Clinical Case Reports International

Case Report
Published: 29 Oct, 2018

Dilemmas in Diagnosing Neck Mass: Branchial Cyst versus Thyroid Tumor

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Abstract

Neck mass poses treatment challenges if not properly addressed and investigated. Careful and meticulous examination is crucial before embarking on any surgical interventions. Numerous differential diagnoses is possible for any neck mass and it differs between adult and pediatric patient. The final diagnosis will depend on the patient's age, the location of the mass, the detail characteristic of the mass as well as the associated symptoms exhibited by the patients. We describe a case of suspicious of branchial cyst which turn out to be a recurrent thyroid tumor.

Keywords: Neck mass; Thyroid tumor; Branchial cyst

Introduction

Neck masses are frequently encountered by surgeons. They are subdivided into midline and lateral neck masses. Cystic neck lesion in adults has to be carefully evaluated to obtain accurate diagnosis and to offer the correct treatment. The commonest midline neck mass in adults is of thyroid gland origin. Thyroid masses are under the subdivision of lower midline neck masses. Examples of thyroid masses are solitary thyroid nodules, multinodular goitre and diffuse thyroid masses. Ultrasound is an excellent technique for imaging the thyroid gland. Solid and cystic lumps can be distinguished and nodules can be characterized with a high degree of accuracy [1].

Branchial Cyst (BC) is one of the commonest examples of lateral cystic neck lesion. It appears as a developmental failure of the branchial apparatus. They often manifest in young adults with an incidence peak in the third decade. Few theories have been suggested to explain the origin of BC, such as the inclusion theory and the branchial apparatus theory. Inclusion theory postulates that BC is epithelial inclusions within a lymph node. This theory is supported by the fact that most BC has lymphoid tissue in their wall. Branchial apparatus theory suggests that branchial cysts represent the remains of pharyngeal pouches or branchial cysts or both and that cysts should be present at birth with peak incidence at the second to third decades [2]. BC mostly, about 60% located in the upper third of the neck at the anterior margin of the Sternocleidomastoid (SCM) muscle. It is usually persistent and 70% are clinically cystic. Ultrasonography is the modality of choice in cysts [3].

We would like to share our experience of managing a patient presented with left sided neck mass, clinically appeared as branchial cyst but further investigations and final histopathological result was of thyroid nodular hyperplasia.

Case Presentation

A 33-year old, Malay lady with history thyroid surgery 20 years ago for multinodular goitre, presented to Otorhinolaryngology clinic in September 2017 with complaints of a left anterolateral neck swelling. The swelling is painless and gradually creasing in size for more than 14 years of duration. The patient was asymptomatic. She had no obstructive symptoms, voice changes, hypo or hyperthyroid symptoms or any constitutional symptoms.

Examination of neck revealed a huge left anterolateral cystic lesion, measuring about 15.0 cm × 10.0 cm, extending superiorly to the lower border of the left mandible, inferiorly to just above the clavicle (Figure 1). Laterally, the mass extends up to the posterior border of the left sternocleidomastoid muscle and medially, it encroaching the midline. There was also surgical scar which most probably could be due to previous thyroidectomy scar. Nasal, ear, laryngeal, cranial nerves and other systemic examinations were unremarkable.

The patient was treated as having branchial cysts until the Fine Needle Aspiration and Cytology (FNAC) findings were reported as colloid nodule with cystic degeneration. Ultrasonography of neck

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Received Date: *22 Sep 2018*
Accepted Date: *24 Oct 2018*
Published Date: *29 Oct 2018*

Citation:
Lazim NM. Dilemmas in Diagnosing Neck Mass: Branchial Cyst versus Thyroid Tumor. Clin Case Rep Int. 2018; 2: 1081.

Figure 1: Huge left neck mass overlying the sternomastoid muscle which was cystic and fluctuant on clinical examination.

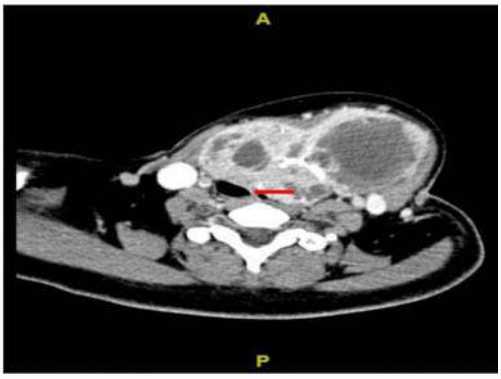

Figure 2: Enlarged thyroid gland with multiple well defined cystic and solid lesions, which displaced and compressed the trachea to the right (red arrow).

interpreted that features are of multinodular goitre. Blood tests such as the thyroid function test and the serum calcium levels were within normal range. Patient was then planned for computer tomography in order to ascertain the origin of the mass and to rule out features of malignancy in view of it is long standing nature. The CT scan reported as the thyroid gland was grossly enlarged with multiple well defined cystic and solid lesions, predominantly cystic lesions. The largest lesion was in the left thyroid gland, measuring 9.1 cm × 9.1 cm × 8.8 cm without retrosternal extension. The lesion caused mass effect to the airway where it compressed and displaced the trachea postero-laterally, and the surrounding structures involving supraglottic, glottic and subglottic region, seen at the level of C2/C3 cervical body till T1/T2 level (Figure 2).

Subsequently, she underwent completion thyroidectomy in January 2018 which revealed a cystic mass overlying the carotid sheath (Figure 3). The mass was excised leaving the carotid sheath content intact (Figure 4). Her histopathological report was nodular hyperplasia of thyroid. Eight months postoperative, the patient is well with no complication and she was pleased with the surgery as her aesthetic has significantly improved.

Discussion

The aim of presenting this case is to show the diversity of the differential diagnosis of the neck mass in our patient. Initially with the location and examination of neck mass, a provisional diagnosis of branchial cyst was speculated but after further investigation like FNAC, ultrasonography and CT scan of the neck, the provisional diagnosis was directed towards multinodular goitre. The location of neck mass and imaging appearances gives surgeon the gross

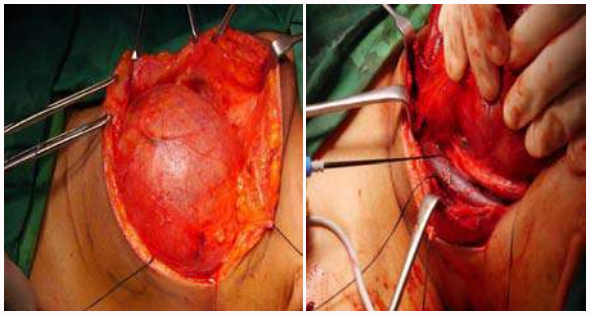

Figure 3: Intraoperatively, the mass was cystic and intimately lies on the carotid sheath (carotid artery, vagal nerve and internal jugular vein).

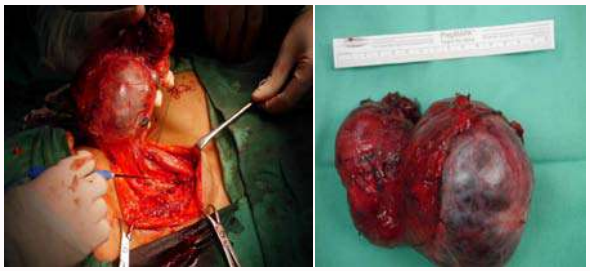

Figure 4: The mass was removed in total, leaving the vagal nerve intact. The mass measured 15.0 cm × 11.0 cm.

idea on the provisional and differential diagnosis. The initial examination of this patient which revealed a very cystic and fluctuant mass giving the impression it could be a branchial cyst. This were supported by its typical location at lateral neck region overlying the sternocleidomastoid, the patient's age as well as presence of extensive surgical scar which could be due to total thyroidectomy.

A differential diagnosis of midline neck masses are numerous and includes subcutaneous lesions (epidermoid cysts, dermoid cysts, teratoid cysts and lipoma), thyroglossal ducts cysts, lymph nodes and thyroid masses. Differential diagnosis for lateral neck masses on the other hand, is divided into skin and subcutaneous lesions (epidermoid cysts, dermoid cysts, teratoid cysts and lipoma), developmental masses (lymphangiomas and branchial cysts), lymph nodes (infectious, inflammatory and neoplastic), neurogenic tumors (neurofibromas and schwannomas), vascular tumors (carotid body tumors) and salivary glands.

In view of wide differential diagnoses, meticulous examination and complete work up is necessary in managing any patients who presented with neck mass. This is crucial in order to come to a correct final diagnosis and proper treatment can be instituted. Sixty percent of BC is located in the upper third of the neck, anterior to the sternocleidomastoid muscle, but they may appear anywhere in neck or even in the parotid gland. Detection of a cystic mass in the lateral neck region should always raise a possibility of thyroid nodule [4]. Seventy percent are cystic, although up to 30% may be solid. Regional lymph node metastasis from the Head and Neck Squamous Cell Carcinoma (HNSCC) of the upper aerodigestive tract might mimic BC in imaging if it undergoes cystic degeneration. Cystic degeneration in cervical metastasis from Waldeyer's ring is estimated to be 33% to 62% [5].

Imaging commonly used for neck masses are Ultrasound (US), Computer Tomography (CT) and Magnetic Resonance Imaging (MRI). US is the initial method of imaging, as it is relatively cheap,

well tolerated, absence of ionizing radiation and provides excellent resolution and contrast of the extra cranial head and neck [6]. US is very useful in cases where Fine Needle Aspiration Cytology (FNAC) is needed and it displays the intracystic architecture and vascularity. In older patients with cystic lateral neck lesions, ultrasound with CT or MRI is the best investigation modality [7].

In BC, US display various echogenicities without intrinsic vascularity on color Doppler. The typical 'snowstorm' appearance is seen on pressing the transducer against the tissue. This is due to the movement of the cholesterol crystals [8]. The role of US-guided FNAC is questionable when assessing cystic lesions because FNAC has a high false-negative rate (38% to 63%) [9]. However, BC is differentiated from HNSCC metastasis by evaluating the cell ploidy using flow cytometry DNA analysis of the FNAC samples [10]. The simple cyst depicts thin, smooth rim and mucoid content of low density in CT, whereas in MRI, uncomplicated BC has low T1-Weighted (T1W) and high T2W signal intensity. An infected cyst will possess thick, irregular, enhancing and maybe septated rim in CT. In MRI an infected cyst will show high signal intensity in both T1W and T2W images. Contrasted images will display an enhanced cystic wall [7].

The commonest midline neck lump in adult is of thyroid gland origin. Thyroid cysts commonly appear as a solitary thyroid nodule of variable size, are painless unless have a hemorrhagic component within. Thyroid cysts usually are fluctuant or tense and on the contrary, adenomas are usually solid. True epithelial thyroid cysts are rare. Cystic thyroid lesions are mostly due to haemorrhage or degeneration within a hyperplastic nodule (part of a multinodular goitre). Toxic and non-toxic multinodular goitres are painless too and have multiple nodules of variable size and shape. In cases of thyroid masses, ultrasound is an excellent choice of imaging and they appear as well-defined, heterogeneous nodules with cystic component and internal septa. The comet tail sign is occasionally seen and it suggests the presence of colloid within [11]. Multinodular thyroid is diagnosed when multiple cystic nodules are present. Ultrasound with fine-needle aspiration cytology is the first-line investigation in cases with solitary thyroid nodule. The presence of punctuate calcifications and chaotic intranodular vascularity on Doppler will raise suspicion of malignancy, hence ultrasound-guided fine needle aspiration is advocated [12]. CT scan is usually performed in thyroid mass to look for the retrosternal extension, to assess any compression on adjacent structures like the trachea and the major neck vessels (internal and external carotid artery and internal jugular vein) as well as suspicious features of malignancy such as presence of metastatic lymph nodes and area of central necrosis.

Conclusion

It is imperative to investigate for a correct diagnosis of any neck mass as the subsequent surgical plan will depends on the final pathology diagnosis. This will avoid unnecessary surgical morbidities and improve patient's post-operative outcomes.

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