

Special Lecture 3

Usefulness of Positron Emission Tomography as a New Neurodiagnostic Tool

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Positron emission tomography (PET) is a new technology which produces quantitative and three-dimensional images of biochemical processes, hemodynamics, and pharmaco-kinetics. Such images are facilitated by the fact that the basic biological and chemical elements are available as positron emitting tracers (carbon-11, nitrogen-13, and oxygen-15).

Abnormal biochemical changes generally precede morphological changes in organs. PET, through its ability to detect these initial abnormalities in organs, has enormous potential as an early and sensitive diagnostic tool. It is also the logical tool for determination of cause and evaluation of therapy in certain diseases.

In the past few years several PET technologies have been devised as neurodiagnostic tools to investigate certain pathological states and the physiological state of the central nervous system. However, all PET techniques currently available for study of regional cerebral blood flow and regional metabolic states have their own merits and limits of applicability. I would like to review these factors. As well, I would like to discuss the usefulness of combined studies of regional cerebral blood flow and regional metabolic rates. These combined studies may prove useful in providing prognostic information and a basis for selecting specific treatment for the individual patient.