《**Presidential Lecture of SNM**》

Nuclear Medicine in North America: Where We Are—Where We Are Heading

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The practice of nuclear medicine and diagnostic imaging is growing on the North American continent, particularly in the United States. This growth has occurred despite some well-publicized problems with volatile reimbursement rates, delayed government approval of new radiopharmaceuticals, and manpower shortages. Continued growth is expected as the population born during the 1947–1962 "baby boom" years ages and develops more health care needs.

As witnessed by the scientific presentations at the Society of Nuclear Medicine's most recent Annual Meeting this past June in Los Angeles, diagnostic nuclear medicine's role continues to increase and expand into new areas. In many disease processes, nuclear medicine not only diagnoses the presence and extent of disease, but it also serves as a prognostic indicator and monitors the effectiveness of treatment. Advanced molecular imaging may offer the promise, in the future, of matching the therapy to the individual, but it is already apparent that sequential evaluation with available single photon and PET techniques will become very important in optimization of therapy for heart disease, cancer and other diseases.

PET continues its spectacular growth in North America, with the availability for reimbursement of PET procedures driving the expansion. Between 1998 and 2002, coverage for dedicated PET scans has expanded to include 12 new diagnostic indications, mostly for the diagnosis of cancer. With the introduction of PET/CT, industry analysts in the United States and Canada forecast that orders and sales of this equipment will continue this positive trend, and the expansion of PET and PET/CT will be robust. Use of FDG is growing rapidly, demonstrating dynamic growth in 2001 and 2002. There are still some regulatory questions that have not been finalized for FDG, nor have the regulations that will apply to the general use of other PET radiopharmaceuticals been finalized.

In the U.S. and Canada, nuclear cardiology continues to be a large part of the diagnostic nuclear medicine volume. Nuclear Cardiology currently accounts for 42 percent of diagnostic nuclear medicine procedures, and this sector's growth has been crucial to the radiopharmaceutical industry. A number of single photon radiopharmaceutical applications are in the regulatory pipeline.

Radioimmunotherapeutics is emerging with the introduction of the Y-90-labeled anti-CD22 agent, Zevulin, in February, 2002. Several other agents are currently being studied in manufacturer-sponsored clinical trials.

The digital age has led to a revolution in workflow in many nuclear medicine departments. Picture archiving and communication systems (PACS) are now installed

in many medium-sized and large hospitals, with the disappearance of film from these departments. There are obvious efficiencies in the imaging department when the staff no longer has to wait for films to be developed, when films no longer need to be filed and retrieved, and when clinicians can see their patients' studies immediately. Image co-registration leads to more accurate diagnosis and the digital archive is soon translated into improved teaching materials and conferences.

In my own subspecialty, pediatric nuclear medicine, there has been steady growth. Instead of a practice that is largely cardiology and oncology, nuclear medicine practice at leading pediatric teaching hospitals is 50 percent or more GU imaging, followed by bone imaging, GI studies, and imaging with tumor avid radiopharmaceuticals. A unique pediatric application that has been invaluable is I-123-MIBG imaging in neuroblastoma. PET imaging looks promising in pediatric oncology, and multi-center therapy studies are underway.

Nuclear medicine has always been the way to demonstrate physiologic processes in a spatial, anatomic context. Nuclear medicine has always been molecular imaging, but, as our understanding biochemistry, immunobiology and molecular biology has progressed, we have acquired considerable sophistication in the design of radiopharmceuticals. Our ability to demonstrate interactions with antigens, receptors, and macromolecules, and even demonstrate the functional status of individual genes has thus moved forward.

I look forward to sharing our experiences in North America, and to having a more expansive discussion of these topics and others with my esteemed colleagues during the Japanese Society of Nuclear Medicine's 2002 Annual Meeting in Kobe.