CLINICAL VIGNETTE

Neck masses: Beyond the Reactive Lymph Node

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Case Report

A 29-year-old female with past medical history of endometriosis and rheumatoid arthritis presented with an enlarging, left neck mass near the angle of the jaw. She first noticed the mass one year prior. Associated symptoms included intermittent hoarseness, lightheadedness, and palpitations. She denied hypertension, tachycardia, sweating, headache, or abdominal pain. She lived in Southern California her entire life. Further questioning revealed that her paternal grandmother had excision of a carotid body tumor.

On exam, her vital signs were normal. Her neck was supple, and there was a palpable 2 centimeter, soft left lateral neck mass. Contrast CT of the neck showed a heterogeneously enhancing mass splaying the left carotid bifurcation with approximately 50% encasement of the proximal internal carotid artery, concerning for carotid body tumor. Slightly more pronounced encasement was seen involving the external carotid artery. Serum catecholamines and urine metabolites were normal. The patient was referred to Vascular Surgery and Otolaryngology, who worked together to first embolize the carotid body tumor and its immediate branches, followed by excision of the mass. Pathology revealed paraganglioma.

Discussion

While paragangliomas are relatively rare, patient visits for neck masses are quite common. The purpose of this discussion is to review the workup of a neck mass in the primary care setting, with a special emphasis on imaging techniques.

A thorough history and physical exam can lead towards a more cost-efficient diagnostic workup. Up to age 20, masses are usually benign.[1] Historical features associated with malignancy are age greater than 40, smoking, and alcohol use.[2,3] Rate of growth is also important. Acute masses tend to be symptomatic, and usually represent reactive lymphadenopathy caused by bacterial or viral infections with salivary or dental sources. These lymph nodes tend to be tender, warm, and swollen. Resolution of the lymphadenopathy can lag resolution of the precipitating illness. For example, viral upper respiratory infections cause the majority of lymphadenopathy in primary care practice, and the lymphadenopathy may resolve up to six weeks after the original symptoms have subsided.[4]

Presence of B symptoms, such as fever, night sweats, and weight loss, can suggest lymphoma. Lymphadenopathy that extends beyond the neck can be caused by HIV, Epstein Barr virus, toxoplasmosis, and cytomegalovirus. Bacterial etiologies that lead to cervical lymphadenopathy include *Staphylococcus*, Group A *Streptococcus*, fusobacterium necrophorum, Bartonella, and tuberculosis. Acute sialedinitis should be considered for acute pain in older patients, in the setting of recent dental procedures, and dehydration.

Chronic masses are more likely benign, and include congenital thyroglossal duct cysts, dermoid cysts, chronically enlarged thyroid glands, laryngoceles from chronic cough, lipomas, and paragangliomas.[5]

Imaging is an important part of the diagnostic process, and the most commonly used modalities include CT, MRI, ultrasound, and PET/CT. Current guidelines recommend CT with contrast as the initial diagnostic test of choice (Level C, 1).

CT is widely available and provides greater anatomic detail, which can be improved further with arterial and venous phase scans.[6] CT perfusion scans assess angiogenesis in the evaluation of malignant lesions. CT has increased radiation exposure, and limited soft tissue resolution, especially in those patients with little body fat.[6] CT is also vulnerable to movement and streak artifact (such as from dental implants). Neck infections, which can be sequellae of dental infections and peritonsillar abscesses, generally require CT given time sensitivity and greater soft tissue edema which limit ultrasound imaging. CT can also assess airway and excluding jugular vein thrombosis.[6] Contrast can better identify tumor margins, abscesses, as well as distinguishing vessels from lymph nodes.[1] However, non-contrast CT is preferred for suspected sialoliths, which can be obscured by IV contrast.[7]

MRI allows for better soft tissue resolution, but suffers from longer image acquisition time. Also, MRI is better for assessing

perineural spread of disease, which can be helpful for skull base tumor staging.[1]

Ultrasound has the benefit of speed, easy tolerability, and wide availability. There is no radiation exposure, and real-time FNA can be done if indicated. Ultrasound also allows examination of the internal architecture of lymph nodes, which can have treatment implications for malignancy.[1] Parotid abscesses can often be drained under ultrasound guidance. However, views are generally limited to superficial structures, is operator dependent, and may require good neck extension to obtain clear windows.[6]

PET/CT can help localize metabolically active lesions, most commonly through the use of the radiotracer FDG. This can help diagnose malignant lesions, with concurrent CT to improve anatomic localization. This is particularly helpful in staging head and neck cancer if there is a concern for distant disease or an unknown primary. However, it suffers from lower resolution, and has difficulty finding metastases that are less than 1 centimeter.[6] Tissue necrosis can also lead to false negatives, such as with squamous cell cancer. Overlap between inflammatory and neoplastic lesions can sometimes lead to false positives.

In our case, given that the mass was hard and fixed, we started with contrast-enhanced CT. The patient did very well after her procedure, and continues to follow up. According to guidelines, she has been referred to a genetic counselor for evaluation of germline mutation testing.

REFERENCES

1. **Wippold FJ II, Cornelius RS, Berger KL, et al.;** Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria. 2012. http://www.acr.org/~/media/ACR/Documents/AppCriteria/ Diagnostic/NeckMassAdenopathy.pdf. Accessed June 18, 2017.
2. **Otto RA, Bowes AK.** Neck masses: benign or malignant? Sorting out the causes by age-group. Postgrad Med. 1990 Jul;88(1):199-204. PubMed PMID: 2367255.
3. **Mendenhall WM, Mancuso AA, Amdur RJ, Stringer SP, Villaret DB, Cassisi NJ.** Squamous cell carcinoma metastatic to the neck from an unknown head and neck primary site. Am J Otolaryngol. 2001 Jul-Aug;22(4):261-7. PubMed PMID: 11464323.
4. **Al-Dajani N, Wootton SH.** Cervical lymphadenitis, suppurative parotitis, thyroiditis, and infected cysts. Infect Dis Clin North Am. 2007 Jun;21(2):523-41, viii. Review. PubMed PMID: 17561081.
5. **Ruhl C.** Evaluation of the neck mass. Med Health R I. 2004 Oct;87(10):307-10. Review. PubMed PMID: 15559383.
6. **St J Blythe JN, Pearce OJ, Tilley EA, Brennan PA.** Contemporary use of imaging modalities in neck mass evaluation. Atlas Oral Maxillofac Surg Clin North Am. 2015 Mar;23(1):1-14. doi: 10.1016/j.cxom.2014.10.001. Epub 2014 Dec 12. Review. PubMed PMID: 25707560.
7. **Haynes J, Arnold KR, Aguirre-Oskins C, Chandra S.** Evaluation of neck masses in adults. Am Fam Physician. 2015 May 15;91(10):698-706. PubMed PMID: 25978199.

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