Adding MI to Residency Training

In 2007, the SNM Molecular Imaging Education Task Force proposed a molecular imaging curriculum to the Nuclear Medicine Residency Review Committee (NM RRC) to be considered for incorporation into the next version of the nuclear medicine program requirements. This action was taken to address the need to educate both current nuclear medicine physicians and the next generation in molecular imaging. To assist the NM RRC in evaluating this proposal, the SNM sent a survey to all nuclear medicine program directors (NMPDs) and many faculty. The survey responses raised concerns that although incorporation of molecular imaging into the program requirements is a laudable goal, new and emerging molecular imaging techniques may not be applicable to clinical practice in a reasonable time frame.

The NM RRC met in mid-November and reviewed the current program requirements, the SNM-proposed molecular imaging curriculum, and the NMPD survey results. The RRC revised and updated the current program requirements without adding significant new requirements. In regard to molecular imaging and the revised program requirements, the following is proposed: "Regularly scheduled didactic sessions must provide instruction in both diagnostic imaging and non-imaging nuclear medicine applications and therapeutic applications, including: . . . Fundamentals of existing and emerging molecular imaging techniques, particularly as they relate to current clinical practice."

Darlene Metter, MD

The timeline for changes in program requirements is often lengthy. It is expected that the proposed new curriculum will be made available for comment in early 2009 and will be discussed at the NMPD session at the 2009 SNM Mid-Winter Meeting in Clearwater, FL. Once the comment period is over and all concerns are addressed, the new requirements must receive final approval from the Accreditation Council for Graduate Medical Education and would likely go into effect in July 2010.

At the next RRC meeting in May 2009, the committee will begin consideration of the next major revision of the program requirements to include considerably more molecular imaging content. The RRC recognizes the importance of balancing new and emerging technologies with practical clinical applications.

Darlene Metter, MD
Chair, Nuclear Medicine Residency Review Committee
Chair, Nuclear Medicine Program Directors

CMS Publishes Final 2009 Rules

In November, the Centers for Medicare & Medicaid Services (CMS) published the final calendar year (CY) 2009 rules for the Hospital Outpatient Prospective Payment System (HOPPS) and the Medicare Physician Fee Schedule (MPFS). Each year, these final rules set Medicare and Medicaid policies, procedures, and payment rates for the upcoming calendar year. Once again, 2009 brings important changes to policies and payments for both nuclear medicine procedures and radiopharmaceuticals.

The 2009 HOPPS final rule includes a 3.6% annual inflation update to Medicare payment rates; however, this increase was not realized for all procedures important to nuclear medicine. CMS will continue to package payments for all diagnostic radiopharmaceuticals and contrast agents within the ambulatory payment classification (APC) category. The rates will continue to be set by hospital claims data median costs. Also, CMS is extending through 2009 the 2008 rate-setting methodology for diagnostic nuclear medicine APCs, using only claims that include a charge with a required diagnostic, therapeutic, or other radioactive product. Finally, drugs and biologicals will be paid at 104% of the average sales price (ASP+4).

Hugh Cannon

In addition to these methodologies, CMS will continue through December 31, 2009, to pay therapeutic radiopharmaceuticals and brachytherapy sources at individual hospital (overall) cost-to-charge ratio times the individual hospital charges for rate setting. This payment structure was enacted on July 15 by the Medicare Improvements for Patients and Providers Act (MIPPA) of

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enhanced green fluorescent protein were efficiently taken up by murine pancreatic islets and were easily visualized with MR and near-infrared fluorescence optical imaging. The result was the suppression of the target gene. The authors concluded that these results "illustrate the value of our approach in overcoming the challenges associated with genetic modification of intact pancreatic islets in a clinically acceptable manner," with the additional advantage of the combined capability of the nanoparticles to precisely deliver siRNA and to magnetically label pancreatic islets.

Transplantation

Tracking Inflammatory Response in Stroke

On November 14, Breckwoldt et al. from the Harvard Medical School (Charlestown, MA) reported ahead of print in the *Proceedings of the National Academy of Sciences of the United States of America* on a functional, enzyme-activatable MR imaging agent designed to accurately track the oxidative activity of myeloperoxidase, a key inflammatory enzyme secreted by activated neutrophils and macrophages/microglia, in stroke in living animals. Using their novel technique, the researchers found myeloperoxidase to be widely distributed in ischemic tissues, positively correlated with infarct size, and detectable as late as 3 wk after stroke. Peak levels of myeloperoxidase were detected at 3 d after ischemia. The technique tracked myeloperoxidase activity and confirmed inflammation on the molecular level in vivo, information that the authors noted "was previously only possible to obtain on ex vivo brain sections and impossible to assess in living human patients." They added that these findings could allow "efficient and noninvasive serial screening of therapies targeting inflammation and the use of myeloperoxidase imaging as an imaging biomarker to risk-stratify patients."

Proceedings of the National Academy of Sciences of the United States of America

Advances in ^{19}F MR Molecular Imaging

The stable isotope ^{19}F, which has been used in a variety of MR investigations for more than 2 decades, remains the focus of considerable research that increasingly looks at molecular-level results in diagnosis and therapy. In the November issue of *Magnetic Resonance in Medicine* (2008;60:1066–1072), Neubauer et al. from Washington University (St. Louis, MO) reported on a new strategy for MR imaging using gadolinium-modulated ^{19}F signals from perfluorcarbon nanoparticles. Gadolinium was directly incorporated as a relaxation agent into the lipid monolayer surrounding the perfluorocarbon in the 200-nm nanoparticles. The result was marked enhancement of the ^{19}F signal, a 4-fold increase in the magnetic relaxation rate of the ^{19}F nuclei at 1.5 T, and a 125% increase in signal. The relaxation effect could also be quantitatively modulated to tailor particle properties by varying the surface concentration of gadolinium. The authors concluded that this strategy "dramatically improves the sensitivity and range of ^{19}F MR imaging/MR spectroscopy and forms the basis for designing contrast agents capable of sensing their surface chemistry."

In an article in the December 7 issue of *Physics in Medicine and Biology* (2008;53:6979–6989), Porcari et al. from the University of Rome "Sapienza" (Italy) reported on a new approach using ^{19}F MR and MR spectroscopy to optimize boron neutron capture therapy (BNCT) in the treatment of malignant brain gliomas. In BNCT, boronated phenylalanine is infused into the patient and subsequently exposed to neutron irradiation, releasing short-range α radiation and "recoil" lithium in tumor cells, resulting in highly localized radiation-induced apoptosis. By labeling the boronophenylalanine with ^{19}F, the authors selectively mapped in vivo spatial distribution and pharmacokinetics using MR and MR spectroscopy in a rat glioma model. Maximum uptake occurred at 2.5 h after infusion into the animals. This approach could be useful in estimating optimal timing for neutron irradiation in BNCT and in providing a method for performing pharmacokinetic studies of other BNCT carriers.

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2008. Proposed changes to the radiopharmaceutical payment methodology cannot be implemented until January 1, 2010.

The 2009 MPFS final rule also implements requirements mandated by the 2008 MIPPA legislation. This bill replaces the anticipated 15.1% payment cut with an overall 1.1% increase to physician payments. Most important, this final rule does not change the radiopharmaceutical payment methodology in the physician office or Independent Diagnostic Testing Facility (IDTF) for 2009. Drugs, contrast agents, and biologicals also will continue to be paid at 106% of the average sales price (ASP+6).

In keeping with the requirements of the Deficit Reduction Act, this final rule continues to cap payment rates for imaging services under the physician fee schedule at the amount paid for the same services when performed in hospital outpatient departments. Twenty nuclear medicine codes are affected by this policy in 2009.

In addition to payment rate setting, the 2009 MPFS final rule implements a few quality-related initiatives. First, CMS did not finalize the proposal to require that physicians who furnish diagnostic testing services meet the quality and performance standards required for IDTFs. CMS will revisit this proposal at a later time, if necessary. Second, CMS finalized 153 measures for 2009 reporting. Included in these measures is 1 nuclear medicine bone scan imaging measure. The rule can be reviewed at the SNM Coding Corner Web site (www.snm.org/codingcorner).

Hugh Cannon
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