Branchial cleft cyst versus dermoid cyst of digastric triangle: report of two cases

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Abstract Lateral neck soft tissue masses manifests with variable etiologies, clinical signs and symptoms. Although these lesions are congenital in nature, manifestations of these may not occur until adulthood. Also some of these lesions may undergo malignant transformations.

We present two cases with lateral neck swellings which were excised successfully under general anaesthesia and later confirmed histopathologically as dermoid and branchial cleft cysts.

Formulation of an appropriate diagnosis is necessary and requires a clinician to bear a host of skills to systematically arrive at a correct treatment plan. Use of advanced imaging techniques such as ultrasonography and magnetic resonance imaging along with proper knowledge of anatomy, pathology and application of basic surgical principles goes a long way in successful and uneventful management of such lesions, as these may overlap many important neurovascular structures or may in turn be wrapped by them.

Keywords Branchial Cleft cyst · Dermoid cyst · Enucleation

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Introduction

Dermoid and branchial cleft cysts are the most common congenital cystic masses of lateral neck [1,2]. Other common benign cystic lateral neck masses that mimic these include thyroglossal duct cyst and cystic nerve sheath tumors. All these are typically soft, slow growing and painless, making clinical distinction difficult [2]. Plain radiography is not of significant diagnostic value in such pathologies and additional modalities like ultrasonography and MRI are essential to assist a surgeon in assessing the proper extent of lesion into the surrounding tissues. Although histopathology still remains the gold standard in establishing the accurate diagnosis of these lesions, this article highlights the need of a proper preoperative workup to ascertain the nature and extent of these lateral neck masses to ensure that correct treatment is rendered.

Case report 1

A 30-year-old female reported to the department of Oral and Maxillofacial

Surgery, DAV dental college and hospital Yamunanagar in May 2007 with a painless swelling on the right side below the lower jaw that had gradually increased in size over last 4 years, without any history of episodes of inflammation or associated fever. On examination a non tender, fluctuant swelling measuring about 4 cm anteroposteriorly and 3 cm superoinferiorly, doughy in consistency was present in right submandibular region. Overlying skin of the neck and the mucosa of floor of mouth were normal in colour and texture. No rise in temperature of overlying skin was noticed. Regional draining lymph nodes were non palpable. Clear saliva was coming out of right wharton's duct.

On FNAC (Fine Needle Aspiration Cytology) very small amount of white, thick, cheesy material was obtained which contained only epithelial cells which although could not lead to a diagnosis, but helped in excluding a vascular lesion.

Ultrasonography, showed a circumscribed mass of about 2.8 x 3.0 cm size in right submandibular region, with hyperechoic areas in between. This was consistent with a dermoid or branchial cyst.

To further aid in distinction between the mass and the surrounding soft tissues, a MRI was carried out which confirmed the findings seen in ultrasonography (Fig. 1 and 2). The lesion was approached surgically by submandibular approach. A well encapsulated, unilocular, non adherent cyst was found at the inferior aspect of right submandibular gland (Fig. 3). It contained yellowish paste like material consistent with keratin lamellae. The cyst lining was sent for histopathologic examination (Fig. 4). This revealed a cyst lined by thick, fibrous capsule lined by squamous epithelium. Adnexal structures including sebaceous glands, hair follicles were seen in capsule which established the diagnosis of dermoid cyst.

Postoperative course was uneventful and follow up period of past 2 years. There was no recurrence observed (Fig. 5).

Case report 2

A 35-year-old female reported to our department for evaluation of a recurrent left neck mass. The patient had first noticed the mass before 10 years. There was history of

Fig. 1 MRI dermoid cyst in coronal section

Fig. 2 MRI dermoid cyst in sagittal section

Fig. 3 Dermoid cyst exposed

Fig. 4 Excised dermoid cyst

Fig. 5 Vacuum drain placed and closure done

Fig. 6 Branchial cleft cyst MRI sagittal section

Fig. 7 Branchial cleft cyst MRI axial section

Fig. 8 Branchial cleft cyst exposed

Fig. 9 Excised cystic lining and aspirated contents

aspiration and drainage at least 3 times earlier by a general medical practitioner. The recurrence this time had manifested as a much larger mass. The mass was not painful and growth was rapid. There was no associated symptoms of dyspnoea, cough, dysphagia or throat pain. Except for previously mentioned needle aspirations there was no history of any other Neck surgeries.

Examination revealed a mobile, not well circumscribed, non tender, 4x3 cm, cystic mass at the level of hyoid bone,

anterior to sternocleidomastoid muscle. No evidence of cervical lymphadenopathy was present. Trachea was in midline, thyroid was normal and breath sounds were clear.

On FNAC, yellowish, pus like fluid was aspirated. A culture of the specimen was negative for any bacterial growth, indicating that the pathology was non-infective in nature.

Ultrasonography demonstrated a complex cystic lesion in which the fluid had few internal echoes in lower part and a

provisional diagnosis of branchial cleft cyst was made.

To further correctly assess the extent of the lesion with regard to its proximity to vital structures of neck, a MRI of neck was advised which revealed an oval smooth-edged capsulated mass, measuring 3.9x3.5x2.8cm present in relation to anterior border of sternocleidomastoid muscle, superficial to the carotid artery with a signal intensity equivalent to fluid (Figs. 6 and 7). Patient was operated under General Anesthesia. The neck mass was

excised uneventfully using the subangular approach (Fig. 8). The excised specimen was sent for histopathologic examination. (Fig. 9)

Microscopic examination revealed a cyst lined by benign stratified squamous epithelium. Plenty of lymphoid tissue was identified in the wall of cyst around the lining epithelium. Many reactive germinal centres were also present. The histopathologic picture was of a branchial cleft cyst.

Discussion

Lateral swellings of the neck can be solid or cystic masses. Various means of differentiating these cystic masses largely depend on their location in neck, displacement of adjacent structures and the characteristics of the cyst itself [3]. Diagnostic imaging techniques like ultrasonography and MRI have been shown to be of great value in evaluating solid and cystic neck masses including dermoid cyst, Branchial Cleft Cyst (BCC), cystic hygroma, thyroglossal duct cyst, jugular vein thrombosis, abscess, metastatic and inflammatory lymphadenopathy, mycotic aneurysms, salivary gland adenoma, thyroid cyst and ganglioneuroma [3].

Cysts associated with second branchial clefts are by far the most common of branchial cleft apparatus anomalies, representing about 95% of cases [3]. A reported differential feature of this cyst is that it lies anterior and medial to sternocleidomastoid muscle with posterior or posterolateral displacement of muscle. The anterior location of BCC has been regarded as such a constant feature, that BCC can be excluded from consideration in cases of cystic masses posterior and medial to sternocleidomastoid muscle [4].

Considering dermoid cysts, about 7% occur in head and neck region, among them 23% are located at floor of mouth and among these 6% develop in submandibular space [5].

Clinically, both the lesions may present as slow growing, painless masses, doughy in consistency. The cyst was soft and well encapsulated without any associated lymphadenopathy.

Although fine needle aspiration biopsy is commonly used in initial diagnostic assessment of neck masses, the technique is less reliable when used on cystic lesions because it results in non-diagnostic samples in significant number of cases [6].

Table 1 Bailey and colleagues classified BCC into four types [4,7]

Type I	Just deep to platysma muscle and anterior surface of sternocleidomastoid muscle
Type II	More medial than type I, is seen along lateral surface of sternocleidomastoid muscle, just lateral to the carotid space and posterior to submandibular glands, arising on a line between the skin of lateral neck and ipsilateral faucial tonsils.
Type III	Extend further medially between the internal carotid artery and external carotid artery at carotid bifurcation.
Type IV	Least common and arises in the pharyngeal mucosal space just deep to the palatine tonsils, often extending upwards from tonsils toward the skull base.

The BCC should be treated by thorough surgical removal. Recurrence results if residual remnants are left or if the lesion is simply aspirated or drained.

Imaging is frequently employed to determine the exact location and characteristics of the pathologic process among patients who present with a lateral neck mass. Imaging modalities including ultrasonography, MRI and CT scan may be useful in reaching a provisional diagnosis, and ruling out vascular malformations. MRI has a distinct advantage in its soft tissue capabilities and it is useful when the distinction between the lesion and the surrounding soft tissue is poor [7].

Ultrasound is a study that is readily available, inexpensive, non invasive and accurate, with a limitation of being highly operator dependent and many radiologists inexperienced in ultrasound prefer MRI [8].

In the two case reports described here, we utilised FNAC, ultrasonography and MRI in the preoperative assessment of the patient. Proper clinical assessment of the masses followed by FNAC helped us to rule out vascular malformations, whereas the ultrasonography complemented by MRI, helped to determine the extent and proximity to vital structures.

Histologically, all true dermoid cysts are lined by epidermis with the presence of adnexal structures such as sweat glands, sebaceous glands, hair and hair follicles [9,10]. If, no structure is present then the structure is called as an epidermoid cyst [9,11]. Contents of dermoid cyst are often keratinaceous, caseous, sebaceous or purulent with hair, nails, fat globules and even cartilage [9,11]. Excision of dermoid cyst is the treatment of choice. There is low recurrence rate as the fibrous capsule which surrounds the cyst makes it easy to enucleate thoroughly [12,13].

Histologically, BCC shows variable amount of connective tissue in the wall. The wall of cyst generally exhibits lymphoid tissue with abundant germinal centres and cyst itself may contain a thin watery fluid or thick gelatinous material. (Table 1)

Conclusion

Congenital neck lesions reflect abnormal embryogenesis in head and neck development. A thorough knowledge of embryology, anatomy and a proper diagnostic work up is critical in diagnosis and treatment of these lesions. Although there might be a role for MRI in complementing the surgeon for proper soft tissue delineation of these masses, FNAC and ultrasonography provide sufficient information to arrive at a correct diagnosis and appropriately manage dermoid and branchial cleft cysts.

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