Considerations of ^{201}Tl as a Myocardial Radionuclide Imaging Agent in Man. H. R. Schelbert, H. Henning, P. Rigo, D. Chaunsey, R. O'Rourke, and W. L. Ashburn. *Invest Radiol* 13: 163–171, 1976.

The authors state that the purpose of their investigation was to evaluate the feasibility of ^{201}Tl for evaluating regional myocardial perfusion in experimental animals and in patients with acute myocardial infarction, with the ultimate aim of performing myocardial imaging. The investigators examined distributions and kinetics of ^{201}Tl in 13 patients and 6 mongrel dogs, three with experimental coronary artery occlusion. Thallium-201 was also compared to ^{86}Rb in 84 rats. The concentration of ^{201}Tl was 30% greater than that of ^{86}Rb in the rat heart at 10 min after intravenous injection. The myocardium-to-blood ratio averaged 51 with ^{201}Tl but was only 32 for rubidium at the 10-min interval. The authors injected radioiodinated albumin into the left atrium of the dog heart and found that the distribution of ^{201}Tl was in parallel and thus appeared to be related to regional blood flow. The concentration of ^{201}Tl in ischemic regions of the heart decreased to 32.3% of that in normal perfused myocardium. Areas of decreased ^{201}Tl uptake were easily identified in patients who had had a recent or old myocardial infarction and these areas corresponded in localization to those indicated by the electrocardiogram. When the hearts were rescanned 24 hr after the injection of ^{201}Tl, a significant retention was noted in the myocardium. In human subjects ^{201}Tl blood levels at 15 min after injection were low (averaging 1.06 $\pm$ 0.41% of the total dose per liter); these levels decreased with a biologic half-time of 3.1 $\pm$ 0.7 days. The 24-hr urinary excretion rates ranged from 0.6 to 6.5% of the total dose, and the excretion rate appeared to be related to urinary flow and the concentration of ^{201}Tl in the blood. Because of the higher target-to-background ratio, ^{201}Tl compared favorably with radioactive rubidium. The authors did not observe any detectable adverse effects from ^{201}Tl in diagnostic doses.

Use of ^{133}Xenon in Early Diagnosis of Inhalation Injury. R. N. Agee, M. Long III, J. L. Hunt, P. A. Petroff, J. Lull, A. D. Mason, and B. A. Pruitt, Jr. *J Trauma* 16: 218–224, 1976.

Physical signs and radiographic evidence of tracheal, bronchial, or pulmonary damage following exposure to products of incomplete combustion accompanying cutaneous thermal injury are usually absent or equivocal during the first 2–3 days after injury, the period when specific therapy may be the most beneficial. The authors undertook the current study to further define the reliability of ^{133}Xe lung scanning for the early detection of injury. Two additional diagnostic modalities, fiber-optic bronchoscopy and pulmonary function studies, were also evaluated. Eighty-six patients who had been admitted for burns were studied at the United States Army Institute of Surgical Research; the xenon lung scans were performed within 72 hr of the trauma. Six to ten millicuries of ^{133}Xe saline solution were injected as an intravenous bolus and sequential scintigrams obtained every 6 sec for 30 sec and then at 30-sec intervals until washout was complete. The criteria for a normal study was the absence of focal radioisotope trapping and complete washout by 90 sec. Besides asthma and chronic obstructive lung disease, general delay in washout beyond 90 sec was seen with inhalation injuries.

Of the 86 studies, 37 were interpreted as positive and 48 as negative for inhalation injury and one was discarded for technical reasons. Of the patients scanned, 74 (86%) were considered to have an appropriate scan result based on all available clinical pathologic evidence. The remaining 11 studies were felt to be erroneous: seven were falsely positive and four were falsely negative. Of the seven false-positive studies, six had normal-appearing tracheobronchial mucosa by fiber-optic bronchoscopy (one patient was not bronchoscoped) and five of the seven had no evidence of obstructive disease by pulmonary function testing. None of these seven had clinical or roentgenographic evidence of inhalation injury during the early post-burn period. Of the four patients classified as false negatives by ^{133}Xe lung scans, all had evidence of inhalation injury by bronchoscopy and pulmonary function testing. Three of the four had a clinical course consistent with inhalation injury. Of the 44 patients undergoing bronchoscopy, none had false-positive findings. However, six patients, later determined to have inhalation injury by all other available criteria, had falsely negative bronchoscopy findings. Of the patients that had pulmonary testing, four were determined to have falsely negative function tests but had no other evidence of obstructive disease.

Adding bronchoscopy or pulmonary function testing appeared to improve diagnostic accuracy. By using any pair of tests, falsely negative diagnosis was virtually eliminated. Inhalation injury, as expected, had an adverse effect on survival rates: the group of patients whose expected mortality lay between 40 and 59% were most affected. All of those with inhalation injury (55) died: only one of eight without inhalation injury died.

The Detection and Significance of Calcifications in the Breast: A Radiological and Pathological Study. R. R. Millis, R. Davis, and A. J. Stacey. *Br J Radiol* 49: 12–26, 1976.

The radiologic detection of calcification was compared by means of xerography, non-screen film, and a film–screen combination. In their study, the "threshold" values of the smallest detectable size of calcifications under simulated clinical conditions was found to be approximately 100 μm for xerography and 400 μm for both of the film techniques. The incidence of calcifications visualized on the preoperative mammograms of patients with carcinoma of the breast was 48.5%. Further calcifications revealed by histologic examination raised the overall incidence of calcification in mammary carcinoma to 63%. The incidence of presurgical mammograms in benign breast disease was 20%. The radiologic features of calcification occurring in malignant and benign breast were illustrated and the author stated no definitive distinguishing features had been established. A discussion is presented on the histologic appearance of calcification in both malignant and benign breast disease. (This article was reviewed because of the interest in bone-scanning agents for the detection of breast malignancies.—Editor.)

Strontium ^{87m}Sr Bone Scanning for the Evaluation of Total Hip Replacement. R. Feith, T. J. J. H. Slooff, I. Kazem, and Th. J. G. van Rens. *J Bone Joint Surg* 58: 79–83, 1976.

Since total hip arthroplasty has become the most accepted surgical procedure for the treatment of advanced osteoarthritis of the hip, necrosis of the femoral head, rheumatoid arthritis of the hip, and resectable tumors of the proximal tibia and acetabulum, the authors wished to evaluate ^{87m}Sr scintigraphy in assessing the normal course after total hip replacement and in the early detection of loosening of the prosthesis. Two groups of patients were studied independently, the first consisted of 17 patients with unilateral osteoarthritis of the hip who were studied before operation and serially after replacement arthoplasty. Studies were performed after 1 week, monthly for 6 months, and at the ninth month after surgery; each study included radiographic examination and the ^{87m}Sr scintiscan. The second group consisted of 28 patients who had undergone total replacement arthoplasty with an uneventful postoperative course, but who later developed pain about the hip with elevation of the erythrocyte sedimentation rate. These patients were suspected of having a loose prosthesis even in the absence of definite radiologic evidence. The interval between surgery and suspected diagnosis of loosening of the prothesis ranged from 0.5 to 4.6 years with a mean period of 2.1 years.

In 12 of the patients who had a normal course after arthoplasty (Group 1), serial scintigraphs showed diffuse increased activity in the region of the affected hip, with a gradual decrease in the level of activity after two months. After a mean period of 4.3 months, activity on the affected side was the same as that on the opposite side. Five of the 17 patients in this group deviated from this pattern. In four patients, periarticular ossification developed in the region of the gluteal muscles, judged by comparing the scans with the radiograph. The radioactive level returned to normal after 9 months. The remaining patient showed an unexplained persistently high uptake on the side of the surgery. After 6 months she started to complain of pain on weight-bearing, and at 6 and 7 months the scans remained positive. Radiologic examinations suggested a loose prothesis, and at surgical revision looseness of both components of the prothesis was found without evidence of infection. In the 28 patients with suspected loosening (Group 2), 22 (76%) showed a positive scan. Revision surgery was performed in 16 of the patients with positive scans, and in all loosening of the prothesis was confirmed. Infection was detected in eight of these patients. The remaining six continued to have symptoms and will require further surgery. In contrast, the six patients with normal scans responded to conservative treatment, and their symptoms have gradually disappeared.

The authors concluded that in most of these cases of total hip replacement scintiscanning proved to be a useful method, particularly when the clinical and radiologic evidence was inconclusive. They observed that, up to 6 months after surgery, increased osteoblastic activity exists. Scintiscanning appeared to be a useful aid following hip replacement for the earlier detection of loosening and infection, and the procedure can be helpful in the diagnosis of complaints after total hip replacement.

Serial Scintigraphy During Isolated Renal Perfusion. D. Fischer and K. Hahn. *S Afr Med J* 50: 854–857, 1976.

This study compared the use of scintigraphic procedures employing ^{99m}Tc-Fe and ^{131}I-Hippuran for the quantitative function evaluation in isolated kidneys of dogs. After removal of one kidney from each of six mongrel dogs, an initial gravity perfusion of the excised kidney was performed with precooled 10% Rhemoacrodox solution in isotonic saline. By means of Gamro machine, the kidneys were then perfused with a 4.8% dextran solution at 4.8°C for from 3 to 24 hr. During perfusion pH, pO_2, pCO_2, LAP, and LDH as well as flow pressure and weight of the organ were monitored. Oxygen was maintained at a constant level. Perfusion pressure was constantly maintained, systolic at 60–50 mm Hg and diastolic at 40–30 mm Hg. Scintigraphic evaluation of the kidney was carried out while it was continuously perfused. The venous branch was allowed to drain while the arterial branch was constantly perfused. After perfusion at 3, 12, 18, and 24 hr, the kidneys were transplanted into their host, and at the same time the contralateral kidney was removed. One of the removed kidneys was perfused for 44 hr at the lower temperature (4.8°C) and for 6 hr at 18–22°C, and this kidney was retained for comparison with the autotransplanted organs. Hippuran excretion was nearly absent at temperatures below 8°C but still measurable; excretion increased with every degree above 4°C. If there was no evidence of Hippuran excretion at 8°C, renal damage was indicated. The authors believe that this examination for nonpulsatile stored kidneys, similar to the method employed by Collins, appears satisfactory. They state that similar radioactive materials can be used in preoperative preservation and during the postoperative periods as a means of control and diagnosis without additional personnel or expenditures. In the past, false values had been obtained, owing to vasospasm, when albumin-based solutions were used. When vasospasm was noted, repeated measurements were done to determine if the spasm were true or the result of organ damage. The basic correlation between organ weight, organ blood flow, and scintigraphic impulse rates gave an initial estimate of organ activity, even when the condition of the donor kidney was unknown. Followup sequential scintigrams provided information regarding the suitability of the organ for transplantation.

A Three-Compartment Model for the Transport and Distribution of Hippuran. L. H. M. Van Stekelenburg, N. Al, A. Kooman, and J. F. W. Tertoolen. *Phys Med Biol J* 21: 74–84, 1976.

A comparative study was made of the different methods for measuring the renal clearance of Hippuran. Plasma sampling was begun very early and the samples were taken at short intervals. The authors felt that their results established beyond doubt that the Hippuran curve was composed of three exponentials, of which the third had a time constant of the order of 1 min. A three-compartment model of Hippuran distribution was postulated, in which two separate compartments communicated with the plasma but not with each other. This hypothesis was developed to explain why the time constants calculated from the two-compartment system far exceeded the experimental findings. The plasma was assumed to share its Hippuran with the two peripheral compartments, the rate of transfer from one compartment to another being proportional to the amount in the first. The proportional factors were determined for 20 adults and averaged. By substituting these averages into differential equations for the distribution process, the only variable remaining was the renal excretion rate, i.e., the fraction of plasma cleared per minute by the kidneys. If this procedure, which the authors claim to be justified by the experimental results, was correct, then the shape of the plasma curve would be determined exclusively by the excretion rate. The

authors showed that the third compartment, though small, had a minor influence on the shape of the renogram curves.

Interictal Regional Cerebral Blood Flow in Patients with Partial Seizures. S. Lavy, E. Melamed, Z. Portnoy, and A. Carmon. *Neurology* 26: 418–422, 1976.

Previous animal and clinical studies in man have shown that cerebral blood flow (CBF) increases during induced or spontaneous seizures. The authors studied the CBF in patients with partial epilepsy during the interictal period by means of ^{133}Xe intracarotid injection method. Eleven adult epileptic patients were studied; their ages ranged from 20 to 63 years (41 years, mean). Patient selection was determined by type of seizure and EEG findings, and Gastaut's classification served as a guide in both criteria. Thus, only patients who had partial epilepsy were included in this study. In eight patients the partial seizures were typical of temporal lobe epilepsy, in two the partial epilepsy was manifested as focal motor seizures, and one patient showed a combination of temporal lobe and focal motor sensory seizures. The interval from onset of seizure to the study in the patients ranged from 1 to 29 years. In four of the seven patients, previous head trauma was determined. Right parietal atrophy was found by pneumoencephalography in one case. The investigation was performed not less than 72 hr after the last clinical seizure. Cerebral angiography had been performed either immediately after the cerebral bloodflow study or at a previous hospitalization. Anticonvulsant drugs were not discontinued before the study. The hemisphere studied was the one that showed the interictal electroencephalographic abnormalities: in six patients it was on the right side and in five on the left. Clearance of the ^{133}Xe was followed for 10 min by an array of 12–20 collimated scintillation detectors. The results of the 10-min cerebral bloodflow study were adjusted to hemoglobin levels, and arterial blood samples were obtained for partial pressure of carbon dioxide. The mean flow values and distribution of regional values were compared with those of a sample of 22 normal control subjects that ranged in age from 20 to 68 years.

A hemispheric area that showed significantly low regional cerebral blood values as compared with the hemispheric mean cerebral blood flow was observed in each of the patients with partial epilepsy. In 10 of the 11 patients, the localized reduced cerebral bloodflow levels deviated significantly from levels obtained from parallel regions and hemispheres of normal controls. In the majority of patients, the site of low cerebral blood flow closely correlated with the clinical type of partial seizure and/or the site of the main electroencephalographic abnormalities. On the basis of their data, the authors suggested that the epilepticogenic focus responsible for the partial seizures may be localized within the hemispheric area showing the abnormal cerebral bloodflow reduction.

The Sink Action of Cerebrospinal Fluid Volume Flow. G. H. Hochwald, A. Wald, and C. Malhan. *Arch Neurol* 33: 339–344, 1976.

The effects of changes in serum osmolarity on volume flow of fluid into the cerebral ventricles of cats were measured by ventricular perfusion with mock cerebrospinal fluid (CSF), mock CSF containing acetazoalmide, or a 30-mOsm/liter sucrose solution. Serum osmolarity was altered by intravenous infusion of a sucrose solution ranging between 10 and 650 mOsm/liter changing volume flow. For all perfusion fluids, regression lines relating volume flow to infused solution osmolarity were parallel. After infusion of a 10-mOsm/liter solution, brain water content increased. One hour after infusion, volume flow returned to normal, although the serum was still hypotonic. Gray-matter water content was still elevated; white matter returned to normal. The results suggest that the source of increased volume flow is the brain and that the CSF acts as a sink limiting excess water accumulation during water intoxication.

Computerized Tomography (CT) in Acute Head Trauma. J. Merino-deVillasante, and J. M. Taveras. *Am J Roentgenol Radium Ther Nucl Med* 126: 765–778, 1976.

This paper discusses the role of computerized tomography (CT) in the management of acute head trauma. The authors define the pathologic processes as follows: (A) edema, or brain swelling from mild and focal to severe and diffuse; (B) contusion, meaning bruising or crushing without interruption of physical continuity of the brain cortex; (C) hematomas in different compartments of the brain, including intracerebral, intraventricular, epidural, acute subdural, chronic subdural, cortical or subcortical, and delayed traumatic intracerebral; (D) post-traumatic atrophy producing focal or generalized ventricular dilatation; and (E) obstructive hydrocephalus from arachnoid adhesions resulting from subarachnoid bleeding. After evaluating retrospectively 100 cases of head trauma examined by computerized tomography, the authors came to the following conclusions:

1. Computerized tomography and plain skull survey should be the first neurologic procedure performed.
2. Angiography may be carried out after computerized tomography when necessary, but it was needed in a relatively small number of cases (patients with technically limited CT scans or those in whom the possibility of associated vascular lesion of the cervical or intracranial vessels was clinically suspected.
3. Since high-quality CT scans were necessary, sedation is required in many instances.
4. There was a generally direct relationship between the severity of clinical presentation and the CT picture of the abnormality, and 70% of the patients clinically diagnosed as having contusion had positive CT scans, and for all practical purposes all patients having severe head trauma had abnormal CT scans.
5. With the advent of faster computerized tomographic scanners, the usefulness of the method would improve because of the reduction in examination time and lesser requirements for sedation. In the group with edema, one of five (20%) had a positive CT scan; in contusion, two of 12 (17%) had a positive CT scan; and in hematomas, 14 of 20 (70%) had a positive CT scan.

The authors divided their 100 cases of head trauma into six groups according to the severity of the trauma as presented clinically. In Group I, where trauma to the head was considered minimal, one of five patients had a positive CT scan (20%). In Group II, where the patients had a very brief period (2–5 min) of loss of consciousness, two of 12 CT scans were positive (17%). In Group III, where the patients were essentially neurologically intact after 24 hr, 14 of 20 patients had a positive CT scan (70%). In Group IV the abnormal clinical findings persisted for 3–4 days, and in this group 11 of 12 patients had a positive CT scan (92%). In Groups V and VI, the head trauma was severe as based on the depth and duration of coma, presence and duration of abnormal posture, and abnormal papillary re-

actions, and all of these 41 patients had a positive CT scan (100%). The authors note that since they had assembled this report several cases of bilateral subdural hematomas had been encountered, and the diagnosis was not made on CT scan.

Individualized Computer Tomography of the Skull with the EMI Scanner Using the 160 × 160 Matrix. S. H. Cornell, J. J. Musallam, C. L. Chiu, and J. H. Christie. *Am J Roentgenol Radium Ther Nucl Med* 126: 779–785, 1976.

The purpose of this communication was to substantiate the advantages of an individualized approach to computer tomography of the head. The authors first outline a number of technical problems: (A) occasionally the patient is positioned so that the base of the skull or top of head is not included in the first set of scans, resulting in an insufficient number of sections; (B) the head may be tilted, causing a poor-quality scan with artifactitious densities, particularly close to the base of the skull; (C) dense streaks tangential to the side of the head are frequently present and may be a problem in the evaluation of patients with possible extracerebral fluid collections (in this situation the head is purposely rotated to one side so that the streaks are projected at a different angle to the skull); and (D) any movement of the head seriously impairs scan quality (this can be partially overcome with the patient motion control modification). The authors state that lesions can be revealed or enhanced by means of intravenously injected contrast material. Of 117 neoplasms, 58 (50%) were seen better after injection of the material. In many of their cases, there was only a suspicion of an abnormality on the initial sectioning, but the lesion was made more definite by contrast. In 13 cases (11%), the tumor was seen only after contrast injection: this group included three acoustic neuromas, three gliomas, two meningiomas, and five cerebral metastases. All aneurysms and vascular malformations were seen better with contrast enhancement and this was also true in four of their cases of cerebral abcesses. The authors state that by approaching each patient individually, they have eliminated the need to recall patients and have improved the diagnostic capability of their method.

Studies on a Radioimmunoassay for Human Erythropoietin. J. J. L. Lertora, P. A. Dargon, A. B. Rege, and J. W. Fisher. *J Lab Clin Med* 86: 140–151, 1975.

A double-antibody radioimmunoassay for human erythropoietin (ESF) in urine and serum is reported. An ESF preparation was derived from urine of patients anemic from a hookworm infestation. After purification, the ESF was then iodinated with ^{125}I by the chloramine-T method. Gel fractionation of the iodinated mixture separated the undamaged immunoreactive ESF from damaged protein. ESF antiserum was produced by intradermal injection in rabbits of ESF in complete Freund's adjuvant. A 50-μl sample was required for the RIA. The sample, iodinated ESF, antiserum, and diluent were refrigerated for 3–4 days. At the end of the first incubation, goat anti-rabbit-gamma-globulin (GARGG) was added to the above reaction mixture and again incubated (refrigerated) for 18–24 hr. Centrifugation of the reaction tubes yielded a precipitate that contained the antibody-bound radioiodinated ESF. Radioactivity levels were measured by scintillation counting.

In this assay, patients with hypoplastic anemia showed a linear decrease in antibody-bound radioiodinated ESF with increasing concentration in either urine or serum. Also, sera from anemic uremic patients yielded lower antibody binding of ^{125}I-ESF than did sera from normal individuals. Generally both uremic patients and normal individuals had nondetectable levels of ESF when tested by the ex-hypoxic polycythemic mouse bioassay, a less sensitive method. The RIA indicated erythropoietin titers of 52–83 milliunits/ml in five normal subjects and 162–200 in four anemic uremic patients. The sensitivity of the RIA was described as 0.01 milliunit ESF.

Radioimmunoassay of Bleomycin. A. Broughton and J. E. Strong. *Cancer Res* 36: 1418–1421, 1976.

The authors reported a radioimmunoassay for serum bleomycin in patients treated for squamous-cell carcinoma, lymphoma, and testicular carcinoma with bleomycin. Reagent preparation included a bleomycin–bovine serum albumin conjugate to prepare the antisera in rabbits. Initially, conjugate in complete Freund's adjuvant was injected intramuscularly into the animals and followed at monthly intervals with conjugate injection. Bleomycin, iodinated with ^{125}I by chloramine-T, was purified by cation-exchange column chromatography, which provided a specific activity of 5 Ci/gm.

The RIA procedure required 100 μl of patient serum. A 10-min heated reagent incubation was followed by a 10-min refrigerated incubation. Separation of free bleomycin from antibody-bound drug was obtained by dextran-coated charcoal and radioactivity levels were determined in a gamma scintillation spectrometer. The standard curve of logit B/B ratio versus logarithm of bleomycin concentration was linear. The sensitivity of the assay was 240 pg bleomycin. Neither CCNU, fluorouracil, arabinosyl cytosine, vincristine, nor prednisone showed competition with bleomycin for antibody binding. At a concentration 2000 times greater than bleomycin, adriamycin reduced iodinated bleomycin binding to antibody. The authors state that this assay exhibits a hundredfold increase in sensitivity for bleomycin over the microbiologic assay. Individual patient data from this assay were not presented.

A Double-Isotope Technique for Cytotoxicity Assays. H. Zola and R. M. J. Palmer. *J Immunol Methods* 6: 133–139, 1974.

The authors described a double-isotope cytotoxicity test of high precision for assaying transplantation antigens plus antibody and cell-mediated cytotoxicity in neoplasia and transplantation. The EL4 lymphoma cells were grown in tissue culture or in mice. To a cell suspension, ^{51}Cr was added and the mixture was heated for 1 hr to the label cells. The cells were washed, resuspended in liquid, and ^{14}C-sorbitol was added to the suspension and the mixture yielded an isotonic mixture. In a liquid scintillation spectrometer aliquots of cell suspensions or supernatant liquid were assayed for radioactivity. The ^{51}Cr was assayed in the preset ^{3}H channel with a counting efficiency of 40% and ^{14}C in its own preset channel with 70% efficiency. The radioactivity of ^{51}Cr and ^{14}C in each sample and the $^{51}Cr/^{14}C$ ratio was determined as an indication of cell lysis independent of media volume. Normally the labeled lymphoma cells do not take up ^{14}C-sorbitol.

The addition of progressive dilutions of antiserum to the labeled EL4 cells yielded a characteristic cytotoxicity curve. Dilutions of mouse liver transplantation antigen prepared in antiserum to EL4 cells yielded a direct linear relationship between cytotoxicity and increasing antigen dilution. Because macrophages took up ^{14}C-sorbitol significantly, macrophage-mediated cytotoxicity or lymphocyte-mediated cytotoxicity in the presence of macrophages could not be determined in this system without prior removal of macro-

phages. The potential sources of error in this assay were mainly related to variations in volume of reagents added. The use, however, of ^{14}C-sorbitol with resultant ^{51}Cr/^{14}C ratios dramatically improved precision within a titration.

Quantitative Estimation of Cytotoxic Activity of Immune Lymphocytes Using ^{51}Cr Labeled Peritoneal Macrophages as Target Cells. G. I. Drizlikh, A. V. Andreyev, I. Kotomina, and B. D. Brondz. *J Immunol Methods* 8: 383–393, 1975.

The authors describe the estimation of cytotoxic effect (CE) of immune lymphocytes both by a nonradioactive method and as reflected by release of radiochromium from labeled macrophages. In the nonradioactive procedure, macrophages isolated from the mouse peritoneal cavity were cultivated in monolayer on glass. Lymphocytes from lymph nodes after animal immunization were added to the macrophages. Direct counting of macrophages remaining viable after incubation led to the CE value. Peritoneal macrophages labeled with ^{51}Cr were cultivated on glass precoated with poly-L-lysine. After 20-hr incubation of the labeled macrophages with normal allogeneic lymphocytes, 10–19% of the total macrophage radioactivity was released from the cells. Dodecylsulfate solution, however, released labeled macrophages completely from glass, allowing CE to be assayed by quantitating ^{51}Cr release from damaged cells as well as by measuring label retention by intact cells.

Assay of CE by ^{51}Cr cell release and by ^{51}Cr cell retention was reported to agree well with the conventional cell counting method. In addition, ^{51}Cr-labeled mouse sarcoma cells were treated with normal or immune lymphocytes. After incubation and centrifugation, supernatant was assayed for radioactivity. Different types of sarcoma cells showed characteristic susceptibility to the CE of immune lymphocytes.

Ultrasonic Scanning of the Pancreas. S. Hancke. *J Clin Ultrasound* 4: 223–230, 1976.

The author reviews the current status of pancreatic ultrasonography and describes the current techniques used in scanning that organ. In an attempt to outline the entire pancreas in a single scan, oblique scans were commonly performed. A line connecting the hilus of the right kidney to the hilus of the spleen was used as an anatomic reference for the axis of the pancreas. The superior mesenteric artery was used as an important landmark for the posterior border of the pancreas and the left lobe of the liver. If this artery extended over the pancreatic bed, then it served as a window for the visualization of portions of the pancreas. The tail of the pancreas was examined in the prone position using the upper portion of the left kidney as a window. With meticulous scanning, the normal pancreas could be outlined in many patients. The shape of the organ was quite variable. Acute pancreatitis produced diffuse enlargement of the gland with a decrease in echogenicity, pancreatic pseudocysts were not detectable by ultrasound if less than 2 cm in diameter, and newly formed pseudocysts were not distinguishable from pancreatic abscesses. The larger and better-defined pseudocyst was most often readily recognized as such. The author states that, in the diagnosis of pancreatic tumors and particularly in their differentiation from areas of chronic pancreatitis, ultrasound has not been reliably evaluated. The determination of the sight and depth of ultrasonographically guided thin-needle biopsy of solid pancreatic lesions may permit tissue diagnosis of both malignancy and benignancy without formal surgery. No complications from the biopsies had been noted. Problems encountered in ultrasonographic evaluation of the pancreas were obesity, gaseous distention, ascites, and absence of a prominent left lobe of the liver.

Renal Carbuncle: Early Diagnosis by Retroperitoneal Ultrasound. M. L. Gelman and L. B. Stone. *Urology* 7: 103–107, 1976.

The authors describe a classic case of renal carbuncle that occurred in a 23-year-old man who had right flank pain, fever, and a history of cutaneous infection and dental surgery. Nephrotomography revealed a questionably ill-defined right lateral renal border, but no specific masses were identified. On the dorsolateral aspect of the right kidney the ultrasonogram revealed a sonolucent mass. Surgical exploration showed a perinephric abscess confluent with the renal parenchyma in the area described by the ultrasound study. Following surgery, ultrasound examination of the right kidney appeared normal. Since the radiographic findings in renal carbuncle may be confusing and ill-defined, the ability to distinguish a localized fluid collection in or about the renal bed by means of ultrasonography is a great advantage.

Differential Diagnosis of Chronic Splenomegaly by Grey-Scale Ultrasonography: Clinical Observations and Digital A-Scan Analysis. K. J. W. Taylor and J. Milan. *Br J Radiol* 49: 519–525, 1976.

In a series of 60 patients presenting with chronic splenomegaly, three types of splenic consistency were identified: (A) a very low level of internal echoes observed in spleens involved with malignant processes such as lymphoma or leukemia; (B) an intermediate level of internal echoes found in benign conditions that include myelofibrosis, portal hypertension, and polycythemia rubra vera after irradiation; and (C) a high level of echo amplitude identified in chronic inflammatory conditions such as malaria, tuberculosis, and sarcoidosis. The qualitative findings were corroborated by computer analysis of A-mode scanning and distribution curves were identified for the various states. Apparently the pathophysiologic basis rests on the increase or decrease in the fibrous supporting structure of the spleen: those conditions promoting increase in the fibrous content will produce increased echogenicity. Current technology does not permit differentiation of normal splenic consistency from malignant involvement. The study was performed on custom-built equipment, but the signal-to-noise ratio of commercially available equipment was not sufficient for duplication of the study.

Ultrasonography in Foreign-Body Detection and Localization. H. W. Skalka. *Ophthalmic Surg* 7: 27–33, 1976.

In the detection of intraocular foreign bodies the major value of ultrasonography is its independence of radiopacity. Once identified, the foreign-body echo can be localized in relation to the coats of the eye without estimation or computation. Both A- and B-scan studies were performed, and the relationship and characteristics of various intraocular foreign bodies within the vitreous and to the sclera are illustrated. Ultrasonography was not suggested as a replacement for radiographic techniques but as an adjunctive procedure. Vitreous hemorrhage, lens dislocation, and the location and extent of retinal detachments can be evaluated by ultrasonography at the initial examination. Instantaneous determination of magnetic mobility of a foreign body can also be determined by ultrasonography.

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