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Kai Lee, PhD
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Katherine L. Rowell, MS, CNMT, Editor
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**Review of Nuclear Medicine Technology**
Both an overview of the latest techniques in nuclear medicine technology as well as an authoritative study guide, this practical handbook is a valuable addition to libraries of students and specialists alike. Informative appendices cover:
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Ann M. Steves, MS, CNMT
Softcover, 176 pp.
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**A Patient's Guide to Nuclear Medicine, Revised Edition**
This popular pamphlet explains nuclear medicine procedures in clear, concise language, helping to allay patient anxieties. Format includes common questions and answers; step-by-step descriptions of procedures; and photographs showing patients undergoing imaging. An update of the highly successful patient pamphlet in use since 1983.

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**AUDIOVISUAL, BOOKS, JOURNALS**

The Society of Nuclear Medicine is continually adding to its library of audiovisuals, books, and other publications. A stop at the publications booth is well worth the time. Here you will find on display what the Society has to offer for year-round educational advancement. Networking opportunities and job referral boards are available at special locations throughout the meeting as well as membership information at our membership booth.

**EXPOSITION**

All the major manufacturers of nuclear medicine products and services—more than 100 in all—will be on hand to explain and demonstrate the most technologically-advanced equipment. Several companies will present User Meetings to give an in-depth understanding of their products.

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NONSTOP CAMERA UTILIZATION

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Thallium: Institution 2

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<th>Study 4</th>
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0 hr  1 hr  2 hrs  3 hrs  4 hrs  5 hrs

Due to the lack of clinically significant redistribution and the slow washout of CARDIOLITE, patients can be batched for stress injection, then imaged one after another over a broader period of time. In comparison, imaging with thallium must take place almost immediately; therefore the camera is frequently idle.

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<td><strong>Clinical Computers in Nuclear Medicine</strong>, 1992. Rowell, ed.</td>
<td>3-150</td>
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<td><strong>Computers in Nuclear Medicine</strong>, 1992. Lee</td>
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<td>3-046</td>
<td>$20.00</td>
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<td><strong>Total</strong></td>
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Computers have become an indispensable tool in nuclear medicine. This is the book for those who wish to acquire a basic understanding of how computers work and the processing techniques used to obtain diagnostic information from radionuclide images. The text gives a thorough description of the hardware components of a nuclear medicine computer system and explains the principles behind many common image processing techniques. The following topics are discussed in detail:

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A tenure track ASSISTANT PROFESSOR position is available at the Center for Functional and Metabolic Imaging (CFMI), in the Department of Radiology, University of Pennsylvania. Candidates should have a PhD or MD degree with a strong background in neuroanatomy or neurobiology, as well as an ability to work with non-human primates in PET, SPECT and MRI imaging procedures. The position will also play a key role in bridging the gap between basic chemistry, pharmacology and clinical research. Working knowledge of image analysis and development of imaging protocols for animals and humans is required. The successful candidate is expected to join the on-going research program at CFMI and attract extramural funding. The University of Pennsylvania is an equal opportunity employer; women and minorities are encouraged to apply. Please send resume to: Dr. Hank F. Kung, Room 305, 5700 Market Street, Philadelphia, PA 19104.

Academic Positions

Radiologist
The Department of Diagnostic Radiology of Yale University School of Medicine in New Haven, Connecticut, is seeking a potential senior member in the Section of Nuclear Medicine with extensive experience in clinical imaging and management of nuclear cardiology. The position involves responsibilities in patient care and resident teaching as well as research. Facilities include a PET Facility with cyclotron, a three-headed SPECT scanner, and a state-of-the-art medical image processing facility. Applicants should send a letter of interest along with a curriculum vitae to: Dr. Robert J. S. King, Department of Radiology, Yale University School of Medicine, 333 Cedar Street, New Haven, Connecticut 06510. Yale University is an affirmative action/equal opportunity employer. Application deadline January 15, 1993.

Physician
Yale University School of Medicine, seeks an experienced Nuclear Medicine Physicist with a strong background in imaging of the heart and interpretation of PET, SPECT and MRI images. It is expected that the candidate will be familiar with the principles of nuclear imaging and the imaging techniques currently in use. The successful candidate will be expected to have a strong commitment to both research and clinical activities. This position is open to candidates with or without faculty appointments. The search will be held with that of other members of the Nuclear Medicine Department. Please forward curriculum vitae and names of three references to: Dr. G. William Jaffe, Department of Radiology, Yale University School of Medicine, 333 Cedar Street, New Haven, Connecticut 06510. Yale University is an affirmative action/equal opportunity employer. Application deadline January 15, 1993.

Positions Wanted

ABNM certified MD available part-time immediately, experienced in all aspects of nuclear medicine, including Cardiac SPECT. Radiology background. Seeks position in NY, NJ area. Reply: Box 301, The Society of Nuclear Medicine, 136 Madison Ave., New York, NY 10016.

ABNM certified MD presently in PET fellowship, available July ‘93. Experienced in all aspects of Nuclear Medicine including PET, SPECT, cardiology and therapy. Would consider position with or without PET. Reply: Box 302, The Society of Nuclear Medicine, 136 Madison Ave., New York, NY 10016.

ABNM certified MD, trained from highly prestigious medical school. Experience includes thyroid, cardiology, SPECT. Some background in medicine and radiology. Write Box 201, The Society of Nuclear Medicine, 136 Madison Avenue, New York, NY 10016-6760.
NUCLEAR MEDICINE RESIDENCY PROGRAM
July 1, 1993

The University of Tennessee Medical Center, Knoxville, Tennessee, is offering two positions in a 2-year ACGME-approved program designed to provide competency in all aspects of nuclear medicine to meet the requirement of the American Board of Nuclear Medicine. UTMC is a 500-bed hospital and the regional referral center for East Tennessee. The Section of Nuclear Medicine is part of the Department of Radiology, a comprehensive diagnostic imaging center with X-ray radiography, CT, MRI, and clinical PET. The Nuclear Medicine Section performs 6,600 conventional imaging procedures, 21,000 RIA's and more than 1,000 clinical PET studies per year. The program includes extensive training in conventional procedures, nuclear cardiology, SPECT imaging, PET, and therapy with radionuclides. The Nuclear Medicine Section is equipped with an up-to-date image processing laboratory and the entire department is interconnected through an ethernet communications system. Special research opportunities are being offered in cardiology, oncology, and neurology.

Applicants should have 2 years of ACGME-approved training in internal medicine, pediatrics, pathology, or radiology. Send applications and CV to: Karl F. Hubner, M.D., Program Director, Nuclear Medicine Residency Program, UTMC, 1924 Alcoa Highway, Knoxville, TN 37920. UTMC is an EEO/AA/Title IX/Section 504/ADA Employer.

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The Department of Radiology produces about 140,000 examinations a year and is staffed by 15 Western-trained Radiologists, most of whom have a strong academic background. The scientific publications by the staff in major international journals amounts to 20-25 per year. The Department is well-equipped with five new ultrasound machines, 4 CT scanners; the second MR (with spectroscopy) is presently being purchased. In addition to the existing Gamma Cameras from General Electric, the Nuclear Medicine Section will add a 3-headed tomographic camera and a 2-headed body camera. A PET camera will be acquired within one year.

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REVIEW OF NUCLEAR MEDICINE TECHNOLOGY
Ann M. Steves, CNMT

This book provides an overview of the latest techniques used in nuclear medicine technology practice. It is an excellent study guide for those who are preparing for the nuclear medicine technologist certification examination. Four appendices address preparation for:

- A certification exam
- Test-taking techniques
- Sample questions and answers
- NRC regulations

Illustrated chapters discuss the following systems: cardiovascular, skeletal, endocrine, gastrointestinal, genitourinary, respiratory, and the central nervous system. The authors also discuss radiation protection and its relation to instrumentation quality control and give the reader an introduction to SPECT.

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The procedural logistics of pharmacologic stress can be another source of emotional stress to the physician or staff. With I.V. Persantine, there’s a flexible, easy-to-follow protocol. No infusion pump needed. No need for site-specific injection. And no extra I.V. line for the imaging agent.

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Stress the facts in pharmacologic stress...call the Du Pont Pharma Nuclear Cardiology Hotline at 1-800-343-7851 for further information and discussion about the proven safety profile of I.V. Persantine.

* Serious adverse reactions associated with the administration of I.V. Persantine have included fatal and nonfatal myocardial infarction, ventricular fibrillation, symptomatic ventricular tachycardia, transient cerebral ischemia and bronchospasm. Severe adverse events have occurred infrequently (0.3%) in a study of 3011 patients. Patients with a history of unstable angina may be at a greater risk for severe myocardial ischemia. Patients with a history of asthma may be at a greater risk for bronchospasm.

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Please see brief summary of prescribing information on reverse for contraindications, warnings, and adverse reactions.

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(dipyridamole USP) Injection 5mg/ml

Brief Summary of Prescribing Information

CONTRAINDICATIONS Hypersensitivity to dipyridamole.

WARNINGS Serious adverse reactions associated with the administration of intravenous Persantine® (dipyridamole USP) have included fatal and nonfatal myocardial infarction, ventricular fibrillation, symptomatic ventricular tachycardia, transient cerebral ischemia, and bronchospasm.

In a study of 3011 patients given intravenous Persantine as an adjunct to thallium myocardial perfusion imaging, two types of serious adverse events were reported: 1) four cases of myocardial infarction (0.1%), two fatal (0.05%), and two nonfatal (0.05%); and 2) six cases of severe bronchospasm (0.2%). Although the incidence of these serious adverse events was small (0.3%, 10 of 3011), the potential clinical information to be gained through use of intravenous Persantine thallium imaging must be weighed against the risk to the patient. Patients with a history of unstable angina may be at a greater risk for severe cardiac ischemia. Patients with a history of asthma may be at a greater risk for bronchospasm during IV Persantine use.

When thallium myocardial perfusion imaging is performed with intravenous Persantine, parental aminophylline should be readily available for relieving adverse events such as bronchospasm or chest pain. Vital signs should be monitored during, and for 10-15 minutes following, the intravenous infusion of Persantine and an electrocardiographic tracing should be obtained using at least one chest lead. Should severe chest pain or bronchospasm occur, parental aminophylline may be administered by slow intravenous injection (50-100 mg over 30-60 seconds) in doses ranging from 50 to 250 mg. In the event of severe hypotension, the patient should be placed in a supine position with the head tilted down if necessary, before administration of parenteral aminophylline. If 250 mg of aminophylline does not relieve chest pain symptoms within a few minutes, sublingual nitroglycerin may be administered. If chest pain continues despite use of aminophylline and nitroglycerin, the possibility of myocardial infarction should be considered. If the clinical condition of a patient with an adverse event permits a one minute delay in the administration of parental aminophylline, thallium-201 may be injected and allowed to circulate for one minute before the injection of aminophylline. This will allow initial thallium perfusion imaging to be performed before reversal of the pharmacologic effects of Persantine on the coronary circulation.

PRECAUTIONS See WARNINGS.

Drug Interactions Oral maintenance theophylline may abolish the coronary vasodilatation induced by intravenous Persantine® (dipyridamole USP) administration. This could lead to a false negative thallium imaging result.

Caricnogenesis, Mutagenesis, Impairmen of Fertility

Studies in which dipyridamole was administered in the feed at doses of up to 75 mg/kg/day (9.4 times the maximum recommended daily human oral dose) in mice (up to 12 weeks in males and up to 42 weeks in females) and rats (up to 111 weeks in males and females), there was no evidence of drug related carcinogenesis. Mutagenicity tests of dipyridamole with bacterial and mammalian cell systems were negative. There was no evidence of impaired fertility when dipyridamole was administered to male and female rats at oral doses up to 500 mg/kg/day (63 times the maximum recommended daily human oral dose). A significant reduction in number of corpora lutea with consequent reduction in implantations and live fetuses was, however, observed at 1250 mg/kg/day.

Calculation based on assumed body weight of 50 kg.

Pregnancy Category B Reproduction studies performed in mice and rats at daily oral doses of up to 125 mg/kg (15.6 times the maximum recommended daily human oral dose) and in rabbits at daily oral doses of up to 30 mg/kg (2.5 times the maximum recommended daily human oral dose) revealed no evidence of impaired embryonic development due to dipyridamole. There are, however, no adequate and well controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human responses, this drug should be used during pregnancy only if clearly needed.

Calculation based on assumed body weight of 50 kg.

Nursing Mothers Dipyridamole is excreted in human milk.

Pediatric Use Safety and effectiveness in children have not been established.

ADVERSE REACTIONS Adverse reaction information concerning intravenous Persantine® (dipyridamole USP) is derived from a study of 3011 patients in which intravenous Persantine was used as an adjunct to thallium myocardial perfusion imaging and from spontaneous reports of adverse reactions and the published literature.

Serious adverse events (fatal and non-fatal myocardial infarction, severe ventricular arrhythmias, and serious CNS abnormalities) are described previously (see WARNINGS). In the study of 3011 patients, the most frequent adverse reactions were: chest pain/angina pectoris (19.7%), electrocardiographic changes (most commonly ST-T changes) (45.5%), headache (12.2%), and dizziness (11.8%). Adverse reactions occurring in greater than 1% of the patients in the study are shown in the following table:

Incidence (%) of Drug-Related Adverse Events

<table>
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<tr>
<th>Condition</th>
<th>Incidence (%)</th>
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<tr>
<td>Chest Pain/Angina</td>
<td>19.7</td>
</tr>
<tr>
<td>Headache</td>
<td>12.2</td>
</tr>
<tr>
<td>Dizziness</td>
<td>11.8</td>
</tr>
<tr>
<td>Electrocardiographic Abnormalities/ST-T changes</td>
<td>7.5</td>
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<tr>
<td>Electrocardiographic Abnormalities/Extrastyles</td>
<td>5.2</td>
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<tr>
<td>Hypotension</td>
<td>4.6</td>
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<tr>
<td>Nausea</td>
<td>4.6</td>
</tr>
<tr>
<td>Flushing</td>
<td>3.4</td>
</tr>
<tr>
<td>Electrocardiographic Abnormalities/Tachycardia</td>
<td>3.2</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>2.6</td>
</tr>
<tr>
<td>Pain Unspecified</td>
<td>2.6</td>
</tr>
<tr>
<td>Blood Pressure Lability</td>
<td>1.6</td>
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<tr>
<td>Hypertension</td>
<td>1.5</td>
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<tr>
<td>Paresthesia</td>
<td>1.2</td>
</tr>
<tr>
<td>Fatigue</td>
<td>0.2</td>
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</tbody>
</table>

Common adverse reactions occurring in 1% or less of the patients within the study included:

Cardiovascular System: Electrocardiographic abnormalities (0.8%), atrial fibrillation (0.8%), atrioventricular (0.3%), ventricular tachycardia (0.2% see WARNINGS), bradycardia (0.2%), myocardial infarction (0.1% see WARNINGS), AV block (0.1%), syncope (0.1%), orthostatic hypotension (0.1%), atrial fibrillation (0.1%), supraventricular (0.1%), ventricular arrhythmia unspecified (0.03% see WARNINGS), heart block unspecified (0.03%), cardiomyopathy (0.03%), edema (0.03%).

Respiratory System: Hypothesis (0.5%), hypoxemia (0.3%), hyperventilation (0.2%), hyperventilation (0.1%), hyperkalemia (0.1%), hypokalemia (0.1%), hypokalemia (0.1%), hypokalemia (0.1%), hypokalemia (0.1%), hypokalemia (0.1%), hypokalemia (0.1%).

Central and Peripheral Nervous System: Hypothesis (0.5%), hypothermia (0.3%), hyperventilation (0.2%), hyperventilation (0.1%), hyperventilation (0.1%), hyperventilation (0.1%), hyperventilation (0.1%), hyperventilation (0.1%).

Gastrointestinal System: Dyspepsia (1.0%), dry mouth (0.8%), abdominal pain (0.7%), fatigue (0.6%), vomiting (0.4%), eructation (0.1%), dysphagia (0.2%), tinnitus (0.03%), appetite increased (0.03%).

Respiratory System: Pharyngitis (0.3%), bronchospasm (0.2% see WARNINGS), hyperventilation (0.1%), rhinitis (0.1%), coughing (0.03%), pleural pain (0.03%).

Other: Myalgia (0.9%), back pain (0.6%), injection site reaction unspecified (0.4%), myalgia (0.4%), arthralgia (0.3%), malaise (0.3%), earache (0.3%), tinnitus (0.1%), vision abnormalities unspecified (0.1%), dyspepsia (0.1%), thirst (0.03%), dehydratation (0.03%), eye pain (0.03%), renal pain (0.03%), perineal pain (0.03%), breast pain (0.03%), interstitial claudication (0.03%), leg cramping (0.03%).

OVERDOSAGE No cases of overdosage in humans have been reported. It is unlikely that overdosage will occur because of the nature of use (i.e., single intravenous administration in controlled settings). See WARNINGS.

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This illustrated guide explains both how computers work and how processing techniques obtain diagnostic information from radionuclide images. Coverage includes:
1. Hardware components in nuclear medicine computer systems. Principles behind common image processing techniques.
2. How nuclear cardiology and SPECT highlight the interaction of hardware and software in nuclear medicine.

Kai Lee, PhD
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