

Skeletal Dose Estimation of the Patient Administered Ytterbium-169 Citrate by MIRD Method

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Ytterbium-169 citrate has recently been put into medical use for external imaging of tumor tissues. The skeletal absorbed dose received by the patient was estimated in accordance with the MIRD Committee method. 500 micro-curie intravenous injection proved to result in 13 rads in skeleton, with the most important contribution of the internal conversion electrons emitted in the electron capture decaying process of the nuclide. If the electron components (internal

conversion electrons and Auger electrons) are to be weighted by the relative damage factor ($n=5$) as was recommended by the ICRP, the skeletal dose equivalent for 500 micro-curie injection turns out to be 46.5 rems. The contribution of the penetrating radiations originating in other organs was found to be negligibly small. The average total body dose was approximately 2 rads.

Experience of the Radioisotope Scanning in the Bone and the Soft Tissue Tumors

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^{67}Ga -Citrate, ^{169}Yb -Citrate and ^{85}Sr were used in the scanning of the primary or secondary tumors of the bone and soft tissue to obtain the site or enlargement of the lesion and to determine the radiation field.

30 cases in ^{67}Ga (0.5~2 mCi.), 6 cases in ^{169}Yb (300~500 $\mu\text{Ci.}$) and 2 cases in ^{85}Sr (100 $\mu\text{Ci.}$) were examined.

Result is as follows.

⁶⁷ Ga-Citrate 30 cases	Accumulation of R.I.				¹⁶⁹ Yb-Citrate 6 cases	Accumulation of R.I.			
Malignant 23,	++~+	±	—		Malignant 2,	++~+	±	—	
Primary	4	4	0	0	Osteogenic sarcoma	1	1	0	0
Ewing's sarcoma	1	1	0	0	Myeloma	1	1	0	0
Haemangiosarcoma	1	1	0	0	Benign 4,				
Myeloma	1	1	0	0	Fibrous dysplasia	2	2	0	0
Rhabdomyosarcoma	1	1	0	0	Desmoplastic fibroma	1	0	0	1
Metastasis	18	14	0	4	Fibrous cortical defect	1	0	0	1
Benign 7,					⁸⁵ Sr				
Fibrous dysplasia	3	3	0	0	Malignant 1,				
Fibrous cortical defect	1	0	0	1	Metastasis	1	0	0	1
Desmoplastic fibroma	1	0	0	1	Benign 1,				
Soft tissue tumor	2	0	0	2	Fibrous dysplasia	1	1	0	0

Differential Diagnosis of Brain Tumor and CVA and Visualization of Soft Tissue Malignancies by Using ^{99m}Tc-Polyphosphate, Pyrophosphate, & Diphosphonate (^{99m}Tc-Ps)

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The new bone seeking radiopharmaceuticals, ^{99m}Tc-Ps. were widely used for surmaying 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 ^{99m}Tc-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 ^{99m}Tc-Ps. Ten millicuries of ^{99m}Tc-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 ^{99m}Tc-pertechnetate.

Four cases out of twelve malignant tumors (ex-

cept brain tumors) examined high concentration of ^{99m}Tc-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 ^{99m}Tc-Ps. and ^{99m}Tc-pertechnetate. Eventhough ^{99m}Tc-pertechnetate gave faint visualization of lesion, ^{99m}Tc-Ps. accumulated to this lesion. Two cases with brain axis tumors were examined also these two labels. ^{99m}Tc-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 ^{99m}Tc-pertechnetate scan. Among them, six cases were histologically proved by operation or autopsy.