system at the treatment ward was stopped during the measurements. The results of measurements showed that I-131 concentration ranged from order of 10^{-8} to 10^{-10} micro-curies per m*l* of air during 8 hours between the 1st and the 3rd day, suggesting that volatilization ratio ranged from order of 10^{-5} to 10^{-5}.

Radioiodine Treatment of Thyroid Cancer: with Special Reference to the Whole Blood Radiation Dose

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Nine patients were treated 11 times with radioiodine-131 for the metastatic lesions from thyroid cancer. The age ranged 19 to 67 (average: 44.8), and the dose 120 mCi to 220 mCi (average: 175.5 mCi).

Total throidectomy had been performed in all but one prior to the dose. Whole blood beta dose was calculated from the blood samples, which were taken at 1, 3, 6, 12, and 24 hours after the oral administration of radioiodine, and thereafter once every day for the period of 11 to 16 days.

The residual dose in each patient was estimated from the urinary excretion of radioiodine, for which a 24- hour urine samples were collected for the period of 4 to 11 days. Both beta and gamma doses were calculated by a computer, HITAC-M 160 II, using a sliced method.

The beta dose ranged 26.8 rads at least with 150 mCi to 160.3 rads at most with 160 mCi. The gamma dose ranged 16.6 rads at least with 200 mCi to 144.6 rads at most with 150 mCi. Now, the total dose ranged 51.1 rads at least with 200 mCi to 245.6 rads at most with 150 mCi.

As for the residual dose, the case presented the lowest whole blood dose showsd 36.9 mCi at 24 hours and 8.7 mCi at 48 hours whereas the case of the highest whole blood dose showed 88.8 mCi at 24 hours and 53.2 mCi at 48 hours. Better correlation between the residual dose and the whole blood radiation dose was found for the gamma as well as for the gamma plus beta, but less for the beta.

Bone marrow examination revealed a decrease of nucleared cell count in 3 of 6 cases during 9 to 15 days post dose but 2 of them recovered within 3 to 9 months. The remaining one was not examined afterwards.

Nine cases as a total had their marrow studies between 3 and 9 months after the dose, which revealed a decrease of nucleated cell count in 2.

Although 5 out of 9 patients have died, the cause of death had nothing to do with the bone marrow suppression.

Nuclear Medicine in Primary Hyperparathyroidism

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In order to clarify the role of nuclear medicine in primary hyperparathyrodism (6 bone, 4 stone, and 3 chemical type), we studied, using the redioisotopic methods, the plasma immuno-reactive parathyroid hormone (i-PTH) level, the presence of bone lesion and the localization of abnormal parathyroid glands. Diagnosis of primary hyperparathyroidism was done by excluding other causes of hypercalcemia.

Plasma basal i-PTH was markedly high in all bone type, while the majority of both other types showed normal i-PTH level. The presence and ex-

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tension of bone lesion were estimated by bone scintigraphy and bone mineral content (BMC) measured by photon beam absorption method. All bone type showed the abnormal accumulation of isotope in skull and bornw tumor. Also, low BMC value was observed in all bone type. On the other hand, no significant differences were found between other 2 types and normal control in regard to bone scintigraphy and BMC. The measurement of BMC could be utilized to observe the post-operative change of bone lesions. Synthetic human (1–34) PTH was assayed in thryroid venous blood obtained from thyroid catheterization. Immunoreactive PTH in thyroid vein under hyperfunctioning parathyroid gland showed high level.

Combining with this method and thyroid venography, the lesions of abnormal parathyroid gland was correctly identified in 6 of 8 cases. Either thyroid or parathyroid scintigraphy was less valuable to depict the abnormal parathyroid gland.

In conclusion, it is a sueful aid in diagnosis, estimation of bone lesion and identification of abnormal parathyroid gland to employ nuclear medicine in primary hyperparathyroidism.

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