From these results, it is concluded that MDP before first hour after administration with HMDP and 23 with MDP by scintimetry. In order to estimate the uptake of these agents by bone and soft tissue, a bone-to-soft tissue ratio was significantly higher than that of MDP. Although this ratio of HMDP was not significantly higher than that of MDP before first hour after administration, the former became gradually higher than the latter, and difference was significant 2 hour after administration.

Overall, HMDP image was judged to be slightly better than MDP in quality and grading by three independent observers. From these results it is concluded that HMDP is a useful skeletal imaging agent.

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A new method for measurement of 24-hour whole-body retention of Tc-99m MDP using a thyroid uptake probe was established and its clinical significance was evaluated in various bone diseases.

1) Reproducibility of 24hr WBR in 9 patients was very good (r=0.997).

2) 24-hour WBR of normal adult males (n=5) was 30.0±4.9%, which was significantly elevated compared to the result reported by Fogelman (WBR of Tc-99m HDP: 19.2±1.7%).

3) No significant differences were noted compared to the groups of benign disorders (n=5, WBR: 31.7±3.9%) and malignant tumors without bone metastasis (n=13, WBR: 30.1±3.6%). However whole-body retentions of the groups of chronic renal failure (n=4, WBR: 97.4±2.4%), malignant tumors with bone metastases (n=6, WBR: 45.7±8.0%) and hyperthyroidism (n=4, WBR: 40.7±6.1%) were significantly elevated. WBR of steroid-induced osteoporotic group was significantly decreased (n=5, WBR: 18.3±6.8%).

Based on these results, this thyroid uptake probe method was simple, reproducible and accurate to measure 24-hour WBR of Tc-99m MDP. Quantification of WBR of Tc-99m MDP was of great clinical value to diagnose metabolic bone disease and to follow-up metabolic and metastatic bone diseases.

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We applied a new position for pelvic bone scintigraphy in order to distinguish the pubic bones from radioactivity in the bladder. The position is as followed: A patient lies in lithotomy position. Gammacamera is set over against his buttocks. This view gives us an image of looking up his pelvic bottom. Then pubic bones are separated from the shadow of urine on the film. Public bones and the shadow of urine which were inseparable on the conventional anterior view were separated top and bottom on the film using our new position. We named this new position as LITHOTOMY-LIKE-POSITION or PELVIC-AXIAL-POSITION. In 47 cases which showed equivocal scans as for pubic bones, 40 cases (85%) were diagnosed correctly by using our new position. This result suggested that our new position was very useful to examine the pubic bones.

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In the conventional bone imaging (CBI), it is not always easy to detect and localize the disease especially in the portion composed of multiple complex bones. In this study ECT was evaluated in the imaging of basal skull and facial bones, comparing CBI. The system was GCA-70AS, manufactured by Toshiba Corporation, composed of two opposed large-field-of-view gamma cameras. Four hours after i.v. injection of 15 mCi of Tc-99m MDP, ECT scan was performed by rotating the cameras 180° about the patient's longitudinal axis. The scanning time was 1-3 min. Transaxial, sagittal and coronal sections were reconstructed by convolution algorithms. As activitie concentrated in various complex bones are separated in the ECTI, the petrous bone, clivus and sella, which could not be visualized in CBI, were identified in ECTI. The sphenoid and ethmoid sinus could also be identified separately in ECTI, while these were seen only as the sphenethmoid complex in the CBI. Further advantage of ECTI was that a little difference of radioactivity could be appreciated because background activity and overwhelming bone activities are separated. We have experienced several patients with sinusitis in whom abnormal concentration and exact location of the disease could be detected only by ECTI.