67Ga-Citrate 30 cases Accumulation of R.I. 169Yb-Citrate 6 cases Accumulation of R.I.

Malignant 23,  
Primary 4 4 0 0  
Ewing's sarcoma 1 1 0 0  
Haemangiosarcoma 1 1 0 0  
Myeloma 1 1 0 0  
Rhabdomyosarcoma 1 1 0 0  
Metastasis 18 14 0 4  

Benign 7,  
Fibrous dysplasia 3 3 0 0  
Fibrous cortical defect 1 0 0 1  
Desmoplastic fibroma 1 0 0 1  
Soft tissue tumor 2 0 0 2  

Differential Diagnosis of Brain Tumor and CVA and Visualization of Soft Tissue Malignancies by Using 99mTc-Polyphosphate, Pyrophosphate, & Diphosphonate (99mTc-Ps)

Tokyo Metropolitan Geriatric Medical Center, Tokyo

The new bone seeking radiopharmaceuticals, 99mTc-Ps, were wildly used for surnaying various type of bone diseases. Among our data, it was observed that the accumulation of radioactivity not only to the metastatic portions of bone but also to the primaries such as brain or lung tumor, etc.

The purpose of this study is to discuss the value of 99mTc-Ps as a tumor scan agents. Twelve cases of various type of malignant tumors, eleven cases of brain tumors, and seven cases of other begin brain diseases, were examined by 99mTc-Ps. Ten millicuries of 99mTc-Ps is injected intravenously, and scanning or imaging were performed 2 hours later. Routine brain scans were also performed to the brain tumors or other brain diseases by 99mTc-pertechnetate.

Four cases out of twelve malignant tumors (except brain tumors) examined high concentration of 99mTc-Ps to primary area or to metastate lesions. Others were difficult to identifying due to hevey accumulation to the bone, and or kidney or bladder.

Ten cases out of eleven successful visualization of brain tumors are made by both 99mTc-Ps, and 99mTc-pertechnetate. Even though 99mTc-pertechnetate gave faint visualization of lesion, 99mTc-Ps. accumulated to this lesion. Two cases with brain axis tumors were examined also these two labels. 99mTc-Ps. scan were found to be more of value, since it disclosed the size & extent of lesion which was covered by adjacent activities in conventional 99mTc-pertechnetate scan. Among them, six cases were histologically proved by operation or autopsy.
Seven cases of other brain diseases such as CVA, AVM, or traumatic hemorrhage, were studied also by these two labels. In these cases, conventional $^{99m}$Tc-pertechnetate scan were found to be of value since no accumulation of $^{99m}$Tc-Ps. to these not malignant brain diseases was observed. This fact could be used for the immediate differentiation of CVA from malignant brain neoplasm.

Animal study was also performed in tumor bearing rabbit with VX$_2$ tumor. Tumor size was approximately 5 cm in diameter had central necrosis and subcutaneous infiltration to the back of the animal. Tumor accumulates $^{99m}$Tc-Ps, however, no activity was found in the necrotic areas.

In summary, in addition to the previously reported tumor scan agents, $^{99m}$Tc-Ps were found to be of value as a tumor scan agents. Among several soft tumor visualizations, authors are especially impressed by the value of brain tumor diagnosis by $^{99m}$Tc-Ps. Some cases with faint visualization by $^{99m}$Tc-pertechnetate were clearly visualized by $^{99m}$Tc-Ps. This strongly suggest us, the brain scan with two $^{99m}$Tc-labels, $^{99m}$Tc-pertechnetate and $^{99m}$Tc-Ps should increase diagnostic accuracy and probably serve for immediate differentiation of brain tumor from CVA.

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**Study for Diagnosis of Breast Carcinoma by the Measurement of Tumor Blood Flow using $^{133}$Xe Clearance**

H. Munechika, I. Aida, Y. Koga and S. Hirabayashi

*Department of Radiology, School of Medicine, Showa University, Tokyo*

T. Sato and K. Shimizu

*Department of Surgery, School of Medicine, Showa University, Tokyo*

The investigation on correlation among blood flow, histological pattern and capillary quantity was carried out in the breast carcinoma.

The blood flow of tumor was calculated from a half time ($T_{1/2}$) examined by $^{133}$Xe clearance curve and following formula.

\[
\text{BLOOD FLOW (ml/100g/min)} = 100 \cdot \lambda \cdot \log_{e} 2/T_{1/2}
\]

The angiography was performed on the resected breast tissue. The resected breast tissue was made into slices of 2-4 mm thick after fixation and microangiography was taken.

As a results, 1) significant difference was observed in blood flow between scirrhous carcinoma and others but not between medullary tubular carcinoma and papillary tubular carcinoma. 2) Capillary quantity was poorer in scirrhous carcinoma than in medullary tubular carcinoma as well as in papillary tubular carcinoma.

In the breast carcinoma, blood flow as well as capillary quantity were by no means identical according to the histological pattern and there was a good correlation between blood flow and capillary quantity.

It is possible to differentiate scirrhous carcinoma and benign tumors at 10.0 of blood flow but could not necessarily be confirmed.