The current CRP focuses on building knowledge sharing among research-oriented facilities using cyclotron-based approaches to expand ^{68}Ga availability for preclinical and human use. Specific goals include: transfer of technology and expertise for optimal cyclotron production of ^{68}Ga using solid and/or liquid targets; transfer of expertise and methods for the separation and purification of cyclotron-produced [^{68}Ga]$GaCl_3$; provision of guidance for quality control and quality assurance of cyclotron-produced [^{68}Ga]$GaCl_3$; provision of radiosynthetic procedures for preparation of widely used ^{68}Ga radiopharmaceuticals (i.e., somatostatin-receptor and prostate-specific membrane antigen ligands) using cyclotron-produced [^{68}Ga]$GaCl_3$, including quality control tests; development of guidance for regulatory approval for human use of radiopharmaceuticals using cyclotron-produced [^{68}Ga]$GaCl_3$ for investigational and routine clinical applications; and adaptation of methods developed for production of [^{68}Ga]$GaCl_3$ using liquid and solid targets to other radionuclides accessible through this technology.

Facilities can join the CRP if they meet minimal criteria necessitated by the short half-life of ^{68}Ga: they must have an existing operational cyclotron with a proton beam energy >12 MeV; a solid target station or a dedicated liquid target system (not in use for routine production of ^{18}F); and a dedicated synthesis module for radiometals.

Proposals to join the CRP are due no later than July 31. More information is available at https://www.iaea.org/projects/crp/f22073.

International Atomic Energy Agency

Imaging Volumes Down During Pandemic

Volumes for imaging procedures after nationwide lockdowns remained markedly low in late April but, according to one source, appeared to be stabilizing across the United States. Quinsite, LLC (Chapel Hill, NC), a health care analytics and consulting firm, releases daily updated reports on the effect of the COVID-19 pandemic on radiology practices. As of April 27, the website indicated that the estimated lost revenue in radiology practices was $37,000 per full-time employee since a designated pandemic effect start date of March 16. The work Relative Value Unit impact was –45.1%. The greatest effects were seen in the western states, where imaging volumes were off 46.8%, with comparable figures of 42.6% in the east and 45.5% in the middle states. The data are also broken down by weekly changes, with the drop in average daily volumes in the April 27 report at 48.2%, not quite as precipitous as that in previous weeks. Mammography has experienced the greatest drop in average daily volume, 78.8% since March.

Quinsite LLC

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.

^{18}F-FDG Uptake and Atrial Arrhythmia in Cardiac Sarcoidosis

In an article e-published on April 19 ahead of print in the *International Journal of Cardiology*, Yodogawa et al. from the Nippon Medical School (Tokyo, Japan) and the Chiba Hokusou Hospital (Japan) reported on an investigation of the presence of atrial ^{18}F-FDG uptake on PET/CT in patients with cardiac sarcoidosis and the relationship with atrial arrhythmia. The retrospective study included 62 patients with cardiac sarcoidosis who underwent PET/CT imaging and echocardiography, as well as serum studies. Twenty-five patients (40.3%) had atrial arrhythmia (2 with atrial tachycardia and 23 with atrial fibrillation). Eighteen of the 25 patients with atrial arrythmia were found to have atrial uptake on PET/CT (72.0%), and 14 of the 37 (37.8%) without atrial arrythmia had atrial uptake. A significant association was found between atrial arrhythmia and age, atrial ^{18}F-FDG uptake, and left atrial diameter. Sex, serum tests, and left ventricular ejection fraction were not found to have significant associations with atrial arrhythmia.

International Journal of Cardiology

PET/CT and CE-CT Discrepancy in Inflammatory Breast Cancer

Jacene et al. from the Dana-Farber Cancer Institute/Brigham and Women's Hospital (Boston, MA) reported on April 21 ahead of print in *Breast Cancer Research and Treatment* on a study comparing contrast-enhanced CT (CE-CT) with ^{18}F-FDG PET/CT in initial staging of inflammatory breast cancer, looking at resulting discrepancies in imaging results and potential effects on patient management. The study included 81 women with inflammatory breast cancer who underwent both PET/CT and CE-CT before treatment. Images were independently interpreted for locoregional and distant metastases, with findings classified by anatomic site as negative, equivocal, or positive for breast cancer involvement. Paired imaging findings were then reviewed as concordant or discordant. Discordant findings were characterized as related

to the presence or absence of distant metastases, affecting the locoregional radiation therapy plan, or the result of incidental findings not related to inflammatory breast cancer. A total of 47 discordant findings between the 2 modalities were identified in 41 patients (50.6%). Thirty of these (63.8%) were related to the presence or absence of distant metastases, most often with disease detection by PET/CT. In 12 patients, PET/CT identified disease not seen on CE-CT. PET/CT suggested changes to management plans created by CT alone in 15 patients and correctly characterized 5 of 7 findings that were equivocal on CE-CT. The authors concluded that "Preliminary data suggest that FDG PET/CT may be the imaging modality of choice for initial staging of inflammatory breast cancer," adding that prospective trials testing initial staging with ^{18}F-FDG PET/CT including important clinical endpoints are warranted.

Breast Cancer Research and Treatment

^{18}F-Fluciclovine PET/CT and PSA Thresholds in BRPC

In a study e-published on April 18 ahead of print in *Urologic Oncology*, Armstrong et al. from the University of Utah Health Sciences/Huntsman Cancer Institute (Salt Lake City) reported on a study assessing various prostate-specific antigen (PSA) thresholds at which ^{18}F-fluciclovine PET imaging may be optimal in biochemically recurrent prostate cancer after definitive treatment. The retrospective study included the records of 115 men who underwent an ^{18}F-fluciclovine PET scan after definitive therapy, with a focus on the rate of positive imaging findings at specific PSA thresholds. No concerning lesions were identified on PET in 25 (21.7%) men, 32 (27.8%) had a single lesion, 45 (39.1%) had 2–5 lesions, and 13 (11.3%) had >5 suspicious lesions. At PSA thresholds of 0.5, 0.5–2.0, and >2 ng/mL, lesions were detected in 55.5%, 70.6%, and 91.5% of patients, respectively. Additional analyses indicated a PSA threshold of 2.10 ng/mL and a PSA cutoff of 1.38 ng/mL. The authors noted that because the probability of having positive imaging findings and increasing numbers of suspicious lesions rises with increasing PSA, a lower PSA threshold of 0.5 ng/mL for ^{18}F-fluciclovine PET imaging could allow earlier intervention with salvage therapies in biochemical recurrence. They cautioned that using a threshold <1 ng/mL carries a higher risk for multiple negative scans. They concluded that "employing a higher PSA threshold of 1 to 2 carries greater sensitivity and specificity and may maximize identifying individuals with early biologically recurrent prostate cancer who may benefit from early intervention, while minimizing negative scans."

Urologic Oncology

^{18}F-FDG PET/CT and COVID-19 Visualization

Lütje et al. from University Hospital Bonn (Germany) reported on April 7 ahead of print in *Nuklearmedizin* on nuclear imaging in the early days of the coronavirus SARS-CoV-2 outbreak. The article provided a summary and discussion of the use of PET/CT in COVID-19 in the earliest weeks of its global spread and reviewed suggestions for possible applications of nuclear medicine techniques, including visualization of immune response to viral challenge in nonhuman primates, visualization of very early lymph node involvement, monitoring of treatment response and prediction of recovery time, and evaluation of ^{18}F-FDG uptake in areas outside the lung. Most of these potential applications remain speculative and are based on experience and research with previous viral outbreaks. The authors emphasized the importance of a multidisciplinary approach in COVID-19 management and the potential of nuclear medicine in collaborative management of the disease.

Nuklearmedizin

MRI and ^{18}F-Flortaucipir in AD Phenotypes

In an article e-published on April 15 ahead of print in *Annals of Clinical and Translational Neurology*, Josephs et al. from the Mayo Clinic (Rochester, MN, and Jacksonville, FL) reported on a study designed to assess relationships between MRI volumetry and ^{18}F-flortaucipir PET findings in typical and atypical clinical phenotypes of Alzheimer disease (AD) by age and decade. The study included 564 participants (β-amyloid–positive typical AD, 86; β-amyloid–positive atypical AD, 80; and β-amyloid–negative normal controls, 398) who underwent apolipoprotein-E genotyping and imaging with MR, ^{18}F-flortaucipir, and ^{11}C-Pittsburgh compound B. MR gray matter volumes and ^{18}F-flortaucipir SUV ratios were assessed for the hippocampus, entorhinal cortex, and neocortex, as well as ratios of hippocampal-to-neocortical and entorhinal-to-neocortical volume and flortaucipir uptake. Additional analyses looked at these variables and phenotypes within 3 age groups (50–59, 60–69, and 70+ y). For the youngest group, greater medial temporal atrophy and PET tracer uptake were observed in the typical than in the atypical phenotype. The typical phenotype also showed greater frontal neocortex uptake. In the remaining groups, hippocampal volume loss was greater in the typical than the atypical phenotype, but only the 60–69-y-old group and not the 70+-y-old group showed a difference in hippocampal ^{18}F-flortaucipir uptake. Over all, a pattern of higher neocortical ^{18}F-flortaucipir uptake correlated with younger age decade for both phenotypes. The authors concluded that the relationships between MRI volumetry and ^{18}F-flortaucipir uptake on PET differ across AD clinical phenotypes and within phenotype by age groups, suggesting that "there is potential risk of masked effects by not accounting for genarian in participants with β-amyloid and τ-positive biomarker defined AD."

Annals of Clinical and Translational Neurology

PET/CT and Bone Marrow Involvement in Follicular Lymphoma

St-Pierre et al. from the Mayo Clinic (Rochester, MN) reported on April 22 ahead of print in *The Oncologist* on a study of the value of ^{18}F-FDG PET/CT

in determining bone involvement in staging follicular lymphoma, using standard bone marrow biopsy as the comparative gold standard. The study included a total of 548 patients with newly diagnosed grade 1–3A follicular lymphoma who underwent ^{18}F-FDG PET imaging. Imaging data considered included the presence, pattern, and location of bone involvement; spleen involvement; and SUVs in the L3 vertebral body. These data were compared with bone marrow biopsy reports. When patients with focal bone lesions on PET/CT were excluded from the analysis, the sensitivity and specificity of PET/CT in detecting bone or marrow involvement, compared with biopsy, were 53% and 88%, respectively. The sensitivity and specificity of spleen involvement on PET/CT in predicting a positive bone marrow biopsy were 55% and 86%, respectively. An L3 SUV_{max} of <2.0 was associated with a negative predictive value of 96% for bone marrow involvement, and an L3 SUV_{mean} <1.4 was associated with a negative predictive value of 100%. The authors concluded that in newly diagnosed follicular lymphoma, PET/CT-detected bone and splenic involvement is highly specific for positive bone marrow involvement. Very low SUVs in the lumbar spine have a high negative predictive value, so that confirmative bone marrow biopsy might be avoided in this subset of patients. They added that bone marrow biopsy remains necessary to definitively exclude bone marrow involvement in a large majority of follicular lymphoma patients with a negative PET.

The Oncologist

^{177}Lu-PSMA Scintigraphy in Elevated PSA and Negative Imaging

In an article e-published on April 13 ahead of print in *Urology Journal*, Ghodsirad et al. from Shohadaye Tairish Hospital/Shahed Beheshti University of Medical Sciences (Tehran, Iran) reported on a study evaluating the sensitivity of ^{177}Lu–prostate-specific membrane antigen (^{177}Lu-PSMA) scintigraphy for detection of metastatic sites in patients with biochemically relapsed prostate cancer but negative imaging results on MR, MR spectroscopy, CT, or bone scintigraphy. The study included 26 men (mean age, 70 y; range, 46–89 y) with biochemical recurrence after surgery or radiation treatment who underwent conventional imaging with negative results. Each participant underwent ^{177}Lu-PSMA-617 diagnostic planar whole-body imaging and SPECT at 3, 24, and 72 h after tracer injection. Results were compared against an additional CT. ^{177}Lu-PSMA-617 imaging detected lesions in the lung (6), abdominal lymph nodes (2), and mediastinum (2) in a total of 10 (38.5%) patients. The authors concluded that the fact that a ^{177}Lu-PSMA SPECT scan can detect metastatic lesions in more than a third of patients with biochemical recurrence and negative conventional imaging is especially relevant for those locations and circumstances in which ^{68}Ga-PSMA for PET is either unavailable or not feasible.

Urology Journal

Long-Term Effects of ^{131}I in Toxic Multinodular Goiter

Roque et al. from the Egaz Moniz Hospital/Occidental Hospital Centre (Lisbon, Portugal) and the University of Siena (Italy) reported on April 22 ahead of print in the *Journal of Clinical Endocrinology and Metabolism* on a study describing the long-term effects of 15 mCi radioiodine in patients treated for toxic multinodular goiter. The study included 153 such patients who were followed annually for up to 12 y for thyroid function, antithyroid antibodies, and ultrasound. Mean thyroid volume reductions were $\geq$50% 3 y after therapy, with the largest reductions seen in the first year (30% $\pm$ 17.8%). Most patients (60%) saw their lowest volumes 3–6 y after treatment. Twenty-two percent of patients experienced regained volumes, but overall the net reduction was statistically significant as late as 9 y after therapy. The mean time to hypothyroidism was 2.7 $\pm$ 2.4 y. Patients who were hyperthyroid saw annual volume decreases of 50% for the first 3 y without additional ^{131}I treatment. At the end of the 12-y follow-up, 61.6% of patients were euthyroid, 11% were hyperthyroid (4.8% overt), and 27.4% were hypothyroid (2.7% overt). Hyperthyroidism was cured in 89% of patients. The authors summarized their findings that "the treatment of toxic multinodular goiter with 15 mCi of radioactive iodine induced low hypothyroidism rates while providing high cure rates and significant volume reduction, maintained in the long-term."

Journal of Clinical Endocrinology and Metabolism

Parotid Gland PET and Late Radiation-Induced Xerostomia Prediction

In an article published on April 6 in *Radiotherapy and Oncology* (2020;148:30–37), Wilkie et al. from the University of Michigan (Ann Arbor) and the Ann Arbor Veterans Administration reported on a study assessing associations between parotid gland PET biomarkers and late radiation-induced xerostomia and evaluating the incremental value of pretreatment PET for predictive xerostomia models. The study included imaging data from 47 patients with human papilloma virus–associated oropharyngeal squamous cell carcinoma before and after uniform chemotherapy/radiation therapy. The authors looked at associations among the 90th percentile of SUVs on PET before/after treatment, mean parotid gland doses, late xerostomia defined by the Xerostomia Questionnaire, and salivary flow rates. Significant associations were identified between late xerostomia and both mean parotid gland dose and SUVs before and after treatment, with posttreatment PET agreement being generally stronger. The addition of the SUV 90th percentile from pretreatment PET improved the prediction model for late moderate or severe xerostomia. The authors concluded that "the addition of pretreatment parotid gland PET biomarkers improved a predictive model for late patient-reported xerostomia" more than

parotid gland doses or pretreatment xerostomia assessment.

Radiotherapy and Oncology

Nonparathyroid Findings on SPECT/CT Parathyroid Localization

Mallick et al. from the University of Pittsburgh Medical Center (PA) reported on April 11 ahead of print in the *Journal of Surgical Research* (2020;252:216–221) on a study of the frequency and types of unexpected and significant findings in ^{99m}Tc-sestamibi SPECT/CT imaging for primary hyperparathyroidism. The study, a retrospective review of all SPECT/CT imaging performed for primary hyperparathyroidism at a single institution over a 6-y period, included 2,413 imaging records. Of these, 652 patients (27%) were found to have 677 (28%) nonparathyroid findings, including thyroid nodules (331, 49%), of which 47 (6.9%) were malignancies: 40 papillary thyroid cancers (11 microcarcinomas), 5 follicular thyroid cancers, 1 medullary carcinoma, and 1 noninvasive follicular thyroid neoplasm with papillary-like features. Pulmonary nodules were identified in 177 patients (26%), among whom 9 were diagnosed with primary lung lesions (6 non–small cell cancers, 1 small cell cancer, 1 carcinoid, and 1 pulmonary sequestration). SPECT/CT also identified 14 patients (2.1%) with breast abnormalities, including 3 cancers. Nine patients (1.3%) had imaging findings of metastatic disease within the lungs (4), bones (3), and mediastinum (2), and 1 patient was diagnosed with follicular lymphoma. Two intracranial tumors were also identified, in addition to dysplastic Barrett esophagitis (1), hiatal hernia (20), and aortic aneurysm (13). In total, 72 (10.6%) of the 677 patients with nonparathyroid findings had premalignant or malignant results on SPECT/CT. The authors summarized their data by writing that in patients undergoing localization for primary hyperparathyroidism with ^{99m}Tc-sestamibi SPECT/CT "nonparathyroid findings are frequent (27%) and can lead to newly diagnosed malignant or premalignant lesions in at least 3% of patients."

Journal of Surgical Research

SNMMI Expands Free Virtual Curriculum

SNMMI announced on April 10 the availability of free and flexible access to its extensive virtual curriculum, which has been expanded since the onset of the COVID-19 pandemic. The content is available free to SNMMI members.

A new SNMMI webinar series, "Artificial Intelligence Methods and Applications in Medical Imaging and Nuclear Medicine," debuted on April 7 with the highest registration ever for an SNMMI webinar. The 6-part series, organized by the Physics Instrumentation and Data Sciences Council, continued through May 12 and reviewed the ways in which artificial intelligence methods are applied in imaging, including current challenges, limitations, and future promise. This series is a part of the new free curriculum, and each webinar offers 1 hour of continuing education (CE) credit for physicians, pharmacists, and technologists.

A new "Quality in Nuclear Medicine" online program is designed to assist learners in understanding the skills vital to practice quality, including evaluating images, managing triage, understanding disease processes, and achieving high-quality interpretable studies. This 12-module program offers 10.25 CE credits for technologists, pharmacists, physicians, and physicists.

On April 29 the SNMMI COVID-19 Task Force organized a webinar on "Imaging of a COVID-19–Positive Patient: What to Expect." The SNMMI-TS quarterly webinars continued on April 22 with "Considerations for Implementing a Successful Cardiac PET Program." The Clinical Trials Network webinar on May 7 was titled "There's a New PET Drug in Town: Manufacturing and Approval Considerations for Your Institution." The SNMMI PET Center of Excellence organized and presented "^{68}Ga-DOTATATE PET/CT: How to Read These Studies and Pitfalls: Case-Based Approach" on April 10. SNMMI has also joined with the American College of Nuclear Medicine to offer webinars on gastric emptying, cardiac CT, ^{177}Lu-DOTATATE prostate-specific membrane antigen therapy, and writing a quality report.

Additional webinar series are planned for:

- PET imaging (gallium imaging, PET imaging of cardiac sarcoid, ^{18}F-fluciclovine PET/CT, pediatric PET, PET/MR imaging of prostate cancer, grant writing, and others); and
- Correlative imaging (vasculitis/arteritis/atherosclerosis, device inflammation/infection, breast imaging, cardiac sarcoid/amyloid, and myocarditis/pericarditis/endocarditis).

Registration is available for future live webinars, with many more available on demand at: www.snmmi.org/webinars.