



Case Series

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Tricky Branchial Cysts: A case series

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Abstract

Branchial cysts although common, should be managed with great precision because of their proximity to vital neurovascular structures. This case series illustrates how tricky can branchial cysts get, especially during dissection. The third case report demonstrates how branchial cysts can be misdiagnosed with other lesions, thus delaying treatment.

Keywords: Branchial cyst, Spinal accessory nerve, Excision.

Introduction

The term 'branchial' came from the Greek word 'bragchia' meaning 'gills'.^[1] Branchial apparatus develops between the 3rd to 8th weeks of embryonic life. Invaginations of ectodermal clefts and endodermal pouches lead to the formation of five mesodermal arches. Branchial cysts or cervical lymphoepithelial cysts result from failed obliteration of these branchial clefts.^[2] They occur equally in both sexes and present commonly in young adults with a peak incidence being in the third decade.^{[1],[3]} 2-3% cases are bilateral.^[4] Anomalous development of the branchial clefts can result in fistulae, sinuses or cysts. Branchial cyst is the second major cause (around 25 %) of head and neck congenital swellings in children out of which 95% of cases are from second branchial cleft.^[2]

Case Report 1

A 22 years old male presented with a right sided upper neck swelling for the past four months. It was painless, progressive, and without any pressure symptoms like change in voice or difficulty in breathing or deglutition. On examination, 5 x 4 cm, globular swelling was seen extending superiorly from mastoid tip to hyoid inferiorly, anteriorly from the angle of mandible to posteriorly deep to sternocleidomastoid on the right side. The swelling was soft, non tender, cystic, compressible, nonpulsatile, and mobile with normal overlying skin. Local temperature was not elevated and transillumination test was negative. USG neck revealed a 2.5 x 3.8 x 4.1 cm well defined cystic lesion on the right side of neck in the right submandibular region on the lateral aspect of right common carotid artery extending cephalad from its bifurcation. CT scan neck revealed a 50 x 39 x 33 mm, cystic swelling in the right submandibular region. USG guided FNAC showed scattered neutrophils and proteinaceous material, with no atypical or malignant cells and reported the swelling to be consistent with a Branchial cyst.

A provisional diagnosis of Branchial cyst (Rt) 2nd cleft was made and excision of the cyst was done under general anaesthesia. Skin incision was given 2 cm below right side mandible. Superior and inferior skin and subplatysmal flaps were raised. The spinal accessory nerve was passing over the substance of the cyst giving it a bilobed appearance- a rare entity (Figure 1). The nerve was separated from the cyst wall via careful dissection and the cyst was removed in totality (Figure 2). The post operative period was uneventful. Histopathological examination reported the swelling to be a Branchial cyst.

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Figure 1: Spinal accessory nerve passing over the branchial cyst making it appears bilobed. Inset- Spinal accessory dissected from cyst wall and retracted laterally.

Figure 2: Surgical field after the branchial cyst was excised. Inset- Excised branchial cyst

Case Report 2

A 66 years old female presented with 5 x 3 cm, globular swelling in the left anterior triangle of the neck for 4 months. It was painless, progressive, and without any pressure symptoms. USG neck revealed a 3 x 4.4 x 4.7 cm cystic lesion. CT scan neck revealed a 4.5 x 3.5 x 5.5 cm, cystic swelling suggestive of type II 2nd branchial cleft cyst (left). USG guided FNAC showed paucicellular smears with numerous foamy macrophages, many containing hemosiderin and opined it to be benign.

A provisional diagnosis of Branchial cyst (Lt) 2nd cleft was made and cyst was excised. However, after FNAC, the swelling shrunk in size making it difficult to approach during surgery. The cyst was carefully excised (Figure 3). Histopathology confirmed it to be a Branchial cyst.



Figure 3: a – Swelling at presentation, b – After FNAC
c – Cyst in situ, d – Excised branchial cyst

Case Report 3

A 20 years old female presented with a tender and cystic swelling in the left side of the neck for last 5 days (Figure 4). Patient underwent multiple USG of the neck showing the swelling was an infected cervical lymph node. Even FNAC showed infected aspirate suggestive of acute adenitis. She was managed for two months as a case of cervical lymph node abscess at level IIa with multiple aspirations, including one incision drainage procedure followed by the recurrence of the

swelling. CT scan neck revealed a type II branchial cyst (2nd cleft) measuring ~ 4 x 3 x 2.5 cm beneath platysma, posterior to Lt sternocleidomastoid just abutting carotid sheath. The cyst was adhered to the surrounding structures, including the submandibular gland, SCM and carotid sheath with multiple lymph nodes due to repeated infections. The branchial cyst was excised along with large lymph nodes surrounding it in toto with dissection preserving important surrounding neurovascular structures (Figure 5). HPE confirmed it to be a Branchial cyst.



Figure 4: Swelling at presentation

Figure 5: Branchial cyst being delivered out after precise dissection

Discussion

Hunczovsky, in 1785, gave the first account of lateral cysts of the neck.^[5] The term branchial cyst was first used by Ascherson in 1832.^[6] Various theories explain its origin^[1] :-

1. Branchial apparatus theory – Branchial cysts are remnants of pharyngeal pouches or branchial clefts or a fusion of the two. However, this does not explain the incidence in young adults instead of at birth.
2. Cervical sinus theory – These are formed from the remains of the cervical sinus of His, which is formed by the growing down of the second arch and its fusion with the fifth arch.
3. Thymopharyngeal duct theory – These cysts are remnants of original connection between thymus and third branchial pouch.
4. Inclusion theory – These are epithelial inclusions within a lymph node.

Second branchial cleft cysts are also known as lateral cervical cysts. These are deep to the anterior border of sternocleidomastoid. Commonly these cysts are seen at the junction of its upper 1/3 and lower 2/3. However, they can develop anywhere along the course of fistula of second branchial cleft, from the skin on the lateral aspect of the neck, to the palatine tonsils, going between the internal and external carotid arteries.^[5] They are usually smooth, round, soft, non tender, fluctuant, mobile, asymptomatic masses covered with normal skin. They are slow growing, taking weeks to years. During upper respiratory tract infections the lymphoid tissue lining the cyst wall enlarges causing secondary enlargement of the cyst. Infected cysts may be painful and rupture due to abscess formation leading to fistulae. Depending on size and location, they can cause dyspnoea, dysphonia, dysphagia and cosmetic deformity.^{[1],[3]} Branchial cleft cyst carcinoma is

extremely rare.^[5] Bailey classified second branchial cysts as highlighted in Table 1.

Table 1: Bailey classification of second branchial cleft cysts^[7]

Type I	The most superficial; it lies on the anterior margin of the sternocleidomastoid muscle, deep to the platysma muscle
Type II	The most common; it develops along the anterior margin of the sternocleidomastoid muscle, lateral to the carotid space and posterior to the submandibular gland (the classic location for these cysts)
Type III	Extends medially between the carotid bifurcation and the lateral wall of the pharynx
Type IV	Lies in the pharyngeal mucosal space; lined with columnar epithelium

Most branchial cysts are thin walled and lined with stratified squamous non-keratinized epithelium that covers the lymphoid tissue which is fashioned in a follicular pattern. They contain a viscous, turbid brownish fluid with crystals of cholesterol. Seldom, they are lined with respiratory or ciliated columnar epithelium.

The diagnosis is reached with the aid of history, clinical examination, Ultrasonography, CT/MRI and USG guided FNAC.^[2] Ultrasonography is cheap, non-invasive, but may fail to distinguish from other cystic neck lesions. CECT and MRI throw light on the volume, nature and relation with neighbouring structures, minimizing surgical complications.^[8]

The differential diagnosis includes cystic hygroma, enlarged lymph nodes, parotid masses, paragangliomas of the vagus nerve, odontogenic infection, lipoma, carotid body tumours, neurofibroma, haemangioma, lymphangioma, teratoma, ectopic salivary tissue, pharyngeal diverticulum, laryngocele, saccule.^[2]

The treatment of choice is undoubtedly complete surgical resection. During surgery, important vascular structures like the internal and external carotid arteries and nerves like the superior laryngeal, glossopharyngeal, vagus, and hypoglossal nerve should be identified to avoid injury. Surgical complications encompass recurrence, persistent fistula, and damage to the cranial nerves.^[5] In our case, the spinal accessory nerve was passing just over the branchial cyst and this warranted a cautious dissection to avoid trauma to the nerve.

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