Metastatic Neck Disease

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KEYWORDS

• Neck mass • Metastatic neck disease • Fine needle aspiration (FNA) • Neck mass with unknown primary malignancy • Malignancy • Cancer

KEY POINTS

- The differential diagnosis for neck masses is broad and can be tailored based on a thorough history and physical examination as well as by patient age.
- New neck masses in adult patients should be considered malignant until proven otherwise.
- Malignant neck masses are commonly painless with most patients developing symptoms from the primary tumor location.
- Diagnostic adjuncts in the workup for metastatic neck disease include CT and PET/CT imaging, MRI, ultrasound, and fine-needle aspiration biopsy.
- Metastatic neck masses are commonly secondary to oral, oropharyngeal, and nasopharyngeal carcinomas; less prevalent are metastases from other malignancies.

Introduction

The presence of metastatic neck disease in patients with head and neck cancer has a tremendous impact on the prognosis of these patients. Patients with head and neck cancer with tumors localized at the primary site without metastasis to the neck have an excellent prognosis with treatment. Although in patients with dissemination to regional cervical lymph nodes, the probability of a 5-year survival, regardless of treatment received, reduces their survival rate by 50%. Even with increased public education and awareness, a large number of patients still present with advanced disease at the time of diagnosis. The American Cancer Society has found that about 40% of the patients with squamous cell carcinoma of the upper aerodigestive tract have clinically evident regional metastatic disease during their initial presentation. Thus, the understanding of the anatomy, dissemination of disease, and treatment of the metastatic neck disease is vital when managing patients with head and neck cancers.

Anatomy of the cervical lymphatics

The lymphatic drainage in the neck can be divided into the central neck compartment and the lateral compartment. Central compartment lymph nodes include lymph nodes in the prelaryngeal, pretracheal, paratracheal, and tracheoesophageal groove. The pretracheal lymph node, also known as the Delphian lymph node, provides drainage from the larynx and thyroid gland. The lymph nodes in the prelaryngeal, paratracheal, and tracheoesophageal groove also provide drainage for the thyroid gland as well as the hypopharynx, subglottic larynx, and cervical esophagus. Boundaries of the central compartment of the neck are demarcated by the hyoid bone superiorly, the innominate artery inferiorly, and the medial borders of the carotid sheath laterally. Cervical lymph nodes in the lateral aspect of the neck primarily drain the mucosa of the upper aerodigestive tract.

The lateral neck is divided into the anterior triangle and the posterior triangle. Lymph nodes in the anterior triangle of the lateral neck include the submental, prevascular facial, and submandibular lymph node chains located in the submental and submandibular triangles of the neck. The deep jugular lymph nodes include the jugulodigastric, jugulo-omohyoid, and supraclavicular group of lymph nodes adjacent to the internal jugular vein (IJV). Cervical lymph nodes located in the posterior triangle of the neck include the accessory chain of lymph nodes located along the spinal accessory nerve and transverse cervical chain of lymph nodes in the floor of the posterior neck. The base of the anterior triangle of the lateral neck lies along the inferior border of the mandible with its peak at the sternoclavicular joint. The lateral margin is the sternocleidomastoid, while the central neck structures border medially. The posterior triangle of the lateral neck is bounded by the posterior border of the sternocleidomastoid muscle (SCM) anteriorly, anterior border of the trapezius muscle posteriorly, and the clavicle inferiorly.

The Memorial Sloan-Kettering Cancer Center leveling system of lymph nodes provides an orderly manner of describing the location of cervical lymph nodes between the clinician and pathologist (Fig. 1). This system divides the lateral neck into 5 levels or nodal groups and the central neck into 2 levels. Level I lymph nodes are located superior to the hyoid bone and the digastric muscle to the inferior border of the mandible. They can be further divided into the submental (level IA) and

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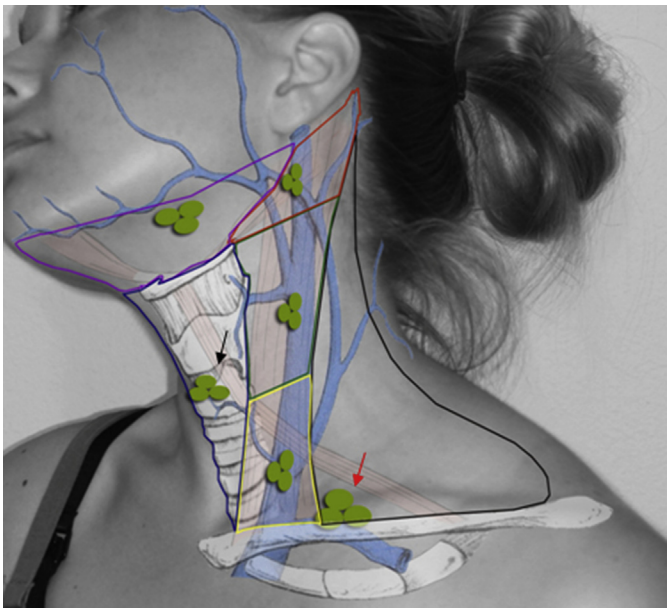

Fig. 1 Photograph demonstrating the levels of the neck with bony, muscular, and visceral landmarks. Level 1 is outlined in lavender; level 2 is outlined in red; level 3 is outlined in green; level 4 is outlined in yellow; level 5 is outlined in black; and level 6 is outlined in navy. The lymph nodes seen in these levels are shown as green ovals. Pretracheal "Delphian" node (*black arrow*). "Virchow" node (*red arrow*) at the junction of the left lymphatic duct and subclavian vein (lymphatic duct not shown).

submandibular (level IB) groups. Submental group lymph nodes are located anterior to the anterior belly of the digastric muscle and cephalad to the hyoid bone up to the inferior border of the mandible. Lymph nodes located posterior to the anterior belly of the digastric muscle and superior to the anterior and posterior bellies of the digastric muscle up to the inferior border of the mandible are the submandibular group. Level II lymph nodes are located around the upper portion of the IJV and the upper portion of the spinal accessory nerve extending from the base of the skull downwards to the bifurcation of the carotid artery. Level III lymph nodes are around the middle portion of the IJV starting from the inferior border of level II extending downwards to the omohyoid muscle. Level IV lymph nodes are the lower portion of the IJV extending from the inferior border of level III downwards to the clavicle. The anterior and posterior borders of level II, III, and IV are the lateral limit of the sternohyoid muscle and the posterior border of the SCM, respectively. The posterior triangle group or level IV is bound by the triangle formed by the clavicle, posterior border of the SCM, and the anterior border of the trapezius muscle (see Fig. 1). The central compartment of the neck is broken down into level VI and VII. Level VI lymph nodes are from the hyoid bone to the suprasternal notch and between the medial borders of the carotid sheath. Level VII, the superior mediastinal group, are the lymph nodes located in the anterior mediastinum extending from the innominate artery inferiorly to the suprasternal notch.

Risk of nodal metastases

Malignancies of the head and neck region frequently involve the cervical lymphatics. Involvement of the regional lymphatics depends on various factors, such as type of primary tumor, location of primary tumor, T stage, and histomorphologic features of the primary tumor. Squamous cell carcinoma of the upper digestive tract is the most common type of cancer to metastasize to the cervical lymphatics. The risk of nodal metastasis of squamous cell carcinoma of the upper aerodigestive tract varies with location of the primary tumor. The risk increases as one progresses from anterior to posterior within the upper aerodigestive tract: lips, oral cavity, oropharynx, and hypopharynx. In primary tumors of the pharynx and larynx, the risk of regional nodal metastasis increases as one progresses from the center to the periphery. Thus, the risk of metastasis increases as one moves from the vocal cords, being the lowest risk, to the false vocal cords, aryepiglottic fold, pyriform sinus, and pharyngeal wall, being the highest risk. Certain primary sites can also have an increased risk of nodal metastases compared with the other primary sites in the same region. For example, in the oral cavity, squamous cell carcinoma of the floor of the mouth has a higher risk compared with the hard palate. The T stage reflects the tumor burden of the primary tumor, and an increasing T stage correlates with a higher risk of cervical metastasis.[1]

Certain histomorphologic features of the primary tumor also increase the risk of nodal metastasis. Poorly differentiated carcinomas have a higher risk compared with well-differentiated carcinomas. Endophytic tumors have also been noted to be more inclined to metastasize compared with exophytic tumors. The tumor thickness in carcinoma of the floor of the mouth and tongue has been well documented to relate to the risk of nodal metastases. In practice, if the risk of occult metastases exceeds 15%, then elective treatment of regional lymph nodes is recommended because it can affect the prognosis of the patient.

Other malignancies of the head and neck region include carcinomas of salivary origin, skin cancers, and thyroid cancers. Metastasis to the cervical lymph nodes from carcinomas of salivary origin tend to be low (<20%), but high-stage (T3 and T4) and high-grade (poorly differentiated) tumors warrant elective treatment of the neck. The risk of neck metastasis from cutaneous cancers of the head and neck is variable. Basal cell carcinomas have a very low risk of metastasis. Small squamous cell carcinomas (<2 cm) of the skin of the head and neck have a very low risk of nodal metastasis, but as the size increases, so does the risk. However, cutaneous melanoma has a predictably high risk of nodal metastasis with increasing thickness and size of the primary tumor. Thus, one can justify the need for elective treatment of the regional lymph nodes for thicker melanomas. Sentinel node mapping has become an available procedure in patients with head and neck cancers of various types but has become particularly popular in patients with cutaneous head and neck melanomas.[2] Regional dissemination of metastasis is quite high in thyroid cancer but elective dissection of regional lymph nodes is not recommended in well-differentiated thyroid carcinomas (papillary and follicular), because it generally does not change the prognosis.

Cervical metastasis can also be the result of dissemination from primary tumors not in the head and neck region. Masses in the supraclavicular area raise suspicion for primary lung lesion metastasis as well as abdominal malignancies, especially gastric cancer. Virchow node, named for Rudolf Virchow, who first described its association with gastric cancer in 1848, refers to the metastatic involvement of the supraclavicular nodes at the junction of the thoracic duct and left subclavian vein.[3] In approximately 10% of patients with head and neck cancer, a