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- This article presents general considerations for optimum PET/CT imaging in patients with head and neck disease. Based on these considerations, the clinical PET/CT imaging protocols currently used at the authors' center are described.
- Pertinent CT Anatomy of the Neck for Interpreting PET/CT** 423
 Barton F. Branstetter IV
- The rise of combined positron emission tomography (PET)/CT has stimulated the need for radiologists who are familiar with both nuclear medicine and anatomic imaging techniques, so that a single interpreting physician can provide a consistent report. To provide patients with a high level of accuracy in PET/CT readings, a correspondingly high level of expertise is needed in each of the contributing modalities. The purpose of this article is to provide guidance for physicians who have experience with nuclear medicine techniques, but are becoming more familiar with CT of the neck, and, in particular, with the imaging of cervical lymph nodes.
- PET/CT Protocols and Artifacts in the Head and Neck** 433
 Todd M. Blodgett, Alex Ryan, Aref Akbarpouranbadr, and Barry M. McCook
- Combined PET/CT has been in existence clinically for nearly 7 years since development and initial evaluation from 1998 to 2001. Combined PET/CT offers advantages over PET and CT acquired on separate devices, including consolidation of imaging studies, more accurate data coregistration, improved lesion localization, and benefits related to radiation therapy planning. This article discusses CT and PET protocols pertinent to PET/CT imaging in patients who have head and neck cancer, including a discussion of how the CT portion of a PET/CT scan can be performed and a description of common PET/CT artifacts that may be encountered secondary to CT protocols.
- Pictorial Essay: Nonmalignant FDG Uptake in the Head and Neck Regions** 445
 Medhat M. Osman, Mark A. Varvares, and Nghi C. Nguyen
- Positron emission tomography (PET) with FDG plays an important growing role in staging, restaging, monitoring treatment, and predicting prognosis in patients who have head and neck cancers. This article provides various examples of nonmalignant causes for FDG-avidity in the head and neck area.

Squamous Cell Carcinoma: Initial Diagnosis and Staging with PET/CT**469**

Gaurang V. Shah, Ka Kit Wong, Dheeraj Gandhi, Hemant Parmar, and Suresh K. Mukherji

Squamous cell carcinoma is the most frequent malignancy of the head and neck region, accounting for 5% of all malignant tumors worldwide. Accurate staging at diagnosis is critical for selection of appropriate treatment strategy. A variety of therapeutic options are used for treatment, including surgery with or without radical dissection, lymph node dissections of various severities, radiotherapy, chemotherapy, and combinations of these. Precise prediction of the extent of primary tumors, detection of unknown primary tumor, cervical lymph node status, and distant metastatic spread is important for treatment planning and prognosis. Accurate evaluation of these factors prior to treatment helps guide surgical extent or radiation ports, minimizing locoregional treatment failure.

Squamous Cell Carcinoma: Restaging and Response to Therapy**481**

Rathan M. Subramaniam and Val J. Lowe

This article describes the use of 18F-fluorodeoxyglucose PET in patients who have head and neck cancer for assessment of therapy response, detection of locoregional recurrence and distant metastasis, and surveillance.

PET Imaging of Skull Base Neoplasms**489**

Erik S. Mittra, Andrei Iagaru, Andrew Quon, and Nancy Fischbein

The utility of 18-F-fluorodeoxyglucose-positron emission tomography (PET) and PET/CT for the evaluation of skull base tumors is incompletely investigated, as a limited number of studies specifically focus on this region with regard to PET imaging. Several patterns can be ascertained, however, by synthesizing the data from various published reports and cases of primary skull base malignancies, as well as head and neck malignancies that extend secondarily to the skull base, including nasopharyngeal carcinoma, nasal cavity and paranasal sinus tumors, parotid cancers, and orbital tumors.

Radiation Treatment Planning for Head and Neck Malignancies**511**

Regiane S. de Andrade and Dwight E. Heron

Innovative approaches have been incorporated to radiation therapy over the last decades. The technologic advances, such as intensity modulated radiation therapy and image guided radiation have resulted in a modern era for this oncologic modality. The mix of imaging approach using computed tomography (CT), magnetic resonance, and positron emission tomography (PET) have been of great value to ascertain the accuracy of tumor target delineation. The use of functional imaging, especially PET/CT, has been incorporated to the modern radiation oncology practice to better define the tumor extent and augment the treatment plan design, as well as response assessment. This article focuses on radiation treatment planning and the integration of PET/CT for head and neck cancer radiation therapy.

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