

Neuro Nuclear Medicine: Dawn or Sunset?

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Advances in Nuclear medicine are closely related to the progress of both tracers and instrumentation. The availability of IMP combined with improvements in SPECT techniques resuscitated in Neuro "Nuclear" Medicine (N.N.M.). So one is today entitled to ask the following questions: How?, When?, Still?, and as a conclusion whether N.N.M. is at its Dawn or at its Sunset?

HOW: this term applies to the way examinations should be performed. Neuro Tomo imaging modalities have shown that not only axial views should be used, but that the three axes are necessary in order to increase the sensitivity of the technique, and the appreciation of the anatomical localization and extension of lesions. This means that either rotating gammacameras or "whole volume" SPECT dedicated machines are necessary to perform brain SPECT.

WHEN: this word asks which indications of N.N.M. can be studied: perfusion agents are or should be useful in vascular pathology, localization of Epileptic Foci, differential diagnosis in Degenerative Dementia's and in certain evaluations of treatment efficiency. Although brain SPECT is of no help for the diagnosis of Stroke, it is the only atraumatic one permitting the localization of the involved territory immediately following the accident. In conjunction with either Acetazolamide or brain blood volume determination, the assessment of vascular reserve, and in a certain way, the prognostic can be approached.

Agents such as HMPAO (and unlike IMP) are useful in case of thrombolysis as they can show the efficiency of the therapeutic act. In some cases (depressions, Parkinson's disease), modification of brain perfusion may have some predictive value about the efficiency of the drugs used.

The availability of iodinated SPECT neuro-

receptors agents leads to a much better approach to brain physiopathology. If the major indications are probably the appreciation of neuroreceptors distribution and availability in different pathologies (serotonergic in degenerative dementias, D2 dopaminergic in Dopa or BZD treatments, opiate in drug abuse . . .), then the daily perfusion will always have to be determined before making any conclusions from neuroreceptors studies.

Specific therapy with labelled monoclonal antibodies of gliomas has still to prove its efficiency; but nonspecific intracavitary radiotherapy of brain cystic tumors has shown already its usefulness.

STILL: refers to "conventional" brain imaging. Use of non diffusible agents is of some help in the evaluation of Brain Blood Barrier alteration before intra—extra cranial by-pass surgery. In the case of lateral sinus thrombosis, or if a patient with intra cranial aneurism is treated with radiosurgery, then studies with labelled erythrocytes are useful if compared with other neuro imaging modalities.

DAWN or SUNSET: Instrument companies have made a real step forward in the domain of dedicated instruments, but radiopharmaceutical companies need to focus on the development of new tracers in the field of neuroreceptors, and protein synthesis. If labelled monoclonal antibodies were to prove their efficiency in the area of specific diagnosis and treatment of brain gliomas, then this would be a major advance in the management of this pathology.

IN CONCLUSION, Neuro Nuclear Imaging can be considered at its dawn, if the nuclear physicians understand and make communicate to the neurologists that there is no competition between Neuro Nuclear Medicine and other imaging modalities. If SPECT is far behind C.T. and

N.M.R. in the anatomical description of a lesion, it is the only technique (with PET) that gives such detailed physiological data. This last point should be kept in mind, otherwise Neuro Nuclear Medi-

cine might reach its sunset quickly, especially when clinicians will have to choose between the investments for C.T., N.M.R., or SPECT machines.