ABSTRACTS


Of 63 patients with proven or disproven infections in the lung, 58 (92%) had excellent positive or negative correlation with the lung scan obtained using Ga-67 citrate. Included were 15 patients with anerobic infections of the lung, 12 with infective endocarditis with emboli, nine with tuberculosis, six with pneumococcal infections, five with carcinoma, four with fungal infections, three with pulmonary involvement secondary to abdominal sepsis, two with pneumonia due to mycoplasma, and seven with other diseases.

Diagnosis was established by transtracheal aspiration, thoracocentesis, needle aspiration, or biopsy of the lung. Seventy-two hours after i.v. injection of 3 mCi of Ga-67 citrate, supine imaging with a rectilinear scanner was performed from head to thigh and from the anterior and posterior aspects. The Ga-67 uptake was increased in anerobic infections, pneumococcal pneumonia, malignant neoplasms, systemic lupus erythematosus, sarcoid, coccidioidomycosis, and septic emboli due to endocarditis. With the exception of normal Ga-67 scans four of nine patients with pulmonary tuberculosis, all culture-proven pulmonary infections showed increased uptake of Ga-67.

The authors concluded that when infection is suspected and routine culture is negative, an increased uptake of Ga-67 in the lung indicates an active disease process and warrants aggressive procedures to establish the diagnosis.


The authors administered octylamine-14C (14C-OA) or 5-hydroxytryptamine (ethylamine-14C) (14C-5-HT) to animals and humans to evaluate lung uptake and deactivation of the agents. After 2–8 mCi of 14C-OA or 14C-5-HT were administered intravenously to rabbits and dogs, the animals were imaged by gamma camera. A minimum of 50% of the dose of each agent concentrated in the lungs and the initial lung removal of the agents from the circulation was dependent primarily on pulmonary blood flow. Clearance of 14C-OA from lung led to an accumulation of radioactivity in the liver followed by excretion as 14CO2 (from initial deamination by monoamine oxidase (MAO)). Dogs that received pargyline (an MAO inhibitor) revealed a lesser rate of 14C-OA lung clearance. After 3–4 mCi of 14C-OA were administered intravenously to normal human subjects, dynamic studies were obtained of the entire upper torso with a gamma camera. Initially, 65%–70% of the dose concentrated in the lung and then declined to 16–19% by 30 min. At 2 min after injection, 95% of the blood radioactivity was composed of deaminated metabolites which reflected MAO activity. The level of radioactivity in the liver then rose to 18–27% of the dose at 30 min. Total 14CO2 excretion amounted to 10–13% of the dose by 35 min total urine radioactivity at 1 hr was slight. These studies were reported to illustrate the potential usefulness of the method to monitor amine uptake and metabolism by the lung dynamically by a noninvasive technique.


In this study, an aerosol of Tc-99m sulfur colloid (mean droplet diameter 2.8 μm, range 1–10 μm) was inhaled by eight patients who had chronic bronchitis and mild airway obstruction. On separate days, each patient received an oral bronchial mucolytic agent (bromhexine or ipropiprolidene glycerol) or a placebo (in a double-blind model) administered in two doses before and one dose following the inhalation. Radioactive particle deposition and clearance from lung were monitored in the prone subject by scintillation camera from a dorsal projection. A deposition pattern for each subject was described by a ratio of initial counts over a central area of right lung to those over total right lung. Following placebo, the ratio was 0.53 ± 0.21 (mean ± SD) with a range of 0.20–0.78. Treatment with bromhexine reduced the ratio to 0.39 ± 0.16 (range, 0.19–0.62), and ipropiprolidene glycerol decreased it to 0.40 ± 0.18 (range, 0.20–0.72). It was hypothesized that the ratio reduction resulted from a pharmacologic effect on the central airway that altered the biologic particle deposition mechanism from one of impaction to one of sedimentation; reflected by a more peripheral distribution of particles within the lung. Particles initially deposited peripherally were retained in the lung longer than those deposited centrally. In seven of the subjects clearance from the peripheral area was increased by the mucolytic agents. Total particle clearance from right lung during the first 60 min, however, was faster under placebo than after drugs because of the lessened initial peripheral deposition associated with a placebo.


The authors evaluated 12 patients with the syndrome of osteonecrosis of the femur at the knee. The patients’ ages ranged from 53 to 75 yr, and only two patients were men. The pain was abrupt and constant over the area of medial femoral condyle, and it was worse during the night.

Bone scan with Sr-85 or Tc-99m diprophosphonate in all patients showed high uptake at the site of pain, and the uptake was well localized over distal portion of the femur in the affected condyle.

The syndrome is classically associated with a subchondral radiolucency, and the lesion may progress to collapse of the bone; however, the radiographs were normal in eight patients, and four patients had minimal degenerative changes. Arthograms were obtained in seven patients and were positive for meniscal degeneration in two. In these 12 patients arthroscopy was avoided. The pain gradually lessened after 2–3 mo, and the bone scans returned to normal several months after the symptoms had resolved.

The authors felt that early recognition of this syndrome should lead to protection from weight-bearing; and only after collapse of the cartilage has occurred, should osteotomy or replacement arthroplasty be considered.


The basic considerations, pharmacology, techniques, and
clinical indications, as well as results of lymphoscintigraphy, are briefly described. For retroperitoneal lymphoscintigraphy, 150 μCi colloidal Au-198 with an average particle size of 5 μm are injected into the webs of each foot; no more than 0.5 ml should be injected. Movement of the lower extremities for 2 hr are required. Scintigraphy can be performed 7 hr after the injection at the earliest, but it is recommended that it be performed after 24 hr. The technique for administering is the same for Tc-99m microcollodids. On each side, 0.5 to 10 mCi are injected in less than 0.5 ml of solution. There is decreased uptake of radiocolloids in lymph nodes in lymphadenitis, lymphomas, melanomas, and after irradiation; it is absent in metastases of solid tumors; and is increased by obstruction of lymphatic circulation. Radioactive gallium and bleomycin are also deposited in neoplastic disease of the lymph nodes.


Eleven radiochemicals were evaluated for localization in the Greene uveal melanotic melanoma in the hamster. After each radioactive agent was injected intraperitoneally, the animals were killed from 1 hr to 1 wk later. Radioactivity in the tissues was determined in a scintillation well counter for gamma emitting nuclides, and P-32 and C-14 were assayed in a liquid scintillation spectrometer. Maximum uptake of P-32 occurred in melanoma at 72 hr postinjection and comprised 2.21% of the dose/g tumor. Tumor-to-choroid ratio (T/C) reached a maximum (2:1) at 24 hr. (The normal choroid showed highest uptake of any ocular tissue for most of the radiochemicals studied.) At 48 hr In-111 bleomycin demonstrated the highest tumor concentration of the agents evaluated (5.45% dose/gm) with a T/C of 2.5. Gallium-67 citrate and In-111 chloride showed a maximum concentration of 4.87%/gm (48 hr) and 2.26%/gm (24 hr), respectively. Corresponding T/C values were 8.0 and 3.1. All other radiochemicals yielded less tumor concentration than did P-32. Successful tumor scintigraphy by gamma camera was achieved with Pb-203 tris(hydroxymethyl)aminomethane, Ga-67 citrate and In-111 bleomycin in this animal model. The importance of radiation dosimetry and of choosing an optimum time for imaging after radiochemical administration were emphasized when considering such agents for clinical use.


Iodine-131 triolein and Se-75 triothiol (1-Butyleneselenyl-2,3-dioctadecyloxypropane (a nonabsorbed gastrointestinal marker) were given simultaneously intragastrically in a small volume of olive oil to normal rats previously fed a diet supplemented with the oil so as to enhance fat absorption. Within 24 hr after infection, fecal excretion of radioactivity was nearly complete. The degree of fat absorption was computed by a) an isotope ratio involving Se-75:1-131 in the test dose and I-131:Se-75 in a random stool sample, and by b) conventional isotope balance involving assay for 1-131 in total feces over 72 hr after dosing. Absorption values derived by both computations were directly related. In other rats previously fed diets unsupplemented with oil so as to reduce absorption, the two radioactive agents were administered in a large volume of oil. The isotope ratio method in these animals tended to underestimate absorption when 0–8 hr feces samples were used for computation and to overestimate with samples thereafter. In yet other rats bearing external biliary fistulae, fat absorption by isotope ratio was significantly decreased. In another group of rats, the superior mesenteric artery was clamped transiently to yield intestinal ischemia. In those animals, the two agents were administered by intraduodenal infusion. Isotope ratios computed on feces along with colonic and cecal contents in ischemic animals indicate no significant difference in intestinal transit rates of the two agents. Such similarity in transport is expected to occur clinically in fat malabsorption caused by a mucosal defect, such as sprue. The authors feel that their isotope ratio method may offer technical improvements clinically over conventional 1-131 triolein fat absorption studies, since their method a) eliminates error caused by incomplete feces collections, and b) permits the analysis to be performed as soon as a radioactive stool sample is obtained.


Forty-eight adult ENT clinic patients with no salivary disorders and 26 patients with severe xerostomia were evaluated in this study. Twenty min after i.v. injection of 123I-T, pertechnetate in a patient who had received no pretreatment, the face was imaged in the anterior and anterolateral oblique (45°) projections by gamma camera with a pinhole collimator. Radioactivity concentration in areas of the parotid and submandibular glands was compared with that in a "neutral reference area" (nonsalivary) in the cervical region of each patient. An "activity index" or ratio was then computed for each gland after correcting for size difference. Activity indices in the normals were 2.23 ± 0.50 and 2.18 ± 0.43 (mean ± SD) for parotid and submandibular glands, respectively. In all seven patients with documented Sjögren's syndrome, xerostomia caused a diminished pertechnetate uptake by the glands. In 19 cases of xerostomia that resulted from sialosis (sialadenosis), pertechnetate uptake was greater than that in normals. Qualitative evaluation of facial images alone (salivary gland scintigraphy) was not found to be consistent for distinguishing between normal and abnormal pertechnetate uptake, in part because of the considerable variations in background radioactivity. The authors believe that their method of quantitative scintigraphy is of value in the differential diagnosis of the two xerostomic conditions whose presenting symptoms are similar but whose treatment is often diametrically opposite.


Antigen E (AgE), the principle allergen of short ragweed pollen *Ambrosia elatior L.*, can be detected in commercial allergen extracts by a double-antibody radioimmunoassay (RIA). This paper describes two modifications to the RIA that increase sensitivity of the test while reducing its completion time. First, rabbit anti-ragweed AgE IgG is coated on the inside of the polystyrene reaction tubes rather than being added as a separate reagent. Second, the new RIA procedure involved adding serial AgE dilutions to the antibody-coated tubes and incubating at an elevated temperature for 2 hr. After the tubes were washed, I-125-labeled anti-ragweed AgE IgG was added, incubated 1 hr at an elevated temperature, and washed. Negative control tubes were also prepared. All tubes were counted in a gamma scintillation
spectrometer. By these modifications, test sensitivity increased to 30 pg AgE/ml of extract in contrast with 7 ng/ml by the older RIAE method and 250 μg/ml by double diffusion gel precipitation. Total incubation time was reduced from 2 days for the older RIA to several hours in this method.


The value of ultrasound in the diagnosis of cholelithiasis has been well established. The authors present three illustrative cases in which ultrasound proved of value in delineating right upper quadrant pathology close to but separable from the gallbladder. In one patient, a clinical diagnosis of acute cholecystitis was made, and an oral cholecystogram failed to delineate the gallbladder. Ultrasonography demonstrated a normal gallbladder and a sonolucent lesion a hepatic fungal abscess in the inferior border of the right lobe of the liver. In a second patient diagnosed as having acute cholecystitis, a right upper quadrant abscess was delineated beneath a surgical scar. In a third patient with documented gallstones, a solid mass was identified directly anterior to the distented gallbladder, and ultimately proved to be carcinoma arising in the neck of the gallbladder. Such experience underscores the value of ultrasonography in evaluation of right upper quadrant pathology, even when the clinical or radiologic points to cholecystitis or cholecystitis as the etiology.


The spectrum of applications of ultrasound in dealing with radiation therapy patients is discussed. Body contours can be outlined quickly and easily and the information transferred to a computer for dosimetry calculations. Determination of chest wall thickness by ultrasound scanning is a rapid and effective method of determining depth of superficial radiation in the postmastectomy patient. Intra-thoracic masses in contact with pleural surface can be outlined by ultrasound and depth and field determined. The demonstration of deep tumors within the abdomen and pelvis is of value in guiding radiation ports to encompass the entire tumor mass, as well as establishing the total depth of the tumor for maximum efficacy of radiation therapy delivery. For intracavitary treatment of pelvic malignancy the ultrasound examination may be performed after insertion of the afterloading applicator for position of the applicator and uterine size. The localization of normal structures by ultrasonography provides a means by which appropriate shielding of these organs can be accomplished to minimize doses to the normal structures; renal localization is a prime example.

Sequential ultrasound scanning is an effective method of recording the response of deep tumor masses to therapy, and assessment of tumor regression can be made effectively and noninvasively by this means.


A series of fourteen patients with proven pancreatic cysts is presented in whom the diagnosis was made by ERP or ultrasonic scanning or both. ERP demonstrated the cyst in four patients and the suspicion of a cyst in eight; ultrasonic scanning showed cysts in 12 of the 14 patients. In the two false-negative ultrasound studies, diagnosis was made by ERP. Ultrasonically guided percutaneous puncture was performed on nineteen occasions in eight patients with cysts as small as 2 cm in diameter without significant complications. The therapeutic value of cyst puncture either single or repeated is, as yet, not established. The authors suggest puncture as a viable possibility with patients in whom surgery is contraindicated. The conclusion is that the first investigation in a patient suspected of having a pancreatic cyst should be ultrasonic scanning. If the ultrasound study is negative or shows a small cyst, ERP should be carried out.


Of a series of 116 renal masses evaluated by ultrasonography, 25 (20%) were diagnosed as solid. At surgery three of the 25 were found to consist of loculated cysts and therefore to represent false-positive diagnoses. The walls separating either loculations of a single cyst or multiple small adjacent cysts were found to be 1–2 mm in thickness, and the authors conclude that these septations produced the internal echoes within the masses that led to the diagnosis of a solid mass in each case. This group does not include patients in whom the studies were technically suboptimal by virtue of obesity or inaccessibility of the lesions. The authors caution that a multilocular cystic mass or several small adjacent cysts separated by thin walls can be mistaken ultrasonographically for solid masses.

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