Clinical evaluation of single photon ECT using universal gamma camera. We assessed simultaneously among 36 ages of transaxial and frontal and sagittal were taken for ECT of the liver, the composite display of ECT and XCT contour image and the reconstruction of arbitrary axis tomograms. For ECT of the liver 60 profile images were taken with sampling time of 10sec after intravenous injection of Tc-99m phytate (5-10 mCi). Three dimensional tomographic images (Toshiba, GCA 401-5), particularly about the clinical evaluation of ECT of the liver, clearly revealed as focal morphology and combining different useful tomograms from XCT at the same slice level has proved useful for complementary evaluation of lesion combining different informations about morphology and function of organs or tissue. The reconstruction of the arbitrary axis tomograms from ECT images was found to be useful for exact evaluation of organs existing obliquely to the body axis, such as heart and kidney.

Application of single photon ECT for dynamic study. We evaluated feasibility of dynamic study in form of ECT using a rotating gamma camera. Since sensitivity of gamma camera is rather limited and takes a time to sample data one around the body, it seemed to be difficult to follow a dynamic process. However dynamic study can be imaged in a tomographic slice under following conditions: 1) physiological gated process. 2) slow clearance process and 3) steady state process. Gated studies applied for heart pumping action synchronized with ECG. To reduce a sampling time, half around 180° data sampling was adopted. Namely, data acquisition time of blood pool study with 99m-Tc-RBC took about 15 min and 30 min for 201-Tl myocardial study. These seemed to be feasible. The ECG gated heart ECT was especially useful to emerge a subtle wall motion abnormalities which an ordinary gated study could not be resolved. On the functional ECT for slow dynamic process of tracer, we adopted to excretion process from hepatobiliary system in order to calculate clearance rate. The liver ECTs were obtained sequentially from 15 to 70 min after injection of 10 mCi of 99m-Tc-EHIDA. Steady state ECT was performed to calculate rCBF by continuous injection of 81Kr saline. This technique was also feasible and clinically useful.

Positron CT study for cerebrovascular diseases. We are performing positron CT (PECT) in neurological diseases, particularly in ischemic cerebrovascular diseases. We found some superiority in PECT rather than in usual neuroradiological diagnostic tools. We have been studying the cerebral circulation and metabolism of ischemic brains in ischemic patients with PECT in order to study the state of blood volume, glucose utilization, and metabolic studies. In patients with cerebral ischemia, axonal atrophy in gray matter was observed. The other difference is the accumulation of 18F-PDG and 13NH3 in fresh infarctions. In epilepsy, the uptake of 11C-MAP in the epileptogenic focus is well visualized in PECT, particularly in glucose imaging. Additionally, PECT imaging was very useful to evaluate the effect of bypass surgery.