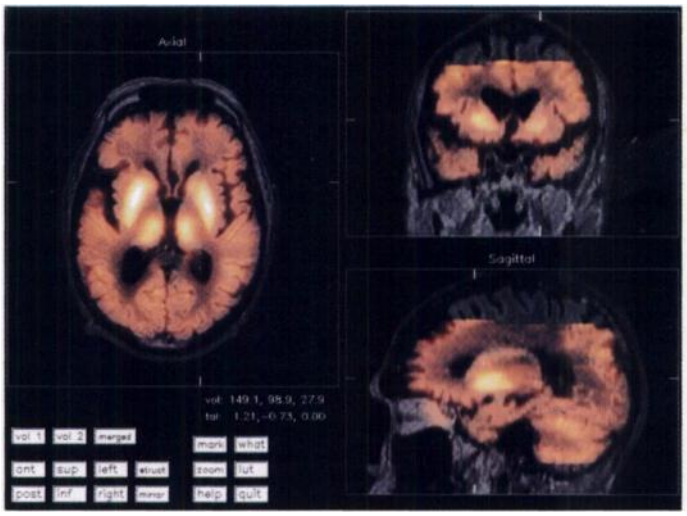
Nuclear Neurology 1996: From Medical Technology to Medical Practice

When "brain" imaging with ^{99m}Tc as pertechnetate became available in the 1960s, the clinical practice of neurology was changed forever. No longer did the neurologist have to listen to a history, perform a neurologic exam and decide whether an invasive angiogram needed to be performed. The radionuclide brain scan provided a convenient, noninvasive, readily available method to assess, for example, if the patient with persistent headaches and a negative neurologic examination represented the early presentation of a brain neoplasm. Other patients with sudden onset of hemiplegia could be assessed for major perfusion defects versus small-vessel disease versus a neoplasm masquerading as a stroke. As gamma cameras became more widely available, dynamic flow imaging further augmented this examination. This technique became one of the most frequently performed nuclear medicine examinations before it was replaced initially by computerized tomography and more recently, by magnetic resonance imaging.

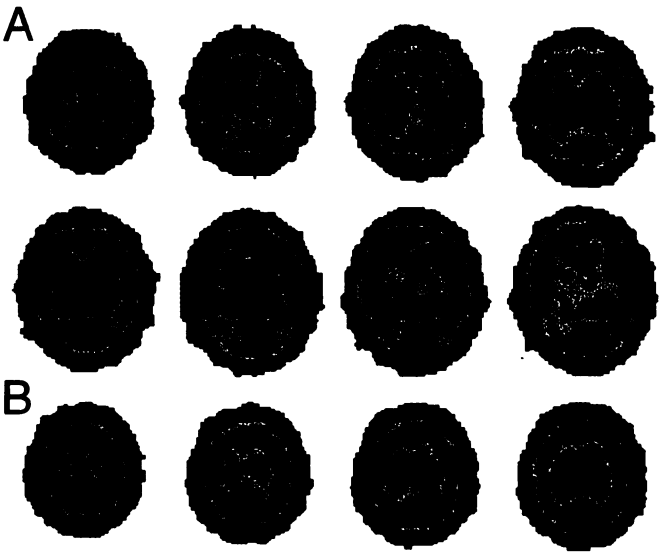
The radionuclide procedure which changed the way neurologists evaluated the brain was in fact, a "nonbrain scan". The radionuclide used was excluded from the normal brain. Many investigators looked forward to the availability of a "true" brain imaging agent. In the early 1970s, Dr. David Kuhl, began telling us that we could (and should) be looking at tomographic slices of the brain obtained by recording from multiple sites around the head, even with single-photon emitting agents. A few centers promised us that PET could do even more wonderful things for brain imaging. When ^{18}F-deoxyglucose was synthesized, a portion of the nuclear medicine community began to believe these promises. Whereas much investigation and evaluation remain to be done, it is hard to believe how far the application of radionuclide imaging to neurologic problems has come as a medical technology, as a medical science and as a medical specialty in the relatively short interval since those days.

The reports in this issue span a wide range of applications of PET and SPECT in the evaluation of disorders of the brain. In this era of heightened economic awareness, and perhaps because of it, there are articles in this issue addressing the effect of cerebral SPECT on clinical management and the role of PET imaging in determining the clinical outcome following temporal lobe resection for refractory seizures. Both PET and SPECT techniques are relevant to assess dopamine physiology and pharmacology, Parkinson's disease, seizure disorders, measurement of cerebral blood flow, the effect of neuro-active pharmaceuticals, the assessment of cerebral trauma, HIV and other infections, headaches and decompression illness.

This issue of *JNM* brings further evidence to the conclusions reached in "Assessment of Brain SPECT", a Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology (*Neurology* 1996;46:278–285), which is recommended reading for all those interested in the techniques of brain SPECT, and by extension, brain PET. Nuclear medicine physicians, scientists and technologists can be pleased that our techniques are truly becoming an inherent part of the practice of neurology and have a firm place in the clinical investigation of psychiatric disorders.



Merged display of registered MRI and FDG-PET volumes of a patient with Stage 2 ADC. See pages 1133–1141.



Transaxial tomographic images in a diver who has experienced decompression illness (A) and a diver who has not (B). See pages 1154–1158.

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