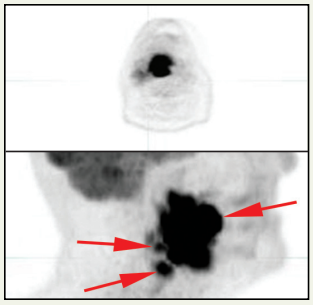
New England PET Imaging System

Case of the Quarter—October 2012

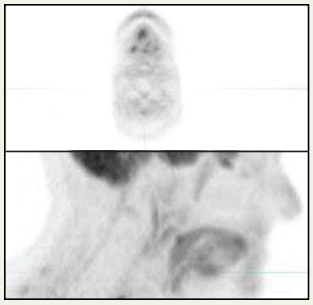
^{18}F-FDG PET/CT for Staging of Head and Neck Cancer

Patient History

This patient is a 60-year-old former smoker who presented to an oral surgeon following four weeks of right neck and throat pain, difficulty opening and closing his mouth and swallowing, and inability to eat, leading to recent weight loss of approximately 20 pounds. Physical examination revealed fixed, tender lymphadenopathy in the right submandibular and sternocleidomastoid regions. Direct visual inspection of the oropharynx showed a mass arising from the right anterior tonsillar pillar and right tongue base. Within five days the patient was seen by an otolaryngologist. Laryngoscopy confirmed an exophytic mass of the right tonsil, with extension to the right tongue base and along the right lateral pharyngeal wall, clinically consistent with neoplasm. There was palpable right Level II cervical lymphadenopathy, the largest lymph node measuring approximately 2.5 cm.



Initial staging PET showing a large primary tumor in the right tonsillar fossa and metastatic cervical lymph nodes.



Restaging PET showing complete resolution of the primary tumor and cervical lymph nodes.

A contrast-enhanced CT scan of the neck and chest was performed, demonstrating an ill-defined lobulated mass in the right tonsillar fossa approximately 4.3 cm in maximum axial-plane dimension, causing compression of the posterior oral cavity airway and oropharyngeal airway. There was associated adenopathy in the right jugular chain with lymph nodes measuring between 1.5 and 2.0 cm in short axis dimension. The impression was of right tonsillar carcinoma with ipsilateral Level II metastatic cervical adenopathy corresponding to the palpable abnormality found on physical exam. Chest CT was negative for distant metastatic disease. Biopsy of the right neck mass conducted on the day of the CT scan was positive for squamous cell carcinoma.

Within five days of the CT scan, the patient had a medical oncology consultation, with the oncologist ordering "full staging" with an ^{18}F-FDG PET/CT scan. A treatment plan was developed that included pain medication, cisplatin chemotherapy, and radiation therapy. The patient completed concurrent chemoradiation and also underwent hyperbaric oxygen treatment.

^{18}F-FDG PET/CT Findings

The initial staging ^{18}F-FDG PET/CT scan demonstrated intense FDG uptake in a large approximately 7 x 4-cm primary tumor in the right tonsillar fossa extending into the oropharynx. Increased FDG uptake indicated metastatic involvement of two enlarged right jugulodiagastric cervical lymph nodes.

A restaging ^{18}F-FDG PET/CT scan was performed eight months after the initial staging scan, following concurrent regimens of chemotherapy and radiation therapy. Within the neck, no residual abnormal FDG avidity was seen. The previously seen large hypermetabolic mass centered in the right tonsillar region and its associated hypermetabolic lymphadenopathy were also no longer seen. The impression was of no residual, recurrent, or metastatic disease seen in the neck. Additionally, a stable 5-mm right middle lobe pulmonary nodule showed no abnormal hypermetabolism on either staging or restaging examinations.

How Did ^{18}F-FDG PET/CT Help?

A staging ^{18}F-FDG PET/CT scan was helpful in this case in initially confirming the malignant tumor and defining extent of disease, while a subsequent restaging ^{18}F-FDG PET/CT scan demonstrated complete metabolic response to chemotherapy and radiation therapy. At the most recent follow-up clinic visit, medical oncology reported continued improvement in the patient's swallowing, with weight gain, and less discomfort.

In order to ensure the highest quality of patient care, New England PET has retained Dr. Ruth Lim as its Chief Medical Officer. Dr. Lim is an Associate Radiologist at Massachusetts General Hospital.

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