left side of neck of 6 months duration with no signs of discharge or sinus tract. Local examination revealed a 5×4 cm soft, non-tender, partly compressible, pulsatile swelling in left submandibular region. The remainder of her physical examination was unremarkable, as were her vital signs and basic laboratory values. Preliminary work up for tuberculosis was done and turned out to be negative. Ultrasonogram of the neck revealed a cystic lesion in upper jugular region compressing adjacent structures. CT scan of the neck showed a hypodense lesion in left parapharyngeal space with a differential diagnosis of branchial cyst, carotid body tumor and necrotic lymph nodes as in Figure 1. Carotid angiogram was done and no abnormality was detected. FNAC was not attempted.



Figure 1: CT neck and angiogram showing a large well defined cystic lesion abutting the left carotid bulb.



Figure 2: Cyst encasing the hypoglossal nerve and post-operative specimen.

Patient was planned surgery under general anesthesia and left neck exploration revealed a cystic mass on the carotid bifurcation encasing the external carotid artery. Careful fine dissection was made close to the mass and dense adhesions were released of the carotid bifurcation and external carotid artery as in Figure 2. Complete excision

of the cyst was done after preserving the hypoglossal nerve which was encircling the cyst and the wound closed primarily. The postoperative period was uneventful without any complications. Histopathological examination confirmed it to be a second branchial cleft cyst.

DISCUSSION

Branchial cleft anomalies arise from deviations in the complex embryologic development of the anterior and lateral neck regions. During the 4th week of intrauterine development, branchial apparatus begins to develop when six pairs of branchial arches appear that are separated by five clefts externally and five pouches internally. By the end of the 7th week, the clefts are obliterated and the arches fuse. 9 The development of the second arch takes place over a more extended time period and anomalies in this region are more common. Cysts, in particular, often present as rapidly enlarging neck masses, and may be prone to repeated infections if not excised early. The inflammatory response produced in such infections has been proposed as one mechanism for the few reports of hypoglossal nerve involvement by branchial cleft cysts. Extremely large cysts can also extrinsically compress nearby structures, causing nerve palsies and vessel thrombosis. Meticulous and careful neck dissection is of paramount importance which allows a complete cyst excision without any damage to adjacent structures.

CONCLUSION

This case serves to remind surgeons that direct involvement of any of the surrounding neck structures should be anticipated for all branchial cleft excisions as most of these cases are asymptomatic. A thorough understanding of the embryology of branchial clefts is of paramount importance which explains the proximity of cysts, sinuses and fistulae to the vital structures of the neck.

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