

ABSTRACTS OF CURRENT LITERATURE

Comparison of Computed Tomography with Radionuclide Tomography in Chest Diagnosis. Makoto Takayama, Naofumi Katayama, Kenji Kawakami, and Shimpei Tada. *Jap J Nucl Med* 16: 695, 1979

In intrathoracic diseases abnormal accumulations of Ga-67 citrate detected by radionuclide tomography using the PHO/CON were compared with the findings on the CT images obtained with ACTA 0100. The diagnostic efficacy of the RN tomograph and CT on anatomical localization of the lesion detected by both methods were discussed. A comparative study was performed in 30 cases of malignant tumor of the lung and the mediastinum, 12 cases of primary lung cancer, six cases of metastatic lung cancer, two cases of malignant lymphoma, and ten others. Eighteen of the 30 cases showed definite evidence of enlarged mediastinal lymph nodes and/or hilar lymph nodes either by plain chest film, chest tomography, or CT. According to localization of Ga-67 deposit the patients were divided into three groups: (a) those with accumulation in mediastinal region; (b) the hilar region; or (c) the lung field. The localization of lesions in each group was compared with the findings on the CT image, and these correlated in all except one case.

The PHO/CON can facilitate the localization of Ga-67 accumulation by tomography, and it appears possible to identify anatomically subdivided mediastinal lymph node groups by the combined study of RN tomography and CT.

Accuracy of Liver Scintigraphy in Focal Liver Disease—A Comparison with Postmortem Studies in 159 Cases. H. J. Biersack, B. Helpap, E. Bell, R. Vogt, H.-P. Breuel; Bonn, Germany. *Nucl-Med (Stuttg)* 18: 177-180, 1979

The authors compared results of hepatic scintigraphy with postmortem findings in 159 patients. The study includes 139 patients with malignant disease and 20 with primary liver tumors. A 3-day to 1-yr interval separated scintigraphy and autopsy. Following i.v. injection of Tc-99m sulfur colloid the patients were examined in ventral, dorsal, and right lateral position. Seventy-eight studies were done with a rectilinear scanner, and 81 with a gamma camera. The authors found 62 of the 139 patients with nonhepatic primary malignant disease to have metastases in the liver, whereas in 77 cases no liver involvement was found at autopsy. Fifty of 62 livers involved in malignant disease had lesions visualized with scintigraphy (true positive = 80.6%). Fifty-six of 77 scans gave true-negative findings (72.7%). False-negative results (19.4%) were found in: (a) diffuse metastatic infiltration (n = 4); (b) lesions with a diameter less than 2 cm (n = 5); and (c) when lengthy intervals existed between scintigraphy and autopsy (n = 3). False-positive results occurred in: (a) diffuse parenchymatous disease (n = 9); (b) with lesions suspected at the hepatic hilus (n = 3); (c) in obstructive jaundice (n = 3); and (d) without known cause (n = 6). Twenty patients had primary hepatic tumors. Seven benign (parasitic, cystic) lesions were identified scintigraphically, and 11 of 13 hepatocellular carcinomas had true-positive scans. The diagnostic accuracy of the rectilinear scanner and the gamma camera were practically identical.

Dose Dependent Uptake of ¹²⁵I-Toluidine Blue and of ⁷⁵Se-Selenomethionine in the Parathyroids of Rabbits. E. Normann, T. Eide,

P. Lung, T. Normann; Oslo, Norway. *Eur J Nucl Med* 4: 453-455, 1979

The authors studied the influence of dose alteration and of glucagon infusion on I-125 toluidine blue and [⁷⁵Se] selenomethionine uptake by the parathyroids. Rabbits with a weight of 3.3-5.5 kg were used. Under anesthesia the parathyroids and the thyroid were exposed. Following i.v. injection of I-125 toluidine blue, animals were sacrificed at 1 and at 2 min. Four groups of animals were studied; each group was given either 0.8, 0.16, 0.32, or 0.64 mg I-125 toluidine blue. The dye had a specific activity of 1766 mBq/mmol. Following i.v. injection of 1.85 mBq/kg body wt [⁷⁵Se] selenomethionine, animals were sacrificed at 20 min. Parathyroids, thyroid tissue, and neck muscles were removed and weighed. Tissue radioactivity was determined in a well counter. Two groups of animals had glucagon infusion of 0.15 mg/kg in 20 ml saline. Total serum calcium and albumin were determined, before and after the infusion. One group received 0.32 mg/kg I-125 labeled toluidine blue, the other 1.85 mBq/kg [⁷⁵Se] selenomethionine, after the glucagon infusion. The animals were sacrificed at the same times as those that had not received glucagon. The authors found that I-125 toluidine blue concentration in the parathyroids calculated as percentage of injected dose was greatest when 0.16 mg/kg body wt of the labeled dye was injected and that uptake was reduced when tracer administration was raised or lowered. Glucagon infusion resulted in decreased serum calcium and in an increased parathyroid/thyroid uptake ratio of the labeled dye from 2.8 to 4.5 during the first minute. The absolute percentage of I-125 toluidine blue uptake by the parathyroids, or the parathyroid/thyroid ratio, was the same for both groups and was not influenced by glucagon infusion. Also the [⁷⁵Se] selenomethionine uptake per gram tissue was not influenced by prior infusion of glucagon. The authors conclude that glucagon will not measurably influence parathyroid uptake of I-125 toluidine blue, or [⁷⁵Se] selenomethionine, and that the labeled dye will show dose dependent uptake.

Clinical Evaluation of Thallium-201 for Breast Tumors. Hisashi Sawa, Teruo Fukuda, Michinao Itami, Rokuro Arai, Takashi Furukawa, Shigeru Harada, Nobuaki Tsuchihashi, Shunichi Fukakusa, and Hirotake Kakehi. *Jap J Nucl Med* 16: 321, 1979

Scintigraphy using thallous chloride Tl-201 was performed for the detection of the breast cancer in 22 patients. In the scintigraphic images of 15 cases of the breast cancers, accumulations of the activity were detected corresponding to the mass in 12 cases (nine infiltrating medullary adenocarcinomas, one infiltrating ductal adenocarcinoma, one mucinous carcinoma, and one scirrhous carcinoma) and no accumulation for three cases (scirrhous adenocarcinoma, one Paget's carcinoma, and one infiltrating medullary adenocarcinoma). On the other hand, seven benign breast tumors (six adenofibromas and one cyst) showed no deposit of activity with the exception of one case that appeared to be very large (6.0 × 5.5 × 4.0 cm). From these results we can assume that Tl-201 tends to readily accumulate in the malignant breast tumors and rarely in benign ones. Thus it is useful to examine breast cancers by the isotopic method using Tl-201 as a radiopharmaceutical.

Noninvasive Diagnosis of Left Ventricular Pseudoaneurysm—Role of 2 Dimensional Echocardiography and Radionuclide Gated Pool Imaging. R. J. Katz, A. Simpson, R. Dibiainco, P. D. Fletcher, H. R. Botes, and B. J. L. Sauerbrunn; V. A. Medical Ctr, Washington DC. *Am J Cardiol* 44: 372–377, 1979.

The authors report a case of left ventricular pseudoaneurysm initially recognized by two-dimensional, real-time echocardiography. When this procedure was supplemented with radioisotope gated cardiac blood pool scanning, the noninvasive studies demonstrated combined true and false left ventricular aneurysms. A 66-year-old man with a 2-yr history of hypertension developed chest pain over 5 days. The electrocardiogram revealed a pattern typical of posterior wall infarction, but the chest radiograph was normal. Approximately 4 mo later, he awoke with chest pain. The EKG showed a new lateral transmural infarction, and the chest radiograph demonstrated a large posterolateral paracardiac mass. The M mode echocardiography showed a large 7.2-cm echo-free space posterior to the left ventricular free wall. The two-dimensional real-time echocardiographic study using the apical four-chamber views revealed a large echo-free, noncontractile space that communicated with the hypocontractile left ventricular cavity through a narrow channel in the ventricular free wall a few centimeters below the mitral valve. Radioisotope gated cardiac blood pool imaging with Tc-99m red blood cells also demonstrated a large noncontractile chamber connected to the high lateral ventricular wall by a narrow waist. Additionally, a small paradoxical bulge was visualized on the posterior left ventricular wall, suggestive of a true aneurysm. The authors conclude that left ventricular pseudoaneurysm can be diagnosed using two-dimensional echocardiography and nuclear imaging, permitting early operative intervention before fatal rupture.

Bone Scintigraphy with ^{99m}Tc-Methylene Diphosphonate in Parodontopathy. S. Hofmann, H. J. Biersack, and R. Knopp; Bonn, Germany. *Nucl-Med (Stuttg)* 18: 189–192, 1979

The authors evaluated skeletal scintigraphy in parodontitis marginalis profunda. Twenty persons were examined—12 had radiographic evidence of the disease and eight normal subjects served as controls. Patients were examined with a gammacamera 2–3 hr after i.v. injection of 15 mCi Tc-99m MDP. Scintigrams, each containing 500,000 cts, were made in the anterior and in right and left lateral positions. The scintigraphic data collected on tape were evaluated with a computer using region of interest (ROI) technique. ROIs were placed over the right or left maxilla and mandible as well as over the occipital bone, which served as reference ROI. ROIs were equal in area. The count rate density ratio of jaw-to-occipital bone was determined. The authors found increased radioisotope uptake in parodontopathy in the maxilla and mandibula. The mean ratio of right maxilla- or mandibula-to-occipital bone was 1.54, with only one patient demonstrating a ratio less than 1.30. The mean ratio of left upper or lower jaw-to-occipital bone was nearly 1.7, and only two patients had a ratio below 1.3. In comparison, the mean ratio for the controls was approximately 1.0. The authors believe that skeletal scintigraphy can be used for early detection of parodontopathy and in the evaluation of treatment.

A Rabbit Model to Study the Biokinetics of Radiopharmaceuticals in Bone. R. A. Khan, J. P. Lavender, and S. P. F. Hughes; London, England. *Eur J Nucl Med* 4: 429–433, 1979

The authors describe a technique to measure the rate of extraction of bone-seeking agents from blood. Sixteen adult rabbits were used. In eight animals the femoral artery was retrogradely cannulated with fine polyethylene tubing, which was advanced to

the origin of the nutrient artery. Radiographic contrast medium was injected, and vessels to the musculature were identified and ligated to prevent isotope escape into the soft tissue. A constant rate infusion pump was used to infuse the radioisotope at the rate of 45 ml/hr. Tracer uptake was monitored with a 2.5 × 2.5 cm NaI probe placed over the bone. In eight animals the nutrient artery was cannulated with a fine lymphangiogram needle, the muscular branch was ligated, and the radiopharmaceutical was administered in a single injection. Technetium-99m HEDP was prepared for each examination in a ratio of 5 mg HEDP to 1 mg hydrated stannous chloride. The stannous diphosphonate mixture was added to 5 ml of Tc-99m. The washout of Tc-99m HEDP was monitored for 60 min in animals with retrograde cannulation of the femoral artery, and isotope infusion. The 2 hr residual radioactivity of Tc-99m HEDP was determined for all animals by dividing the measured activity of the extirpated tibia into the total injected activity. The authors found that infusion of Tc-99m HEDP into the nutrient artery increased bone activity in a linear fashion as a function of time. The washout curve was biexponential with two well-defined compartments. The 2-hr residual radioactivity in bone varied according to the route of administration. It was $43 \pm 5\%$ when HEDP was injected as a single dose into the nutrient artery and $7.8 \pm 2.3\%$ when the tracer was infused into the femoral artery. Since cannulation of the nutrient artery occludes it and prevents outflow of nonextracted tracer, the difference in results might be due to pooling of the tracer in the single shot study. The authors believe that the described rabbit model offers an inexpensive approach to investigate the kinetics of radiopharmaceuticals during their passage through bone and to study the altered kinetics in pathological conditions.

Clinical Use of 131-I-19-Iodocholesterol Adrenal Scintigraphy. Shanghai Second Medical College, Shanghai. *Chin Med J* 92: 233–236, 1979

Fifty-one cases of adrenal disease diagnosed since 1975 by scintiscanning using I-131-19-iodocholesterol are discussed. Of the 51, 40 were cases of primary aldosteronism and 11 were cases of Cushing's syndrome. Patients were prepared with Lugol's solution or potassium perchlorate before the intravenous injection of 2–3 mCi of tracer material containing 7–20 mg 19-iodocholesterol. The thyroid gland was monitored 4–7 days after the injection of I-131-19-iodocholesterol in seven patients, and thyroid blockade was found to be adequate. Dexamethasone suppression was used when indicated. Among 26 cases of adrenal adenoma proved surgically, 14 had undergone retroperitoneal oxygen insufflation with positive findings in only three cases. Thus adrenal scintiscanning has proved to be very valuable in the localization of adrenal cortical adenomas. Hyperplasia was suggested by bilateral images of equal radioactivity concentration and adenoma by a sharp contrast in radioactivity of the two sides. The technique is also useful in the evaluation of cases operated on previously to determine whether there is any functional adrenal tissue left to cause persistence of symptoms. If so, reoperation is indicated, as in two such cases reported in this series.

Usefulness of Adrenal Venography and Iodocholesterol Scan in Adrenal Surgery. K. R. Herwig and L. P. Sonda; Univ. of Michigan Medical Ctr, Ann Arbor, Michigan. *J Urol* 122: 7–9, 1979

Adrenal scintiscanning and adrenal venography with sampling of adrenal venous blood are valuable methods to localize adrenal cortical lesions of Cushing's syndrome and primary aldosteronism. Sixty-three patients with these conditions were investigated by the authors between 1970 and 1977. Scintiscans using I-131-19-iodocholesterol were obtained in all 38 patients with primary aldo-

steronism (23 of these underwent additional scanning after dexamethasone suppression) and in 16 patients with Cushing's syndrome. Three patients with Cushing's syndrome had adrenal venography performed, as did 33 patients with primary aldosteronism. Accuracy of the localization studies in Cushing's syndrome due to adenoma was 3/3 with venography and 6/6 with adrenal scintigraphy. No venography was performed in those with hyperplasia, but 8/8 were correctly identified by scintigraphy. Scintigrams failed to localize the lesions in two cases of Cushing's syndrome due to adrenal carcinoma. In primary aldosteronism adrenal venography correctly localized the disease process in 22 of 25 cases with adenoma and four of five cases with hyperplasia. Adrenal venous blood sampling yielded correct localization in nine of nine patients with adenoma and three of four with hyperplasia. Adrenal scintiscanning was accurate in 23 of 29 patients with adenoma and in four of seven with hyperplasia. Dexamethasone suppression scans gave correct localization in 17 of 19 cases of adenoma and four of four cases of hyperplasia. Adrenal scintiscanning appears to be of greatest aid in finding hormonally active remnants of tissue following so-called bilateral adrenalectomy and in finding the small adenomas of primary aldosteronism when used with dexamethasone suppression.

Clinical Evaluation of Tumor Scintigraphy with ^{99m}Tc-Bleomycin (Part I) Fundamental Studies on Labelling Methods of ^{99m}Tc-Bleomycin and Its Clinical Application. Teruo Odori. *Jap J Nucl Med* 16: 721, 1979

Fundamental studies on the labeling techniques for Tc-99m-bleomycin (Tc-99m-BLM) were performed, and among them, the Sn-resin kit method was found to be the best. It produced the most chemically stable Tc-99m-BLM, and required a minimum amount of tin without ascorbic acid.

Clinical evaluation of the kit-labeled Tc-99m-BLM was performed in various malignant and benign diseases. A comparative study with Ga-67 citrate (Ga-67) scintigraphy was also performed. Tc-99m-BLM showed superior sensitivity and specificity, 73 and 72%, for malignant tumors over Ga-67, 64 and 41%, respectively. Though Tc-99m-BLM scintigraphy has a disadvantage in detecting lesions in the trunk, compared with Ga-67 scintigraphy, because of the high background radioactivity from 30 min to 1 hr after intravenous injection, it provides an excellent means for the detection of malignant tumors in the limbs, head, and neck.

Semiquantitative Use of Biocept-G Radioreceptorassay. R. O. Husa, R. F. Mattingly; Medical College of Wisconsin, Milwaukee, Wisconsin. *Obstet Gynecol* 54: 199-204, 1979

Preliminary findings in the use of the Biocept-G kit as a semiquantitative test for human chorionic gonadotropin (hCG) are reported based on 93 blood samples from 62 patients. The ratio of sample counts to reference control counts (S/R) obtained using the kit was compared with the hCG level determined by quantitative radioimmunoassay (RIA). A correlation line was calculated from the 44 samples with S.R. values between 0.295 and 1.200. Results were linearized by logit-log transformation [$\logit(S/R)/1.6$ against \ln mIU/ml] and the correlation line calculated by linear regression. The correlation coefficient was -0.92 . When three points from one patient were excluded, the correlation coefficient was -0.96 . The limits of the correlation curve are 89 and 4592 mIU/ml. The S/R ratio was reproducible between different Biocept-G kits and the same trend in hCG titer with therapy was obtained with all kits tested. The results of this investigation suggest that substantially more information can be obtained from the Biocept-G assay without significant additional time, cost, or effort. Pending further study of the semiquantitative Biocept-G

assay, great care must be used in the interpretation of S/R ratios above 1.10. Replicate serum samples along with low, medium, and high control sera should be employed to check for kit variability.

Estimation of Population Doses from Medical Uses of Radiopharmaceuticals in Japan, 1977. 2. Estimation of Genetically Significant Dose, per Caput, Mean Bone Marrow Dose and Leukemia Significant Dose. Tadashi Hashizume, Takashi Maruyama, Hiroshi Yamaguchi, Kanae Nishizawa, and Yukio Tateno. *Nipp Act Radiol* 39: 747, 1979

Population doses from diagnostic and therapeutic uses of radiopharmaceuticals have been estimated on the basis of a nationwide survey of the data on the number of investigations and treatments with radiopharmaceuticals in nuclear medicine departments and the annual amount of their activity. The gonad and marrow doses were calculated from published biokinetic data from humans using the MIRD method.

The resultant annual genetically significant dose from diagnostic and therapeutic uses of radiopharmaceuticals was 0.36 and 0.02 mrad (3.6 and 0.2 μ Gy) per person, respectively, with a total of 0.38 mrad (3.8 μ Gy) per person. The annual per Caput mean bone marrow dose was 2.3 mrad (23 μ Gy) for diagnosis and 0.2 mrad (2 μ Gy), for therapy. The resultant annual leukemia significant dose was 1.8 mrad (18 μ Gy) per person for diagnostic uses and 0.2 mrad (2 μ Gy) per person for therapeutic use, with a total of 2.0 mrad (20 μ Gy) per person. These population doses by sex and age of patients and by type of radiopharmaceuticals were tabulated in the article.

Application of A.R.T. to Time-Coded Emission Tomography. K. F. Doral and W. L. Rogers. *Phys Med Biol* 24: 879-894, 1979

Time-coded aperture imaging is a relatively simple technique for generating three-dimensional information, particularly when compared with rotational emission tomography. In addition to its mechanical simplicity, it can be used close to small organs. Since data is collected from only a relatively narrow solid angle, however, depth resolution (i.e., resolution in the plane perpendicular to the camera crystal) is poor.

This paper describes the use of the Algebraic Reconstruction Technique (ART) to reconstruct the data obtained from time-coded emission tomography rather than simple back projection, which had been used previously. The three-dimensional reconstruction technique, which involves multiple iterations, is purported to result in significant improvements in the quality of the images. The raw data has been grouped into subsets to reduce the amount of core memory required for reconstruction, so this process is feasible for a minicomputer. Nevertheless, the reconstruction of four planes requires 1 hr per iteration. At present, no correction for γ ray attenuation is incorporated into the reconstruction. Results from both simulated situations and small phantoms demonstrate the image quality that can be obtained and that depth resolution is poor. Quantitative results are not impressive in an absolute sense, but relative activities are measured reasonably well, particularly when the lack of attenuation correction is considered.

Merit of Ge and NaI(Tl) Detectors as Determined by Imaging Efficiency and Scatter Rejection. M. G. Strauss and I. S. Sherman. *Phys Med Biol* 24: 702-710, 1979

Germanium detectors provide the ability for virtually complete scatter rejection, due to their superb energy resolution, but have not been widely used for imaging primarily because of the small

crystal size and consequent low efficiency compared with NaI(Tl). The authors undertake to determine the size of Ge detector required to achieve the same signal-to-noise ratio (S/N) obtainable with NaI(Tl). (S/N is defined as a function of image contrast, intrinsic detector efficiency, and detector area.) Position-sensitive detectors (such as those used in the Anger camera) were excluded from consideration because of the higher probability of Compton scatter in germanium, which offsets the value of scatter rejection. Results indicate that the same S/N ratio can be obtained by a germanium detector as that of 0.9 times the area of a NaI(Tl) crystal, given equal scanning times with identical collimators and with the NaI(Tl) analyzer window set at 126 keV. This result is specifically for targets of decreased activity where it is felt that the improved contrast available from Ge detectors will be most advantageous for detectability of small lesions. The authors conclude that Ge and NaI(Tl) detectors of approximately the same area will provide equivalent S/N ratios for the same scanning time but that the image contrast for targets of decreased activity may be as much as 50% higher with the Ge system. The advantage may be realized by using large numbers of Ge crystals as an imaging array.

The Value of a Tracer Dose in Predicting the Kinetics of Therapeutic Doses of ^{131}I in Thyrotoxicosis. M. K. O'Connor, M. J. Cullen, and J. F. Malone. *Br J Radiol* 52: 719-726, 1979

This study is based upon the premise that the calculation of thyroid absorbed dose before the administration of therapeutic doses of I-131 is generally neglected for two reasons—the feeling that there is little correlation between the kinetics of a tracer dose and a subsequent therapy dose, and secondly that prediction of the outcome based on absorbed dose is uncertain. The relationship between tracer and therapy dose kinetics was investigated by measuring the respective 24-hr thyroid uptake and the effective half lives. Tracer doses ranged from 5–16 μCi with therapy doses administered within 2 to 4 wk of the tracer study. Thyroid uptake was measured in the conventional manner with precautions taken to reduce the count rate from the therapy doses. Effective half life was determined by placing thermoluminescent dosimetry discs over the patients' thyroid glands for known periods of time. The patients were taught to position the discs accurately by themselves so that this phase of the experiment did not require frequent visits to the hospital. Results from 23 euthyroid and hyperthyroid patients, as well as from two patients with carcinoma of the thyroid show very good correlation of 24-hr uptake values between tracer and therapeutic doses. There is also reasonably good correlation between the effective half lives. The authors ascribe much of the difficulty in relating the outcome of I-131 therapy to absorbed dose to poor dose estimates. Where specific endpoints are used as criteria, a linear relationship with absorbed dose can be demonstrated. Since dose can be accurately predicted on the basis of tracer measurements, the authors feel that a renewed look at individual tailoring of therapeutic dosage is desirable in view of the possible complications that can attend the administration of standard ablative doses.

Review of Report by Mancuso, Stewart and Kneale of Radiation Exposure of Hanford Workers. G. B. Hutchison and B. MacMahon. *Health Phys* 37: 207-220, 1979

This review article was prepared at the request of the Department of Energy. It contains a summary of the principal findings of the report by Mancuso et al., a discussion on the methods used, and an independent analysis of some of the data. After adjustment of the Hanford data for age and calendar year of death, the authors conclude that the cancer sites that may show a radiation-dose-relationship are cancer of the pancreas and multiple myeloma.

They further conclude that there is no evidence that a relationship exists between radiation and lymphatic and hemopoietic cancers other than myeloma. The same finding is true for solid tumors at sites other than the pancreas, and possibly, the kidney. Hutchison and MacMahon also agree that the conclusion of Mancuso et al. that there is a variation in sensitivity to radiation by age at exposure does not have a sound basis. It is pointed out that the analyses of both sets of data are preliminary and that use of cohort analysis on all of the data now available will provide "... a better understanding of the experience ...". Interested readers are also referred to the Letters to the Editors by G. W. C. Tait and especially G. W. Keale et al. in the same issue.

Autopsy Experience with a Radioactive Cadaver. A. Sidney Johnston, John Minarcik, Raymond Rossi, and Steven Pinsky. *Health Phys* 37: 231-236, 1979

This article describes the autopsy of a patient who had received 200 mCi of I-131 for the treatment of metastatic follicular thyroid carcinoma. Although the patient died 10 days after administration of I-131, postmortem radiation levels were as high as 60 mR/hr at the body surface. A description of the procedures used to minimize direct exposure to gamma radiation and accidental ingestion of radioactivity by the pathologist and his assistants is presented, as well as techniques for minimizing contamination of the autopsy room and other hospital space. In contrast to the general information presented in NCRP Handbook 37 and other well-known references, procedures are described in detail. Numerous radiation readings were taken with TLD finger badges, body film badges, pocket ionization chambers, an air sampler, a probe for measuring burdens, and a sensitive gas flow proportional counter. These were used to evaluate the effectiveness of the containment efforts. The pathologist's whole-body exposure was significant but not excessive. All other personnel had minimal exposures. The techniques described are applicable to patients who have been treated with other radionuclides, such as P-32, Au-198, or Sr-90.

In Vitro Investigation of Gallstone Shadowing with Ultrasound Tomography. R. Filly, A. Moss, and L. Way; Univ. of California, San Francisco, California. *J Clin Ultrasound* 7:255-262, 1979

Using a gel, the sonographic equivalent of liver, and a latex container to simulate the gallbladder, the authors scanned gallstone specimens that varied in size from 1 to 40 mm from 37 patients. They determined that each stone cast an acoustic shadow regardless of size, shape, surface characteristics, composition, or the presence of calcium. The fact that small stones may or may not cast a shadow is apparently dependent upon the relationship of the beam to the stone and only minimal alteration of the scanning angle will greatly affect the shadowing phenomenon. The clinical significance of these findings rests in the authors' recommendation that multiple images of a stone with only slight alterations in transducer position will increase the chances of demonstrating sonic shadowing. The presence of a slight degree of acoustic shadowing is as significant as a strong shadow for confirming the presence of a gallstone. In vitro and in vivo scans are presented.

B-Mode Echoencephalography in the Normal and High Risk Infant. M. L. Johnson, L. A. Mack, C. M. Rumack, and C. Rashbaum; Univ. of Colorado, Denver, Colorado. *Am J Roentgenol* 133: 375-381, 1979

The authors present a series of 25 normal and 41 high risk infants examined by B-mode echoencephalography. Single pass scans in the same orientation as computed tomographic studies were taken and compared with the CT scans. Measurement of the

normal lateral ventricle at the midbody in term infants yielded a mean value of 1.1 cm and a ratio of lateral ventricle-to-hemisphere of 28%. High risk or premature infants demonstrated a ratio of 31%. Excellent correlation between the ultrasound and CT studies was obtained for the normal infants—correspondence was not as good in normal prematures as in hydrocephalics. Resolution of hydrocephalus after shunting was demonstrated, and an intraventricular clot was imaged as a mass within the ventricle in four instances. The normal thalami, cerebral peduncles, lateral ventricles, and sylvian fissures are routinely imaged. Representative echoencephalograms and corresponding CT scans are provided.

Echogenic Fluid: A Pitfall in the Ultrasonographic Diagnosis of Cystic Lesions. Lynette A. Thurber, Peter L. Cooperberg, John G. Clement, Edward A. Lyons, Raymond Gramiak, and Jerry Cunningham; Vancouver General Hospital, Vancouver, British Columbia. *J Clin Ultrasound* 7:273-278, 1979

The authors present six cases of proven fluid-containing lesions that demonstrated low-level echoes diffusely scattered through the fluid. Three splenic cysts and single cases of pyometrocopolpos, hydroureter, and pyonephrosis are presented. Both the smooth wall and good through transmission expected of a cystic lesion were identified in all cases; however, the presence of fine low-level echoes throughout the mass led to the mistaken diagnosis of a homogeneously solid entity in several cases. Such fine low-level echoes have been shown to be produced by cholesterol crystals, protein macroaggregates, and inspissated bile and pus. Fluid-fluid layers will frequently identify such low-level echoes as particles suspended in fluid. The authors suggest that when such a lesion is suspected, the patient should be kept in the chosen scanning position for 5-10 min to allow layering of the fluid and, thus, confirmation of the diagnosis. In vivo and in vitro scans are provided.

Ultrasound Evaluation of American Burkitt's Lymphoma. Thomas H. Shawker, N. Reed Dunnick, Gordon L. Head, and Ian T. Magrath; National Institutes of Health, The Clinical Center, Bethesda, Maryland. *J Clin Ultrasound* 7:279-283, 1979

The authors present the ultrasonographic findings in a series of 22 cases of American Burkitt's lymphoma. Large, bulky, solitary masses occurring most frequently in the pelvis and lower abdomen are the characteristic findings. The masses are characteristically sonolucent, being mostly well-margined and with fine low-level echoes internally. The mantle of retroperitoneal lymphadenopathy characteristic of other forms of lymphoma is conspicuously absent with Burkitt's. Assessment of the kidneys is important because hydronephrosis is a complication recognized in 28% of patients with retroperitoneal or pelvic Burkitt's lymphoma. Monitoring of the response to chemotherapy can also be accomplished by ultrasonography. Representative scans are presented.

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