

Imaging of Head and Neck Lymph Nodes



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KEYWORDS

• Cervical • Lymph nodes • CT • MR • PET • PET/CT • SCCa

KEY POINTS

- Knowledge of cervical lymph node anatomy, drainage pathways, and common pathology is key to cervical lymph node imaging interpretation.
- Correlation with clinical history and physical examination is vital to making the correct diagnosis or providing an appropriate differential.
- Contrast-enhanced computed tomography (CT) is considered the best modality for evaluating a neck mass of unknown cause; however, CT, MR, and PET/CT are complementary imaging modalities in the evaluation of the head and neck.

INTRODUCTION

Cervical lymph node evaluation and interpretation can be difficult for both the general radiologist and neuroradiologist alike. Lymph nodes facilitate lymph fluid transportation, filter foreign objects, and initiate an immune response, thereby making lymph nodes a location that can be affected by many different disease processes.¹ An understanding of cervical lymph node anatomy, lymph node drainage pathways, and common pathology (disease processes or abnormalities) is the foundation for interpretation of lymph node pathology. A location-specific approach to lymph node pathology as well as knowledge of various lymph node morphologies can further refine a differential diagnosis. Clinical information and physical examination can provide critical diagnostic information when combined with imaging.

This article reviews cervical lymph node anatomy as well as drainage pathways. Specific nodal morphologies with associated differential diagnoses and imaging findings are discussed. The article concludes with discussion of rare diseases

affecting cervical lymph nodes as well as the importance of imaging in head and neck (HN) cancer.

NORMAL CERVICAL LYMPH NODE ANATOMY

Cervical lymph nodes can be classified based on basic anatomic location (such as groups and chains) or described with neoplastic processes using the formal American Joint Committee on Cancer's (AJCC) criteria.^{1,2} The simple anatomic description of lymph node groups includes the submental group located inferior to the anterior mandible (**Fig. 1A**). The submandibular group of lymph nodes is located near the submandibular glands at the angles of the mandible (see **Fig. 1B**). The parotid lymph nodes include the intraglandular nodes (**Fig. 2A**) within the fascia circumscribing the parotid space (PS). Lymph nodes located within the subcutaneous tissues near the external auditory canal (EAC) can be referred to as *preauricular nodes* when found anterior to the EAC and *postauricular nodes* when found posterior to the EAC (see **Fig. 2B**).

The authors have no disclosures.

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Radiol Clin N Am 53 (2015) 115–132

<http://dx.doi.org/10.1016/j.rcl.2014.09.011>

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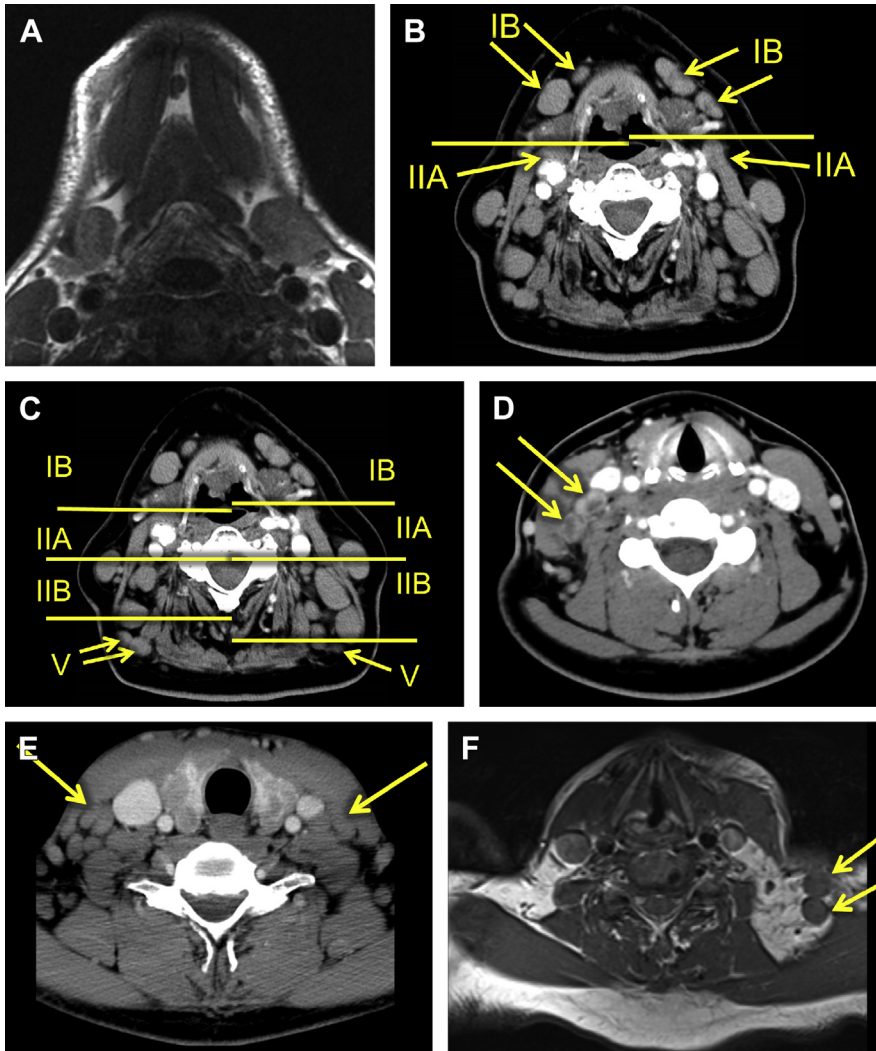


Fig. 1. (A) Axial T1-weighted (T1WI) MR of level IA or submental lymph node between the anterior bellies of the digastric muscles. (B) Axial contrast-enhanced computed tomography (CECT) of level IB and IIA lymph node enlargement in a confirmed case of non-Hodgkin lymphoma. (C) Axial CECT of enlarged bilateral level IB, IIA, IIB and V lymph nodes in a confirmed case of non-Hodgkin lymphoma. (D) Axial CECT of necrotic, right level III lymph nodes (arrow) in a confirmed case of squamous cell carcinoma. (E) Axial CECT of level IV lymph nodes (arrow). (F) Axial TIWI MR with prominent left supraclavicular (transverse cervical chain) lymph nodes (arrow).

A more general definition of periauricular nodes can be superficial lymph nodes near the EAC itself. The retropharyngeal space (RPS) lymph nodes include both the medial RPS nodes found in the paramedian RPS in the suprahyoid neck (SHN) and the lateral RPS nodes found lateral to the prevertebral muscles and medial to the internal jugular vein and internal carotid artery (CA) within the lateral RPS.

The facial lymph nodes include multiple nodes named for their anatomic location, such as the mandibular nodes superficial to the mandible, the buccinator nodes within the subcutaneous tissues

of the cheek, the infraorbital nodes below the orbits, the malar nodes along the malar eminence, and the zygomatic nodes superficial to the zygomatic arch (see Fig. 2C). The occipital group of nodes is located within the subcutaneous tissues posterior and inferior to calvarium (see Fig. 2D). The retropharyngeal group is, as named, in the RPS (see Fig. 2E).

The major nodal chains within the cervical soft tissues can be thought of as 3 linear chains of lymph nodes, roughly forming a triangle on each side of the neck (Fig. 3A). Anteriorly, the internal jugular chain (IJC) surrounds the internal jugular

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