

eligible” beyond the established time limits.

The American Board of Nuclear Medicine (ABNM) was among the first of the boards to implement these time limit policies. ABNM has established a 7-y transition period: training must be completed within 7 years of applying for the ABNM certification examination. For additional details, see: <http://www.abnm.org/index.cfm?PageID=5044&RPID=5044>.

*American Board of Medical
Specialties*

HHS Launches Web Health Care Tracker

On May 15 U.S. Department of Health and Human Services (HHS) Secretary Kathleen Sebelius announced the launch of a new Web-based tool designed to “make it easier for all Americans to monitor and measure

how the nation’s health care system is performing.” The tool, known as the Health System Measurement Project, is intended to provide government regulators, insurers, the public, and others with “consistent data-driven views of changes in critical U.S. health system indicators.” The Health System Measurement Project brings together datasets from across the federal government that span topical areas, such as access to care, cost and affordability, prevention, and health information technology. It presents these indicators by population characteristics, such as age, sex, income level, insurance coverage, and geography.

HHS indicated that with this system it is possible to quickly view data on a given topical area from multiple sources, compare trends across measures, and compare national trends with those at state and regional levels. For

example, an individual could use the Web site to monitor the percentage of people who have a specific source of ongoing medical care or track avoidable hospitalizations for adults and children by region or ethnic group.

The measures included in the Health System Measurement Project, developed and selected by the HHS Office of the Assistant Secretary for Planning and Evaluation, are aligned with the HHS Strategic Plan, the National Quality Strategy, and other departmental strategic planning efforts. The measures are drawn primarily from existing publicly available datasets. The tool contains information on how the measures were calculated and provides users with direct links back to the original data sources. Access to the system is available at: HealthMeasures.aspe.hhs.gov.

*U.S. Department of Health and
Human Services*

FROM THE LITERATURE

Each month the editor of Newsline selects articles on diagnostic, therapeutic, research, and practice issues from a range of international publications. Most selections come from outside the standard canon of nuclear medicine and radiology journals. These briefs are offered as a monthly window on the broad arena of medical and scientific endeavor in which nuclear medicine now plays an essential role. The lines between diagnosis and therapy are sometimes blurred, as radiolabels are increasingly used as adjuncts to therapy and/or as active agents in therapeutic regimens, and these shifting lines are reflected in the briefs presented here. We have also added a small section on noteworthy reviews of the literature.

⁶⁸Ga-DOTATOC PET in GTV Delineation

In an article e-published on May 9 ahead of print in the *International Journal of Radiation Oncology, Biology,*

Physics, Graf et al. from the Charité Universitätsmedizin Berlin (Germany) reported on the potential impact of ⁶⁸Ga-DOTATOC PET in addition to MR and CT imaging in a study retrospectively assessing gross tumor volume (GTV) delineation of meningiomas of the skull base in patients treated with fractionated stereotactic radiation therapy (FSRT). The study included the scans of 48 patients with 54 skull base meningiomas identified and previously treated with FSRT. All patients had undergone PET and MR/CT imaging. Scans were coregistered, and GTVs were first delineated with the MR/CT data and then with PET data. Resulting overlapping areas were referred to as GTV_{common}, an area that became GTV_{final} in each patient study by adding volumes defined by either PET alone or MR/CT alone. Forty-eight of the 54 skull base lesions in 45 patients showed increased ⁶⁸Ga-DOTATOC uptake and underwent additional analyses. The resulting mean GTV_{final} was

significantly smaller when data from PET was added into consideration. PET resulted in >10% modification of GTV_{final} size in 32 (67%) meningiomas. The authors concluded that “⁶⁸Ga-DOTATOC PET/CT seems to improve the target volume delineation in skull base meningiomas, often leading to a reduction of GTV compared with results from conventional imaging (MRI and CT).”

*International Journal of Radiation
Oncology, Biology, Physics*

PET and Crohn Disease

Holtmann et al. from the Johannes Gutenberg University (Mainz, Germany) reported on May 9 ahead of print in *Digestive Diseases and Sciences* on a study designed to evaluate the accuracy of ¹⁸F-FDG PET for assessment of inflammation and disease activity in Crohn disease as a way to simplify current complexities in diagnostic assessment and therapy monitoring. The study included 43 patients with Crohn

disease who underwent ileocolonoscopy, hydro MR, and ^{18}F -FDG PET imaging. The researchers were able to analyze 241 bowel segments with all 3 approaches. Ileocolonoscopy identified 80 inflamed segments, PET detected 72, and hydro-MR imaging detected 53. Using ileocolonoscopy as the comparative standard, overall sensitivities with PET and hydro-MR were 90% and 66%, respectively, with respective sensitivities of 92.6% and 99%. All 3 techniques showed good concordance in assessment of inflammatory and fibrotic stenoses. PET also showed significant correlation with C-reactive protein and Crohn Disease Endoscopic Index of Severity levels. The authors concluded that because PET is able to “detect mucosal inflammation in Crohn disease with high sensitivity and specificity and to enable proper assessment of inflammatory activity in stenosis,” it is a promising noninvasive technique for clinical management.

Digestive Diseases and Sciences

NHL Treatment and Interim PET

In an article e-published on May 18 ahead of print in the *International Journal of Radiation Oncology, Biology, Physics*, Halasz et al. from the Harvard Radiation Oncology Program (Boston, MA) evaluated the relationship between interim or posttherapy ^{18}F -FDG PET or PET/CT response and outcomes in patients treated with combined modality therapy for aggressive non-Hodgkin lymphoma (NHL). The study included 59 such patients (83% with stage I/II disease) who received chemotherapy and consolidated involved-field radiation therapy. All patients underwent interim and most underwent postchemotherapy PET or PET/CT for restaging. The researchers looked at resulting progression-free survival and local control rates with and without a negative interim or postchemotherapy PET scan over a median follow-up of 46.5 mo. PET results in a total of 39 patients were negative at the end of chemotherapy (including 12 patients with negative interim but no

posttherapy PET). The remaining 20 patients were PET positive after chemotherapy (including 7 with positive interim but no posttherapy PET). Three-year progression-free survival rates for patients with negative and positive interim scans were 97% and 90%, respectively. Corresponding 3-y actuarial local control rates were 100% and 90%, respectively.

International Journal of Radiation Oncology, Biology, Physics

Optical Imaging and Epileptic Focus

Haglund, from Duke University Medical Center (Durham, NC) reported in the June issue of *Epilepsia* (2012;53[suppl 1]:87–97) on a study to determine whether high-resolution optical imaging can precisely identify neocortical epileptic foci and whether this imaging approach can provide incremental information on the role of neuroanatomic pathways in seizure propagation. The study was conducted in primates in which small acute epileptic foci ($0.5 \times 0.5 \text{ mm}^2$) were created in the visual neocortex. Single-unit and surface electroencephalograph (EEG) recordings were combined with optical imaging of voltage-sensitive dye changes, and brief visual stimulation evoked interictal bursts. Different bursts were analyzed to determine the locations of the epileptic foci and analyzed with EEG data to determine exact foci locations. Optical imaging not only identified individual foci that were separated by $<3 \text{ mm}$ but also monitored the development of individual epileptic foci, showing optical excitatory activity at the foci with surrounding zones of inhibitory-like activity. Outside of these surrounding zones optical imaging showed propagation pathways with alternating bands of excitation and inhibition. The author concluded that this study demonstrated that “optical imaging can precisely localize an epileptic focus and provides excellent spatial resolution of the changes that occur in and around the site of the epileptic focus.” Optical imaging could resolve some of the complexities in localizing

neocortical epileptic foci that currently require video electroencephalography, high-resolution MR, PET, SPECT, and/or invasive monitoring.

Epilepsia

2012 NCCN Hodgkin Lymphoma Guidelines

In an article appearing in the May 1 issue of the *Journal of the National Comprehensive Cancer Network* (2012; 10:589–597), Hoppe, from Stanford University School of Medicine (CA), and colleagues from cancer centers across the United States provided an update on the latest National Comprehensive Cancer Network Clinical Practice Guidelines in Oncology for Hodgkin Lymphoma. Among the major changes reviewed in the article is the new recommendation against PET for interim restaging of patients with stage I–II favorable disease. The group instead now recommends diagnostic CT scanning of involved sites for interim restaging in these patients. In other recommendations, maintenance rituximab for 2 y is included as an option for patients with stage IB–IIB or stage III–IV lymphocyte-predominant Hodgkin lymphoma treated with rituximab alone in the first-line setting. Brentuximabvedotin has been added as an option for patients with progressive or relapsed disease after second-line chemotherapy or high-dose therapy with autologous stem cell rescue.

Journal of the National Comprehensive Cancer Network

Parathyroid 4D CT and Dose

Mahajan et al. from Yale University School of Medicine (New Haven, CT) reported in the June issue of the *World Journal of Surgery* (2012;36: 1335–1339) on radiation dose from preoperative localization of parathyroid tumors using 4D CT in patients with primary hyperparathyroidism. The study included analysis of 4D CT or $^{99\text{m}}\text{Tc}$ -SPECT data from patients with biochemically unequivocal primary hyperparathyroidism referred for minimally invasive parathyroidectomy. Radiation doses from CT were esti-

mated at an average of 10.4 mSv, using the Imaging Performance Assessment of CT Scanners calculator. Radiation doses from SPECT were estimated at an average of 7.8 mSv, using the Nuclear Regulatory Commission Regulation method. Estimated background radiation exposure was estimated at ~3 mSv. However, the dose to the thyroid with 4D CT was 57 times higher than that with SPECT. The authors calculated age- and sex-dependent risk factors to estimate the risk of a 20-y-old woman eventually developing thyroid cancer as a result of 4D CT imaging at 0.1%. They concluded that although 4D CT is a superior preoperative imaging modality for locating parathyroid tumors, the significantly higher associated thyroid radiation indicates that this approach “should be used judiciously in young primary hyperparathyroidism patients.”

World Journal of Surgery

Regional Dynamics of Amyloid- β Deposition

In an article e-published on May 23 ahead of print in *Brain*, Villain et al. from INSERM (Caen, France) reported on a study using PET to explore the regional dynamics of amyloid- β deposition in a large longitudinal cohort of healthy elderly individuals and individuals with mild cognitive impairment (MCI) or Alzheimer disease (AD). The study included a total of 184 participants (32 patients with AD, 49 with MCI, and 103 healthy controls), each of whom underwent 2 Pittsburgh compound B PET scans at 18-mo intervals. Parametric rate-of-change maps were created with clinical status, disease progression (clinical conversion from healthy to MCI to AD), and Pittsburgh compound B status (positive or negative) as independent factors. Both Pittsburgh compound B-positive and -negative individuals showed a significant increase in amyloid- β deposition over the interval, with a significantly higher increase in Pittsburgh compound B-positive individuals. The authors suggested that this unexpected finding indicates “either that

Pittsburgh compound B-negative individuals have slower rates of amyloid- β accumulation than positive, or that the proportion of individuals showing significant increase in amyloid- β deposition, termed ‘Pittsburgh compound B accumulators,’ is higher within the Pittsburgh compound B-positive group than within the Pittsburgh compound B-negative group.” Additional analyses support the existence of distinct groups of Pittsburgh compound B accumulators and nonaccumulators. The authors went on to determine that higher rates of amyloid- β deposition were associated with higher amyloid- β burden, “suggesting that amyloid- β deposition does not reach a plateau when cognitive impairments manifest but is instead an ongoing process present even at the AD stage.” Amyloid- β accumulation did seem to slow in the latest stages of the process (among those with the highest amyloid burden). The authors concluded that the implications of the existence of Pittsburgh compound B accumulator and nonaccumulator groups calls for additional study.

Brain

μ -Opioid Receptors and Pain Threshold

Hagelberg et al. from Turku University Hospital (Finland) reported on May 20 ahead of print in *Neuroscience Letters* on a study designed to determine whether resting state brain μ -opioid receptor binding without painful stimulation can be a long-term predictor of experimental pain sensitivity. The study included 12 healthy men who underwent ^{11}C -carfentanil PET to measure μ -opioid receptor binding potential. At a later time, the participants underwent psychological testing to measure cold pressor pain threshold, cold pressor pain tolerance, and tactile sensitivity. Correlations between μ -opioid receptor binding potential and these pain/sensitivity tests were based on both voxel-by-voxel and region-of-interest image analyses. Results indicated that striatal μ -opioid receptor binding potential predicts

cold pressor pain threshold but not cold pressor pain tolerance or tactile sensitivity. The authors concluded that this finding suggests that “striatal μ -opioid receptor density is involved in setting individual pain threshold.”

Neuroscience Letters

PET/CT and Gastric Cancer Staging

In an article e-published on May 1 ahead of print in *Cancer*, Smyth et al. from the Memorial Sloan-Kettering Cancer Center and the Weill-Cornell Medical Center (New York, NY) reported on a study assessing the potential incremental value of preoperative ^{18}F -FDG PET/CT in addition to routine CT, endoscopic ultrasound, and laparoscopic staging of localized gastric cancer. The study included 113 patients with locally advanced gastric/gastroesophageal cancer (T3 or T4 or lymph node-positive disease) who were screened for 2 neoadjuvant chemotherapy protocols. All patients underwent both standard ^{18}F -FDG PET/CT and laparoscopy with cytologic examination of washings. PET/CT results were analyzed for both sensitivity and specificity in identifying metastatic disease not seen on CT and for overall cost effectiveness. PET/CT identified occult metastatic disease in 11 additional patients (10%), with laparoscopy identifying occult metastatic disease in 21 patients (27%), with overlap in only 1 patient, for a total of 31 patients so identified. PET tracer uptake in the primary tumor was positively associated with male sex, proximal tumors, and nondiffuse Lauren’s subtype. The authors estimated that the addition of ^{18}F -FDG PET/CT to standard staging evaluation of patients with locally advanced gastric cancer would result in cost savings of ~\$13,000 per patient. They concluded that “because of reduced morbidity from fewer futile surgeries and lower patient care costs, PET/CT should be considered as a component of the standard staging algorithm for localized gastric cancer.”

Cancer

PET and Mesothelioma Subtypes

Kadota and colleagues from Memorial Sloan–Kettering Cancer Center (New York, NY) and Kagawa University (Japan) reported on May 21 ahead of print in the *Journal of Thoracic Oncology* on a study investigating whether preoperative maximum standardized uptake value (SUV_{max}) on ^{18}F -FDG PET correlated with histologic subtype in individuals with epithelial malignant pleural mesothelioma. This work expands on the group's recent proposal to reclassify the pleomorphic subtype of epithelioid malignant pleural mesothelioma as nonepithelioid (biphasic/sarcomatoid) histology because of its similarly poor prognosis. The study included data from 78 patients with malignant pleural mesothelioma who underwent preoperative ^{18}F -FDG PET imaging. Epithelioid tumors were retrospectively categorized as trabecular, tubulopapillary, micropapillary, solid, or pleomorphic and were assigned according to SUV_{max} to low (<10.0) and high (≥ 10.0) uptake groups. The 12 patients with epithelioid tumors with high SUV_{max} experienced significantly shorter overall survival than the 54 patients with epithelioid tumors with low SUV_{max} (medians, 7.1 and 18.8 mo, respectively). Survival times for those with high SUV_{max} were comparable to those of the 12 patients with nonepithelioid tumors. Epithelioid tumors with pleomorphic subtypes had marginally higher tracer uptake than those of the epithelioid nonpleomorphic subtype and were comparable to nonepithelioid tumors. Fifty percent of epithelioid tumors with high SUV_{max} were of the pleomorphic subtype. Only 6% of epithelioid tumors with low SUV_{max} showed epithelioid pleomorphic subtypes. The authors identified a positive correlation between mitotic count and SUV_{max} . They concluded that "preoperative SUV_{max} on FDG PET in epithelioid malignant pleural mesothelioma can indicate patients with pleomorphic subtype with poor prognosis," a finding

that supports reclassification as nonepithelioid.

Journal of Thoracic Oncology

PET/CT and GTV Estimation in Cervical Cancer

In an article e-published on May 22 ahead of print in the *International Journal of Gynecological Cancer*, Upasani et al. from the Tata Memorial Hospital (Mumbai, India) reported on a study evaluating the potential of ^{18}F -FDG PET/CT in conformal radiation treatment planning in primary tumors in cervical carcinoma and looking at maximum standardized uptake values (SUV_{max}) at which tumor volumes correlate closely with those assessed by MR imaging. The study included data from 74 patients with biopsy-proven cervical carcinomas (stages IIB and IIIB) who underwent both pretreatment ^{18}F -FDG PET/CT and MR imaging. Volumes of cervical disease on MR were correlated with different percentage cutoffs of PET/CT SUV_{max} . The mean SUV_{max} for primary tumors was 15.7. The mean MR volume correlated significantly with 30%–35% SUV_{max} value levels. The mean difference between MR and PET volumes was least at 30% SUV_{max} .

International Journal of Gynecological Cancer

DaTscan and Clinically Uncertain Parkinsonian Syndrome

Kupsch and colleagues from the Universitätsmedizin Berlin (Germany) reported on May 8 ahead of print in *Neurodegenerative Diseases* on changes in clinical management and quality of life as a result of ^{123}I -ioflupane SPECT (DaTscan) imaging in patients with clinically uncertain parkinsonian syndrome. A total of 267 such patients participated at universities in Europe and the United States, with 131 randomly assigned to DaTscan imaging and 136 to a group managed without such imaging. Safety, changes in clinical management and diagnosis, and quality of life issues were assessed at 4 and 12 wk after

imaging. Results showed that significantly more patients in the DaTscan group had changes in management after 12 weeks and changes in diagnosis at 4 and 12 wk than those in the control group. No quality of life issues were noted in either group, and no serious adverse effects were noted with DaTscan. The authors concluded that DaTscan imaging "is a useful adjunct to differential diagnosis of clinically uncertain parkinsonian syndrome."

Neurodegenerative Diseases

REVIEWS

Review articles provide an important way to stay up to date on the latest topics and approaches by providing valuable summaries of pertinent literature. The Newsline editor recommends several reviews accessioned into the PubMed database in May. In an article e-published on May 4 ahead of print in *Cancer Treatment Reviews* Bollineni et al. from the University of Groningen (The Netherlands) provided an overview of "Hypoxia imaging using positron emission tomography in non-small cell lung cancer: implications for radiotherapy." Fox et al., from the Memorial Sloan–Kettering Cancer Center (New York, NY) on May 18 ahead of print in *Current Opinion in Urology*, reviewed "Molecular imaging of prostate cancer." On May 12 ahead of print in *Neuroimage*, C.J. Price from University College London (UK) published "A review and synthesis of the first 20 years of PET and fMRI studies of heard speech, spoken language, and reading." Yeoh and Mikhaeel, from Guy's and St. Thomas's Hospital (London, UK) on May 10 ahead of print in the *International Journal of Radiation Oncology, Biology, Physiology* asked, "Are we ready for positron emission tomography/computed tomography-based target volume definition in lymphoma radiation therapy?" On May 24 ahead of print in the *Journal of Surgical Oncology*, Chen and Carrasquillo from the National Institutes of Health (Bethesda, MD) reviewed "Molecular imaging of adrenal neoplasms."