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Evaluation of primary lateral neck mass in adults: Cross sectional study

Erişkinlerde primer lateral boyun kitle değerlendirilmesi: Kesitsel çalışma

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Abstract

Aim: Primary Lateral neck mass (PLNM) is a disease that expresses a pathology in neck, excluding thyroid and skin tumors. The spectrum ranges from "lumps, mass or tumors," congenital tumors, inflammatory diseases, and benign neoplasm to malignant neoplasm. The current Skandalakis algorithm excludes thyroid pathology. Correct anamnesis and physical examination are especially important for data collection. We herein analyzed the methods of study in PLNM.

Methods: This cross-sectional study was performed with review of medical records from January 2010 to July 2019. All patients with diagnoses of PLMN and older than 15 years of age were analyzed. We excluded patients with "classic" and unknown lateral neck masses. Standardized protocols for data collection were implemented to minimize or avoid bias. The statistical analysis was carried out with STATA v 14.0.

Results: A total of 78 patients were studied. Age and time of evolution were the most crucial factors in presumptive diagnoses. The most frequent location was the anterior triangle in the neck (77%). Murmurs and thrills were clinically defined as vascular pathologies. Mobility on all axes without fixation to deep planes were clinically defined as Lipoma. The pathological examinations were more frequently reported as lymphomas (32), which were followed by Branchial Cleft Cysts. Ultrasound was a complementary study useful in congenital malformations to determine cystic characteristics. The presence of "B symptoms" and FNA (fine needle aspiration) are useful in primary Lymphoproliferative adenopathy. MRI (Magnetic resonance image) and Angio-MRI are useful in tumors of nervous origin (schwannomas, neurofibromas, and paragangliomas tumors). Malignant soft tissue tumors (sarcomas) need complementary studies and imaging for surgical planning.

Conclusion: Differential diagnoses of the primary lateral neck masses challenge surgeons. Anamnesis and physical examination are the most crucial factors for the presumptive diagnoses. Complementary studies and imaging should be requested with selective criteria.

Keywords: Primary lateral neck mass, Lateral neck mass, Head and neck tumors

Öz

Amaç: Primer Lateral boyun kitlesi (PLNM), tiroid ve deri tümörleri dışında boyundaki patolojileri ifade eden bir hastalıktır. Spektrum "topaklar, kitle veya tümörler", konjenital tümörler, enflamatuar hastalıklar ve iyi huylu neoplazmadan kötü huylu neoplazmaya kadar değişir. Mevcut Skandalakis algoritması tiroid patolojisini dışlamaktadır. Veri toplama için doğru anamnez ve fiziksel muayene özellikle önemlidir. Burada PLNM'de çalışma yöntemlerini analiz ettik.

Yöntemler: Bu kesitsel çalışma, Ocak 2010'dan Temmuz 2019'a kadar tıbbi kayıtların gözden geçirilmesi ile gerçekleştirildi. PLMN tanısı olan ve 15 yaşından büyük tüm hastalar analiz edildi. "Klasik" ve bilinmeyen lateral boyun kitlesi olan hastaları dışladık. Önyargıyı en aza indirmek veya önlemek için veri toplama için standartlaştırılmış protokoller uygulandı. İstatistiksel analiz STATA v 14.0 ile gerçekleştirildi.

Bulgular: Toplam 78 hasta incelendi. Yaş ve süregelme zamanı, varsayımsal tanılarda en önemli faktörlerdi. En sık yerleşim yeri boyundaki ön üçgendi (% 77). Üfürüm ve thrill, klinik olarak vasküler patolojiler olarak tanımlandı. Derin planlara fiksasyon olmaksızın tüm eksenlerde hareketlilik klinik olarak Lipoma olarak tanımlandı. Patolojik incelemeler daha sık lenfoma (32) olarak bildirilmiş, bunu Branşiyal Yarık Kistleri izlemiştir. Ultrason, kistik özelliklerin belirlenmesinde konjenital malformasyonlarda yararlı tamamlayıcı bir çalışmaydı. "B semptomları" ve FNA'nın (ince iğne aspirasyonu) varlığı, birincil Lenfoproliferatif adenopatide faydalıdır. MRI (Manyetik rezonans görüntüsü) ve Anjiyo-MRI, sinir kaynaklı tümörlerde (schwannomlar, nörofibromlar ve paraganglioma tümörleri) faydalıdır. Kötü huylu yumuşak doku tümörleri (sarkomlar), cerrahi planlama için tamamlayıcı çalışmalara ve görüntülemeye ihtiyaç duyar.

Sonuç: Primer lateral boyun kitlelerinin ayırıcı tanısı cerrahları zorlamaktadır. Anamnez ve fizik muayene, olası tanılar için en önemli faktörlerdir. Seçici kriterler ile tamamlayıcı çalışmalar ve görüntüleme talep edilmelidir.

Anahtar kelimeler: Primer lateral boyun kitlesi, Lateral boyun kitlesi, Baş ve boyun tümörleri

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Introduction

One of the most important considerations in an adult with a lump in the neck, is that the mass may represent a metastatic tumor from a primary cancer, often but not always in the upper respiratory or alimentary tract. Primary lateral neck mass (PLNM) is a disease that expresses a pathology in the neck, excluding thyroid and skin tumors. The Spectrum ranges from "lumps, mass or tumors," congenital tumors, inflammatory diseases, benign neoplasm, to malignant neoplasm. The current Skandalakis algorithm excludes thyroid pathology [1]. Correct anamnesis and physical examination are especially important for the data collection. The anatomical location of the mass, and overall time course are crucial factors to help differentiate neoplastic disease from other possibilities. In addition, the patient's age plays a key role.

The neck is divided into cervical triangles, all of which have a common boundary, the sternocleidomastoid muscle. The posterior cervical triangle is bound anteriorly by the posterior aspect of the sternocleidomastoid muscle, posteriorly by the anterior border of the trapezius muscle, and inferiorly by the clavicle. The boundaries of the anterior cervical triangle are the median line of the neck, the inferior border of the mandible superiorly, and the anterior border of the sternocleidomastoid muscle posteriorly. The location of the neck mass in a particular lymphatic zone also provides the clinician a key to the site of origin of a primary tumor or inflammatory process.

In these groups of patients, the diagnosis should made quickly so that correct management of the disease can be instituted. Imaging is often an essential component in evaluating PLNM and can be helpful in characterizing congenital, inflammatory, vascular, and neoplastic lesions [2]. In some cases, characteristic imaging appearances can be diagnostic, so correct evaluation provides framework for timely diagnosis [3]

Ultrasound of the neck is usually performed with the patient in the supine position, with the neck extended. A high-frequency linear transducer provides good resolution of superficial structures and is therefore useful for evaluation of most palpable masses in the neck. Doppler imaging provides visualization of arterial and venous flow and can be used to evaluate the presence and distribution of flow within a mass. The examination should also include assessment of the sub mandibular, parotid, and thyroid glands, when indicated. Identifying a normal thyroid gland is important in the preoperative workup of some congenital neck masses such as thyroglossal duct cyst or ectopic thyroid [4].

One of the primary advantages of an ultrasound is its ability to distinguish between solid and cystic masses. Simple cystic masses are anechoic and demonstrate posterior acoustic enhancement. This phenomenon is sometimes referred to as increased through transmission, making the tissues behind the cyst appear brighter than the adjacent soft tissues due to the increased velocity of sound waves through fluid in the cyst relative to soft tissues. Doppler imaging can also elucidate how flow is distributed within a mass (centrally, peripherally, or evenly throughout), and whether the flow is normal, increased, or decreased, all which may have diagnostic significance.

In most situations, computed tomography (CT) of the neck with contrast is the best initial imaging study for evaluation of a neck mass in an adult. CT with contrast provides adequate information regarding the size, extent, location, and characteristics of the mass. Cystic and solid lesions can be distinguished, and the relationship of the mass to other vital structures such as the airway, cranial nerves, and major blood vessels can be assessed. The scan will also reveal possible primary sites in the case of neoplastic disease. To encompass the entire upper aerodigestive tract, the ordering physician should request that the CT scan of the neck extend from the base of the skull to the thoracic inlet [5].

Magnetic resonance image (MRI) is an excellent imaging modality for soft tissue lesions, but is not required in most situations. MRI is more expensive and time-consuming. However, it may be useful in certain clinical scenarios, for example, in a patient with paraganglioma. Angio MRI is the gold standard for diagnosis. A typical neck MRI protocol includes multiplanar T1, fat-suppressed T2 or short tau inversion recovery (STIR) sequences, diffusion-weighted images (DWI), and post contrast, fat-suppressed T1 weighted sequences. Compared with CT, MRI protocols are more complex, and may require tailoring to specific pathologies. T1 weighted images are helpful for delineation of anatomy. Fat appears bright on T1 and T2 weighted images, and fat suppression is helpful for elucidating underlying lesions on T2 weighted and post contrast sequences. Various fat-suppression sequences are available, which vary by technique and manufacturer, including STIR [6].

Fine needle aspiration cytology offers an accurate, sensitive, inexpensive, and rapid method for evaluation of a cervical adenopathy or mass. Slide preparation is critical for accurate diagnosis, and immediate inspection in a specialized cytopathology clinic allows additional material to be acquired if the aspirate is acellular or if further material is required for immunocytochemistry or culture. For patients with poorly defined or deep-seated lesions, image or ultrasound guidance can be used. Inevitably, there will be cases in which the validity of fine needle biopsy is called into question. In these circumstances an open biopsy may be the only way to determine the diagnosis. The objective of the study is to analyze the approach in diagnosing PLNM.

Materials and methods

This cross-sectional study was performed with a review of medical records from January 2010 to July 2019. All patients with diagnoses of PLMN and older than 15 years of age were analyzed. We excluded patients with "classic" and unknown lateral neck masses. Standardized protocols for data collection were implemented to minimize or avoid bias. Preformed strategies on recollection of information were defined before the study started. All procedures performed in this study involving human participants were in accordance with the ethical national and international standards.

We aimed to determine the utility of anamnesis (age, time of evolution and medical history), physical examination (anatomical location and characteristics of the tumor) and complementary studies requested.

Statistical analysis

Statistical analysis was carried out with STATA v 14.0, which allowed for the application of the corresponding statistical epidemiologic techniques by analyzing descriptive statistical variables.

Results

A total of 78 patients (42 women and 36 men) with a mean age of 27 (10) years (15-63 years) were included. Age and time of evolution were the most crucial factors on presumptive diagnoses. The Skandalakis algorithm was used. Congenital tumors, inflammatory diseases, benign neoplasm were more frequent in young patients. Malignant tumors were diagnosed in adults older than 45 years of age. Lymphoproliferative diseases were frequent in young, adult, and old patients. When the time of evolution was less than 30 days, the diseases were most clinically defined as inflammatory diseases or benign tumors. Hard, painful, and fast-growing neck tumors were defined as malignant. The most frequent anatomical location was the anterior triangle in the neck (77%). Murmurs and thrills indicated vascular pathology. The mobility on all axes without fixation to deep planes indicated lipoma. The pathological examinations more frequently reported as lymphomas (32), followed by Branchial Cleft Cysts (19), Lipomas (7), Lymphangioma (6), Paragangliomas Tumors (5), Schwannomas (3), Neurofibromas (2), Undifferentiated Sarcoma (2), Liposarcoma (1), and arteriovenous malformation (1) (Table 1). Ultrasound and doppler were complementary studies useful in congenital malformations to determine cystic characteristics and vascularization. The presence of “B symptoms” and FNA (fine needle aspiration) are useful in primary Lymphoproliferative adenopathy. Unilocular cyst diagnoses indicated Branchial Cleft Cysts, while multilocular cyst with tracts were diagnosed as Lymphangioma. The presence of “B symptoms” and FNA (fine needle aspiration) are useful in primary Lymphoproliferative adenopathy. MRI and Angio-MRI were useful in tumors of nervous origin (schwannomas, neurofibromas, and paragangliomas). Malignant soft tissue tumors (sarcomas) needed complementary studies for surgical planning, like CT or MRI.

Table 1: Distribution of pathological diagnoses of the patients

Pathology	Percent
Lymphomas	41
Branchial Cleft Cysts	24
Lipomas	9
Lymphangioma	8
Paragangliomas Tumors	6
Schwannomas	4
Neurofibromas	3
Undifferentiated Sarcoma	3
Liposarcoma	1
Arteriovenous Malformation	1

All patients with primary Lymphoproliferative adenopathy underwent open biopsy to determinate cytogenetic characteristics for immunocytochemistry studies. All other patients had resection of the tumor with open surgery. Four seromas were presented. Among patients operated due to schwannomas, there were patients with dysphonia and 1 with a swallowing disorder. Four patients died (3 advanced lymphomas, and a patient with sarcoma). The median follow-up was 27 months. There were no recurrences.

Discussion

Primary lateral neck mass (PLNM) includes pathologies in the neck excluding the thyroid, and skin tumors metastases of upper respiratory or alimentary tract. The diagnosis is highly challenging in a variety of these cases. Understanding the basic evaluation of the neck mass is essential in determining when a mass is insignificant or significant, and potentially malignant. Beginning with an understanding of neck anatomy, a thorough history-taking and physical examination can become straightforward and well directed.

Patient’s age, duration and progression of the neck mass, and associated symptoms if any, can often significantly narrow the possible diagnosis. In general, the potential for malign neoplasm increases with increasing patient age [7].

Progressive neck masses present for more than two weeks are more likely to be neoplastic. Definition of the size, location, and physical qualities of the neck mass provide insight into its origin. All patients with a neck mass deserve a thorough exam of the skin. For almost all patients with a progression neck mass, except for suspected vascular tumors, fine needle aspiration is a good next step.

Branchial cleft cysts are most commonly found in late childhood or early adulthood. Similar to thyroglossal duct cysts, they are frequently diagnosed following an upper respiratory tract infection when the mass becomes inflamed. Occasionally the mass resolves, but most often they persist as a soft mass in the neck. The first branchial cleft cyst is found at the mandibular angle inferior to the ear lobule along the inferior border of the mandible and may have a tract that connects to the external auditory canal. The second branchial cleft cyst is the most common type and may have a tract that opens along the anterior border of the sternocleidomastoid muscle. This cyst sometimes has a tract that opens in the oropharynx at the superior portion of the tonsillar fossa. Patient’s age, duration, location, and progression of the neck mass with ultrasound and aspiration of cholesterol fluid is sometimes enough for diagnosis. However, congenital cystic lesions such as branchial cleft cysts are often well depicted on CT examinations. In some cases, however, branchial cleft cysts and associated sinus tracts may be collapsed, rendering them difficult to identify on any imaging modality. Uncomplicated branchial cleft cysts appear as hypoattenuating lesions with a thin wall. In cases of infected branchial cleft cysts, CT demonstrates a hypoattenuating cystic lesion, which may have a thickened wall, and inflammatory changes in the surrounding soft tissues [8] (Figure 1).

MRI may be helpful in evaluating atypical features of branchial cleft cysts, which can result from intracapsular hemorrhage or solidification of cystic fluid, appearing as abnormal signal intensities of the contents. Intracystic hemorrhage can demonstrate hyperintensity on T1 and T2 weighted images, while solidification of cystic fluid displays homogeneous hypo intensity on T2 weighted images without enhancement. Atypical branchial cleft cysts can be difficult to differentiate from cystic malignancies even on MRI, and tissue sampling may be necessary [9]. Definitive treatment is complete surgical excision of the cyst and tract.

Figure 1: 18-year-old patient with left neck mass, mobile, elastic, 5 years of evolution. Ultrasound: cystic lesion, anechogenic image with posterior reinforcement. Diagnosis: Branchial cleft cysts

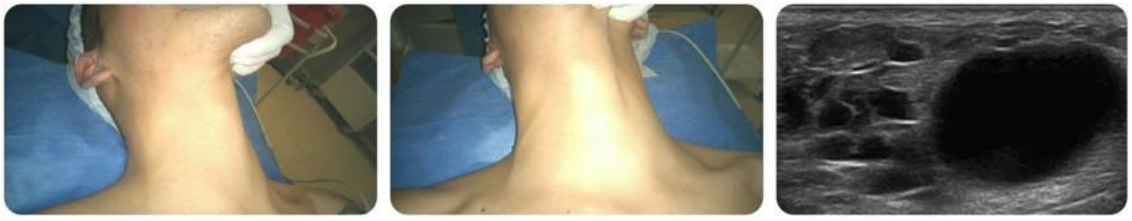

Figure 2: 15 -year-old male patient with right neck mass, elastic, 2 years of evolution. Ultrasound: multi trabecular cyst image in right supraclavicular region

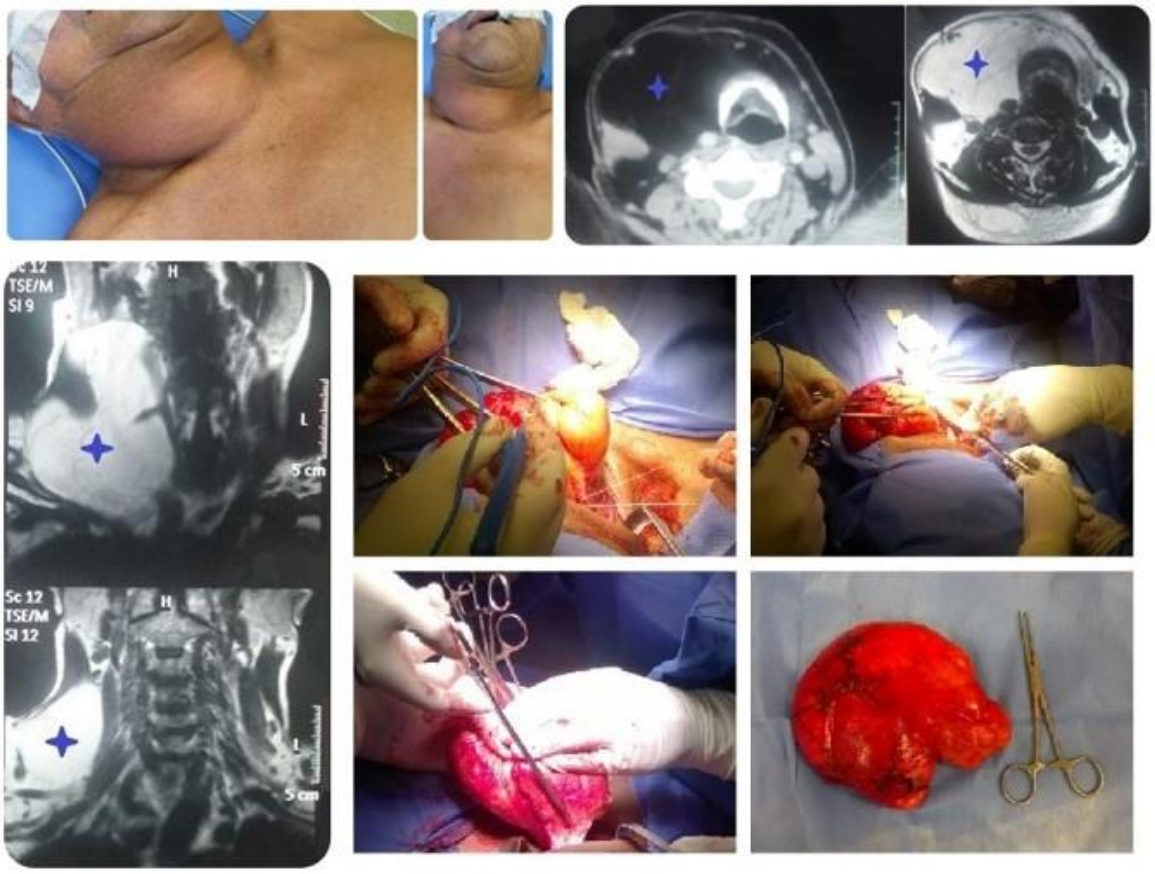

Figure 3: 54-year-old male patient. 6 years of evolution and slow growth. MRI. Lipoma in STIR sequence of fat suppression is confirmed.

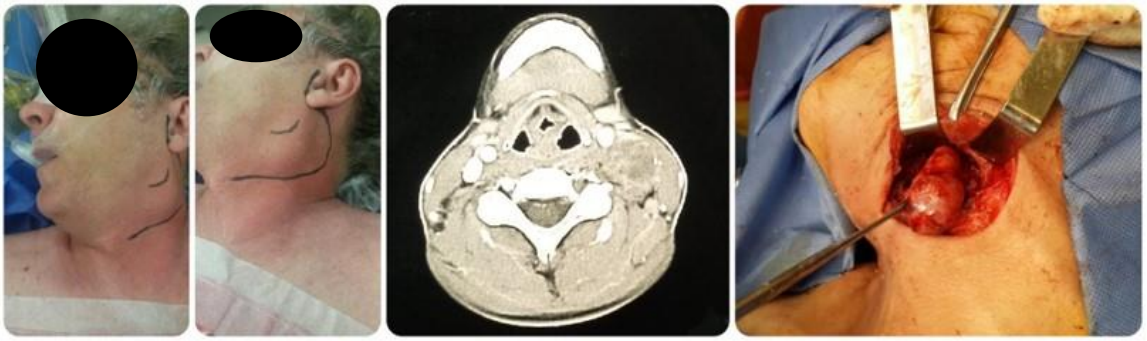

Figure 4: 65-year-old patient with a history of B symptoms and lateral neck tumor. TC: nodal image with central necrosis. FNA: lymphoproliferative syndrome. Biopsy is decided to perform immunohistochemistry.

Lymphangioma, or lymphatic malformation, is a rare, congenital anomaly that usually presents in childhood and occasionally in adults. The majority of cases occur in the head and neck, mostly in the posterior triangle [10]. Diagnosis is by history of a soft, compressible neck mass that usually enlarges proportionally with the growth of the patient. Characteristic findings of trabecular cyst-like structures on imaging studies like ultrasound or CT scan of the neck. Macrocystic lymphatic malformation appears as an unilocular or multilocular cystic lesion, usually with thin septations (Figure 2). Definitive diagnosis of lymphangioma is from operative pathology. Treatment regimens vary depending on macrocystic or microcystic features, but usually involve an attempt at complete surgical excision [11].

Lipomas and especially liposarcomas are extremely rare lesions presenting above the clavicles, as they usually occur in extremities and the trunk. In general, patients present with a slowly enlarging, painless neck mass. A history of trauma to the area affected may also be elicited [12]. Physical examination reveals a subcutaneous, smooth-surfaced soft tissue mass. For most subcutaneous lipomas, no imaging studies are required, but a deep lipoma requires contrast-enhanced CT scan or MRI of the neck to determine the extent of the process before complete surgical excision. STIR sequences with fat suppression on MRI are useful to determinate fat tumors (Figure 3). Although simple lipomas and well-differentiated liposarcomas are both grossly fatty masses, MRI has been described as useful in attempting to distinguish these two lesions. Several imaging features are more closely associated with well-differentiated liposarcomas, including thickened or nodular septa, associated non-adipose masses, prominent foci of high T2 signal, and prominent areas of enhancement. Higher grade liposarcomas generally do not confound the MRI diagnosis of grossly fatty lesions because they typically contain little or no macroscopic fat [13]. A significant number of lipomas will have prominent non-adipose areas and will demonstrate an imaging appearance traditionally ascribed to well-differentiated liposarcoma. Features that suggest malignancy include increased patient age, large lesion size, presence of thick septa, presence of nodular and/or globular or non-adipose mass like areas, and decreased percentage of fat composition [14].

Lymphomas are a heterogeneous group of lymphoproliferative disorders and are classified as Hodgkin or non-Hodgkin lymphoma. Young adults with chronic non-tender nodal enlargements in the anterior or posterior triangle of the neck may have Hodgkin's lymphoma [15]. Seventy percent of Hodgkin's disease is first diagnosed in the neck and only 25% of these will have B symptoms (fever, chills, night sweats or weight loss). The size, consistency, tenderness, and mobility of the mass provide diagnostic clues. Symptoms include odynophagia, globus sensation, otalgia, or hearing loss associated with otitis media and dysphagia. Classic constitutional symptoms include fever, night sweats, and weight loss. Lymphomas present most frequently with lymphadenopathy and frequently involve the head and neck region. In the head and neck region this disease most often presents as a painless nodal mass, which may become painful with rapid growth. Hodgkin disease rarely presents in extra nodal sites in the head and neck area, whereas non-Hodgkin lymphoma often presents with extra nodal manifestation in the Waldeyer ring, mainly the palatine tonsil and nasopharynx. FNA are useful in primary lymphoproliferative adenopathy (Figure 4). CT imaging studies of the head and neck, chest, abdomen, and pelvis assist in staging, in addition to planning the most appropriate site for biopsy to confirm the diagnosis [16]. Open biopsy is frequently necessary to ensure an adequate specimen for appropriate cytogenetic studies. Vascular anomalies are disorders of the endothelium and surrounding cells that can affect the vasculature and involve any anatomical structure. Arteriovenous malformations (AVMs) are defects in the vascular system, consisting of tangles of abnormal blood vessels (nidus) in which the feeding arteries are directly connected to a venous drainage network without interposition of a capillary bed. The most common site of extracranial AVM is the head and neck [17]. AVM is present at birth but may not become evident until childhood. AVM has a pink-red cutaneous stain with a palpable thrill or bruit, and it is important to distinguish AVM from a capillary malformation or hemangioma (Figure 5). Common complications are pain, ulceration, bleeding, and congestive heart failure. AVM can cause disfigurement, compression, or destruction of adjacent tissues AVMs are usually diagnosed through a combination of MRI and angiography [18]. These tests may need to be repeated to analyze a change in the size of the AVM, recent bleeding, or the appearance of new lesions. AVM is not a static malformation, it progresses over time, and recurs. Genetic abnormalities cause certain types of familial AVMs. The goal of treatment is usually to control AVM. For superficial AVMs, patients should prevent desiccation and subsequent ulceration, and compression garments for extremity lesions may reduce pain and swelling. Intervention including embolization, resection, or a combination is focused on reducing symptoms, preserving vital functions, and improving deformities [19].

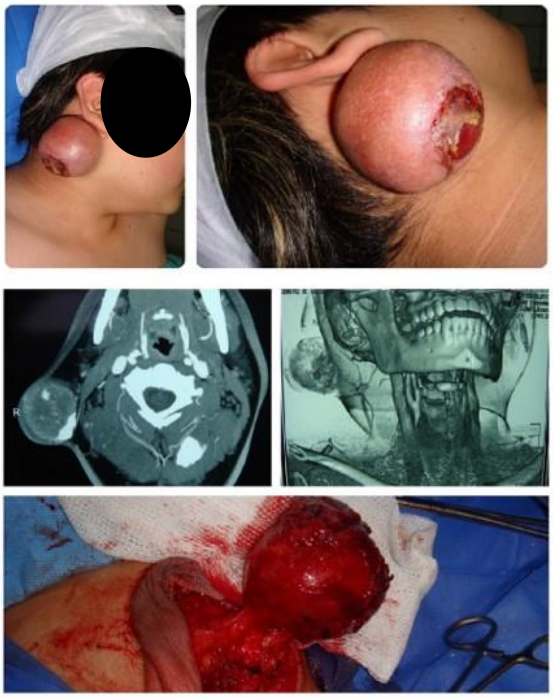

Figure 5: 15-year-old patient with AVM showed as a lateral neck tumor. Angio CT confirmed diagnosis.

Adults older than 40 years have a high likelihood of harboring a malignant neoplasm. Some other more common

benign and malignant neck neoplastic lesions are discussed here, including, primary vascular neoplasms, neurogenic neoplasms, and lymphoma benign neoplasms presenting in the neck involve tumors arising from elements of the parapharyngeal space (PPS). These neoplasms include salivary gland tumors, neurogenic tumors, and paragangliomas (carotid body tumors, glomus jugulare, glomus vagale). The patient may complain of dysphagia, dyspnea, symptoms of obstructive sleep apnea, symptoms of eustachian tube dysfunction, or other symptoms related to cranial neuropathies. These symptoms usually present with significant tumor size. In addition, symptoms of flushing, hypertension, and palpitations may occur in association with functional paragangliomas [20]. The most common finding on physical examination is that of a painless neck mass or painless oropharyngeal mass. The neck mass may have a palpable thrill or audible bruit. Paragangliomas derived from the carotid body are mobile in an anteroposterior direction but not in a vertical direction. Patients with these symptoms and clinical findings warrant a contrast-enhanced CT scan of the neck, preferably from the skull base through the clavicles, before referral to an otolaryngologist. In addition, patients with symptoms of a secreting paraganglioma should undergo a 24-hour urine collection for catecholamines and their metabolites.

Radiographic distinction between paragangliomas and nerve sheath tumors (schwannoma and neurofibroma) is generally easy because paragangliomas are very vascular tumors. They arise from the neural crest and are most commonly located within the bifurcation of the common carotid artery (carotid body tumors), in the perineurium of the vagus nerve (glomus vagale), at the jugular bulb (glomus jugulare), or in the middle ear cavity (glomus tympanicum). Of these four common sites, only glomus vagale and glomus jugulare are in direct relationship to the PPS. They enhance intensely on CT and MRI and have flow voids are diagnostic of paragangliomas but may not be readily apparent on MRI if the tumor is 2 cm in diameter or smaller. Contrast-enhanced CT scan can help make the diagnosis because paragangliomas enhance intensely compared to nerve sheath tumors, which may or may not enhance. The classic carotid body tumor is located within the carotid bifurcation in the infrahyoid neck and is not in immediate proximity to the PPS. It tends to splay the internal and external carotid arteries and this finding helps differentiate a carotid body tumor from a glomus vagale that tends to displace the carotid artery anteriorly [21] (Figure 6). Another distinction between other paragangliomas and carotid body tumors is that unlike carotid body tumors, other paragangliomas often have demonstrable feeder vessels that most commonly arise from the ascending pharyngeal artery. Conventional angiography can demonstrate vascular anatomy and is useful if embolization is part of the treatment plan, such as for paragangliomas at the skull base. Radiologic differential diagnosis of schwannoma versus neurofibroma may not be easy. Heterogeneity within the lesion is more commonly seen in schwannomas because of cystic change or hemorrhage. Schwannomas arise from the Schwann cells of the peripheral nerve sheath and in the Carotid Space (CS), the vagus nerve and the sympathetic chain are the common nerves of origin. These well encapsulated tumors appear as a round or ovoid mass that is isointense to muscle on T1-weighted images, hyperintense on T2-weighted images, and enhance following contrast administration. These imaging characteristics are by no means unique to schwannomas, and paragangliomas can appear similar. However, schwannomas do not have flow voids even when they are large.

Additionally, schwannomas at the skull base cause regressive remodeling of bone, whereas permeative changes are seen with paraganglioma. Neurofibroma, on the other hand, is a benign heterogeneous peripheral nerve sheath tumor arising from the connective tissue of peripheral nerve sheath, three types of neurofibromas are described: Localized, plexiform, and diffuse. On MRI, localized neurofibroma usually shows nonspecific signal intensity and variable contrast enhancement. Plexiform neurofibroma represents diffuse involvement of a long nerve segment and its branches, and its gross appearance has been described as a “bag of worms.” The classic target sign appearance, which is a less common imaging feature, but almost always is pathognomonic, is seen on T2-weighted images with high-signal-intensity myxoid material peripherally and a relatively low-signal-intensity fibrous component centrally. The reverse target sign may be present on T1-weighted images after IV administration of gadolinium-based contrast material, characterized by enhancement of the central fibrous component and a relative lack of enhancement of the surrounding myxoid component (Figure 7). Diffuse neurofibroma is a less common subtype of neurofibroma that has received little attention in the imaging literature [22].

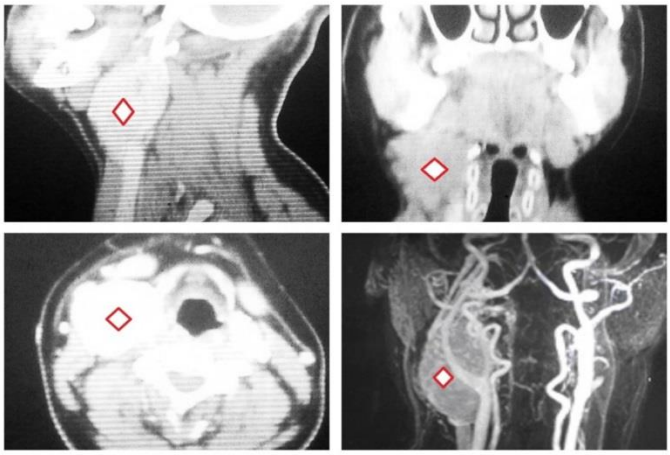

Figure 6: The classic carotid body tumor is located within the carotid bifurcation in the infrahyoid neck and is not in immediate proximity to the PPS. They enhance intensely on CT and have flow voids. Flow voids are diagnostic of paragangliomas.

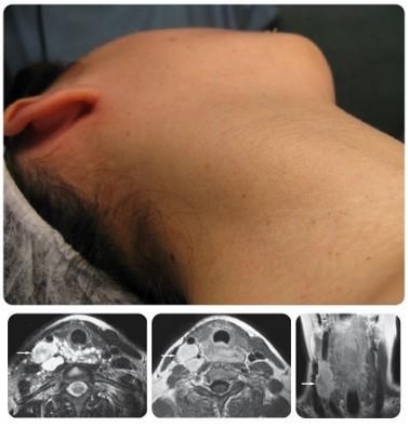

Figure 7: MRI: T2-weighted images with high-signal-intensity myxoid material peripherally and a relatively low-signal-intensity fibrous component centrally. The reverse target sign may be present on T1-weighted images after IV administration of gadolinium-based contrast material, characterized by enhancement of the central fibrous component and a relative lack of enhancement of the surrounding myxoid component. Right Vagus Plexiform neurofibroma.

Sarcomas are malignant neoplasms originating from mesodermal tissues that constitute connective tissues of the body. They are rare group of malignancies that constitute less than 1% of body's tumors, including those of the head and neck region. In head and neck region, based on histological subtyping, 50% of sarcomas are constituted by osteosarcoma, rhabdomyosarcoma, malignant fibrous histiocytoma, fibrosarcoma and angiosarcoma. The most common symptom of head neck soft tissue sarcoma is a painless mass (in 80% of cases). Pain could be present occasionally and it is the most common presenting symptom in bone sarcomas. Visual anomalies, epistaxis, chronic sinusitis, otalgia, sensory and/or motor anomalies are the other presenting features [23]. The detailed history and physical examination play a major role in the diagnosis of the head and neck sarcomas. It is recommended to stage these lesions prior to any biopsy. Imaging plays a major role in defining the extent of the tumor to nearby vital structures for treatment planning and deciding surgical approach decision. The imaging modalities best indicated for head and neck sarcoma are similar to those elsewhere in the body. MRI is generally better to computed tomography scans in soft tissue sarcomas. CT scan is preferred to assess bone involvement. CT scan reconstruction is to be considered in the treatment planning [24]. Due to the complex anatomy in the head and neck region, combined MRI and CT scan are recommended (Figure 8). The classical treatment modalities employed in head and neck sarcoma include surgery, radiotherapy and/or chemotherapy. Treatment of sarcomas is dictated by tumor type, stage, location, size, and patient age. Due to the anatomical complexity and surrounding vital structures in the head and neck region, wide excision with adequate margin is not possible in all cases [25].

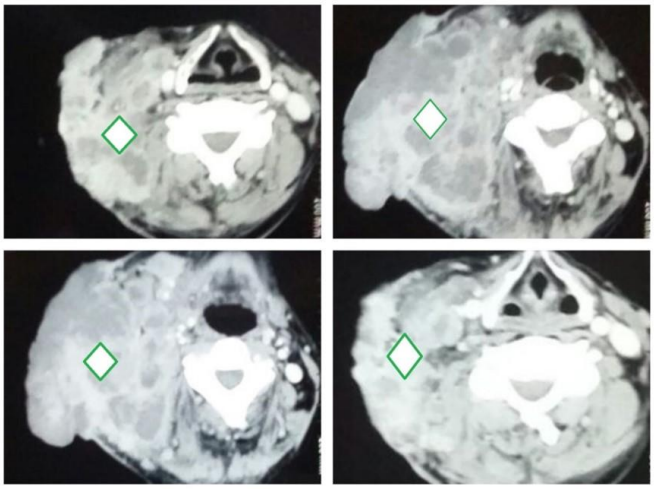

Figure 8: 48-year-old patient with a history of HIV. FNA: Sarcomatoid type lesion. CT: heterogeneous lesion, very bulky, no contrast-enhanced, and with hypodense center compatible with central necrosis

Limitations

The limitations of this study are inferior level of evidence compared with prospective studies, temporal relationships are often difficult to assess and cannot determine causation, only association. The strength of the study is providing novel information to the research community about PLNM.

Conclusion

The differential diagnosis of the primary lateral neck masses requires an effort to the surgeons. Anamnesis and physical examination are the most important for the presumption diagnoses. It is important the frequency of different pathologies, so it has not lost validity Skandalakis algorithm. Complementary studies images should be requested with selective criteria.

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