Unusual Location of a Branchial Cyst in a Septuagenarian Female: Report of a Case

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Abstract

Introduction: Supraclavicular and lower neck location of Branchial Cleft Cysts are very unusual and involve cysts deriving from the third or fourth branchial pouch. They can be easily misdiagnosed, especially in older people without clinical history of recurrent infection.

Methods: A 76-year-old woman presented with a 4-month history of a painless swelling and palpable mass in the left side of her neck just above the clavicle and posterior to the sternocleidomastoid muscle. Ultrasound (US) examination demonstrated the cystic nature of the mass, and Duplex scan found a critical stenosis of the left internal carotid artery.

Discussion: Surgical resection combined with left carotid endarterectomy was performed. Histopathological examination revealed a Branchial Cleft Cyst.

Conclusion: Because of anatomical considerations and the age of the patient, the differential diagnosis was broad, however, treatment options were limited. Due to the malignant potential, surgical resection was the only way to provide both diagnosis and treatment.

To our knowledge, this is the first case in literature describing a supraclavicular Branchial Cleft Cyst without a sinus tract, neither with the skin nor with the pyriform sinus or a thyroid lobe.

Keywords: Branchial Cyst; Surgical Resection; Atypical; Unusual Location; Supraclavicular Location

Introduction

Branchial Cleft Cysts (BCCs) are a rare disease affecting both pediatric and adult patients. They frequently present as a soft swelling in the neck, constituting the most common presentation of a neck mass in young adults[1].

We report a case of an atypical posterior BCC because of location and CT appearance in a seventy-six-year-old woman leading to a challenging differential diagnosis.

To our knowledge, this is the first case reported in literature of a supraclavicular BCC without a sinus tract neither with the skin nor with the pyriform sinus or a thyroid lobe.

Case Report

A 76-year-old woman presented with 4-month history of a painless swelling and palpable mass in the left side of her neck just above the clavicle and posterior to the sternocleidomastoid muscle. The mass appeared 6-months prior and grew rapidly. It was never painful or inflamed. The patient denied a recent upper respiratory tract or head and neck infection, as well as any hoarseness, dysphagia, dizziness, or loss of consciousness.

On physical examination and chest radiograph, the neck lump was soft, fluctuant, non-tender and motionless during swallowing. It was situated at the base of the neck, in the suprACLAVICULAR fossa, posterior to the sternocleidomastoid muscle. There was no associated thyroid gland swelling, and examination of bilateral axillary and cervical lymph nodes was normal.

Biochemical, hematological and virological blood profiles, including an erythrocyte sedimentation rate was normal suggesting no inflammatory or infective nature of the mass.

An ultrasound of the neck showed a low to medium-level echogenicity and a cystic rather than solid structure without any internal septa, measuring 4 x 6cm in size. Duplex scan showed neither infiltration nor compression of the left internal jugular vein and of the left common carotid artery. During Doppler evaluation a critical asymptomatic stenosis of the left internal carotid artery was detected.

The adjacent muscular and vascular structures were not infiltrated on computed-tomography (CT) scan evaluation. Densitometric analysis confirmed its cystic nature (Figure 1 A,B,C).

Flexible bronchoscopy investigation did not show any pathological aspect of the upper and lower respiratory tract.

To exclude the malignant nature of the cyst, a positron-emission-tomography (PET) scan was performed, showing no pathological 18F-FDG up-take in the mass or any additional site. Our diagnosis initially favored a brachial cyst or a lymphatic cyst.

Because of patient discomfort, the uncertain diagnosis, and the presence of associated critical carotid disease she was referred for surgery.

A left carotid endarterectomy and excision of the cyst was performed simultaneously. A single surgical access through a left cervicotomy was performed along the anterior margin of the sternocleidomastoid muscle. Carotid endarterectomy was performed first. After the complete mobilization of the sternocleidomastoid muscle, and its medial retraction, the cyst was identified. The cyst wall appeared to have a yellowish shine. The mass was located deep and lateral to the neurovascular neck bundle reaching the pleural dome under the clavicle close to the vertebral vessels (Figure 2).

Figure 2. Intraoperative view showing the anterior wall of the cyst that was located deeply and laterally the neurovascular neck bundle reaching the pleural dome under the clavicle.

An accurate inspection of the lesion revealed the absence of a sinus tract or any other connection with thoracic or neck structures.

Before the excision of the mass, a sample of the fluid content was sent for biochemical and cytological examination. Then the cyst was then completely freed and excised without difficulties.

The surgical specimen was sent for pathological examination.

Figure 1(A,B,C). CT scan examination showed a left supraclavicular mass with regular profiles, deeply the sternomastoid muscle without any infiltration nor relationship with adjacent muscular and vascular structures. Densitometric analysis confirmed its cystic structure of dysomogeneous fluid content, without internal septation.
Cystic fluid showed a low composition in cholesterol and triglyceride (78 and 25 mg/dl, respectively), a plasma-like protein content (Total proteins: 5.2 g/dl, Albumin: 4.0 g/dl) and high LDH levels (1676 U/L). No malignant cells were present on microscopic examination.

Pathological examination of the cyst showed a cavity lined by squamous epithelium and containing copious lymphoid tissue in the wall (Figure 3). At 18 months follow-up the patient is in good clinical condition without recurrence of disease.

Discussion

BCCs represent a congenital developmental anomaly resulting from defects in the normal maturation of the branchial apparatus during the embryonic life. The precise mechanism is still not clear[1]. There are four theories of origin of branchial cysts[1]. They may represent remnants of pharyngeal pouches, or branchial clefts, or a fusion of these two elements. Alternative theories include remains of cervical sinus of His and the persistence of a connection between the thymus and the third branchialpouch.King et al [2]. Proposed the “Inclusion Theory” in which cyst epithelium arises from lymph node squamous epithelium, as most branchial cysts contain lymphoid tissue with no internal opening.

Congenital anomalies of the branchial apparatus are the most common cause of a cystic neck lesion in children and young adults with a peak age of incidence in the third decade. Typically, they present as a swelling in the anterior triangle of the neck adjacent to the angle of the mandible. Sixty percent of presenting patients are male, and 60% occur on the left side, and most arise from the second branchial cleft [1].

In our patient, the cyst was located posteriorly to the left of the sternocleidomastoid muscle extending in the thoracic inlet. Branchial cleft cysts, depending on the arch from which they origin, can be located at different levels. Supraclavicular and lower neck locations are very unusual, and involve cysts deriving from the third or fourth branchial pouch. Fourth arch anomalies represent 1-2% of all branchial anomalies[1]. Usually in these cases is described, a sinus tract connecting the cyst with the pyriform fossa exists. In our case, we were not able to demonstrate the sinus tract despite the cyst location in the lower neck atthe thoracic inlet, posterior to the sternocleidomastoid muscle, above the subclavian vessels, close to the vertebral artery.

Third branchial anomalies typically develop in the posterior compartment of the neck behind the sternocleidomastoid muscle. But in all the cases reported in literature, they are located cranially, unlike the lesion we described. Because of these anatomical considerations, the differential diagnosis was quite challenging.

In this case, considering the age of the patient, we had concern for a malignant lesion.

While the majority of cystic lesions in young adults represent BCC, Granström et al. [3] reported that 80% of cystic lesions in patients over 40 years of age are malignant. Head and neck squamous cell carcinoma which metastases to cervical lymph nodes, often undergoes cystic degeneration and may mimic BCC. The incidence of such cystic lesions in cervical metastases from Waldeyer’s ring has been estimated 33-62%[4].

Occult thyroid papillary carcinomas may manifest initially and solely as cervical cystic lesions[5]. Fine-needle-aspiration(FNA) can be used to exclude malignancy. Nevertheless, this can be difficult to distinguish a low-grade neof ormation from a benign cyst such as BCC even in experienced hands[6]. To evaluate the probability of malignancy, our patient was studied with a CT-scan and PET scan.

An inflammatory or suppurative lymph node could be excluded considering the absence of symptoms, lack of sources of infection, and the normal blood and microbiological profiles.

Third BCCs in all reported cases in the literature are located cranially. Thus, the location of this lesion posed another difficulty in diagnosis, with other considerations of causes of supraclavicular swelling such as a cervical thoracic duct cyst [7]. In fact, these very rare lesions are almost always left-sided locating between the left internal jugular vein and the left brachiocephalic vein. Ultrasonographic appearance is very similar to BCC. Sometimes in BCC the presence of cholesterol crystals is responsible of the typical “snowstorm” appearance at transducer pressure on the cyst [8]. But, in this case, the presence of low cholesterol levels made it difficult to differentiate this lesion from a thoracic duct cyst.
FNA with biochemical and cytological examination of the cyst content could address this diagnostic question, but would not change the ultimate management [1,6]. We preferred to avoid FNA, as the surgical dissection is more difficult increasing the risk of incomplete removal after drainage, even if only partially drained.

It has also been reported that infection and an incomplete removal of the cyst wall doubles the risk of recurrence [9]. We decided in favor of surgical resection to alleviate the discomfort of the patient, decrease the risk of potential infection, and to obtain a definitive histological diagnosis. In addition, we eliminated malignant potential as it is still unclear if BCCs have the ability to become malignant [1,10].

The congenital anomalies of the brachial apparatus can be easily misdiagnosed, especially in older people, without clinical history of recurrent infection. It is imperative in these patients to make every effort to exclude malignancy.

**Conclusion**

Because of anatomical considerations and the age of the patient, the differential diagnosis was broad; however, treatment options were limited. Due to the malignant potential, surgical resection was the only way to provide both diagnosis and treatment.

To our knowledge, this is the first case in literature describing a supraclavicular Branchial Cleft Cyst without a sinus tract, neither with the skin nor with the pyriform sinus or a thyroid lobe.

**References**


