

ABSTRACTS OF CURRENT LITERATURE

The Use of Thallium-201 Myocardial Scintigraphy for the Diagnosis of Previous Infarction. A. Gustafson, I. Stubbe, S.-E. Svensson, U. Tylén, H. Westling; Lund, Sweden. *Acta Med Scand* 209:373-377, 1981

Resting Tl-201 scintigraphy was used to diagnose remote infarction in 87 patients. Gamma camera scintigraphy followed 15-60 min after i.v. injection of 1.5 mCi Tl-201. Images were obtained in six standard projections. The final scintigraphic evaluation was made by two observers who had all clinical information. Scintigrams were classified as normal, probably normal, possibly abnormal, and abnormal. All patients had selective coronary arteriography and left ventricular biplane angiography. Biplane cinefluorography was performed in supine and 60° RAO projections. Angiographic data were evaluated without knowledge of other examinations. Localized abnormalities of left ventricular wall movements were graded as follows: normal; slight hypokinesia; marked, localized hypokinesia; and localized akinesia or dyskinesia. Coronary angiography identified the extent of stenosis, graded on a four-step scale. A 12-lead ECG was used to identify myocardial infarction. The clinical records were also examined for evidence of infarction. Patients were excluded from the study when evidence suggested that infarction occurred during the preceding 6 mo. Thirty-three patients were found to have a typical infarction history. ECG changes had disappeared in eight of these 33. Another 14 had clinical evidence for probable previous infarction. Among these 47 patients with clinical evidence of past infarction, six lacked angiographic evidence and were found to have valvular heart disease. ECG, scintigraphy, and left ventricular wall motion abnormalities were suggestive of infarction in all six. Eighteen patients had an abnormal scintigram but lacked angiographic criteria for infarction. Eight scans were probably correctly evaluated, and ten were probably incorrectly assessed. The authors conclude that resting Tl-201 scintigraphy was high sensitivity for detection of remote infarction. False-positive results occur, so that the diagnosis should not be made on the basis of scintigraphy alone.

Myocardial Emission Tomography with Thallium-201. Value of Multiple and Orthogonal Sections in the Study of the Myocardial Infarction. J. Maublant, J. Cassagnes, M. Jourde, A. Veyre, G. Meyniel; Clermont-Ferrand, France. *Eur J Nucl Med* 6:289-294, 1981

The use of a commercially available single-emission tomography system was evaluated in 20 patients with infarction. Thirty microcuries of Tl-201 chloride/kg body weight were injected at rest in standing position. Ten minutes after tracer injection three gamma camera views of 500,000 cts each were obtained in anterior, LAO 45°, and left lateral positions. The camera was equipped with a parallel-hole, low-energy, high-resolution collimator. Liver and spleen were masked before BG subtraction. Nine-point smoothing was used. After this conventional examination, the study was continued with the patients lying on a mobile bed while images for tomographic reconstruction were obtained. The camera head was adjusted so that it could rotate with the smallest radius around the patient. Thirty-two adjacent 45-sec views were obtained, each separated by a rotation of 11.25°. Number and thickness of transverse reconstructed slices were determined by the operator. Generally, less than 15 slices passed through the

myocardium of the left ventricle. The computer reconstructed sagittal and frontal slices in a few seconds. The authors report that all confirmed infarcts in 15 patients were clearly visualized. In five patients with ambiguous ECG or enzymatic results, it was possible to identify four defects. The left ventricular myocardium was reproduced in accordance with known anatomy. Posteroseptal and posterolateral walls were clearly seen in the transverse sections. Diaphragmatic infarcts were identified in sagittal or frontal sections. The myocardium's mean count contribution was 19% of the transverse image and only 10% of the conventional image. This improvement was also clearly seen when the ratio of myocardium activity to BG activity was calculated. It was 2.57 ± 0.56 on the transverse sections and 1.60 ± 0.28 on the conventional views. The authors believe that single-emission tomographic reconstruction will improve estimation of infarct size and evaluation of drug effects.

Normal Left Ventricular Emptying in Coronary Artery Disease at Rest—Analysis by Radiographic and Equilibrium Radionuclide Ventriculography. B. S. Denenberg, P. T. Makler, A. A. Boye, J. F. Spann; Temple University Health Center, Philadelphia, PA. *Am J Cardiol* 48:311-317, 1981

Resting biplane contrast ventriculography at 60 frames per second was carried out in 54 patients, 23 of whom had at least one coronary artery with greater than 75% stenosis and 31 who had normal coronary arteries on angiography. No patient had abnormal resting ventricular function or valvular disease. Six of the patients with coronary artery disease and eight patients with normal coronary arteries were also studied by equilibrium-gated radionuclide ventriculography following labeling of the patients' red blood cells in vivo with 20 mCi of sodium pertechnetate. When volume as a percent of end-diastolic volume was plotted against the percent of systole elapsed, essentially a way to look at ejection fractions during short intervals of systole, no significant difference was seen between the ejection fraction of patients with coronary artery disease and that of normal individuals. There was good correlation between contrast ventriculography and radionuclide ventriculography ($R = 0.971$).

Comparison of Upright and Supine Bicycle Exercise in the Detection and Evaluation of Extent of Coronary Artery Disease by Equilibrium Radionuclide Ventriculography. M. R. Freeman, D. S. Berman, H. Staniloff, U. Elkayam, J. Maddahi, H. J. C. Swan, J. Forrester; UCLA, Los Angeles, CA. *Am Heart J* 102:182-188, 1981

The assessment of left ventricular (LV) and of right ventricular (RV) performance in the detection of coronary artery disease (CAD) by radionuclide ventriculography (RNV) were compared in upright and supine bicycle exercise. Patients were divided into three groups: Group A (15 patients) had normal coronary arteriograms and normal resting LV function; Group B (12 patients) had CAD but no previous myocardial infarction (MI); Group C (10 patients) had CAD and previously documented MI. Radiographic and radionuclide studies were done within a 3-mo time span with no intervening MI. Radionuclide studies were performed using in vitro Tc-99m-labeled red cells, multigated data acquisition by gamma camera interfaced to computer, maximal exercise, and

standard evaluation parameters. Normal patients showed no difference in clinical, EKG, and hemodynamic responses between upright and supine exercise. Patients with CAD had significantly higher ($p < 0.05$) maximum heart rate, systolic blood pressure, and heart rate-systolic blood pressure product during upright exercise. Left ventricular ejection, right ventricular ejection fraction, and segmental wall-motion parameters did not differ in the supine and upright exercise position in any of the three groups, and individual patient responses showed a high degree of concordance. Exercise-induced changes in LV volume varied depending upon the position and presence or absence of CAD. Detection and prediction of extent of CAD by RNV did not vary due to position, supine compared with upright.

A Thresholding for Radionuclide Angiocardiology. M. L. Goris, P. A. Briandet, A. J. Thomas, J. H. McKillop, P. Sneed, D. P. Wiklander; Stanford University, Informatik States, Inc., and ADAC Laboratories. *Invest Radiology* 16:115-119, 1981

The authors present an operator-independent processing method for gated cardiac blood-pool studies. They have created an algorithm (which accepts an estimate of the position of the left ventricle) based on the idea that there should be a region where there is a count-rate change between end-systole and end-diastole. The curve of stroke volume versus end-diastolic count rate is approximated by a straight line whose intercept with the count rate occurs at the threshold or background level. This method was computerized and validated using a number of cases and unskilled as well as skilled operators.

Experimental Myocardial Infarction in the Closed-Chest Dog: A New Technique. C. Zollkofer, W. Castaneda-Zuniga, Z. Vlodaver, J. Rysavy, A. S. Gomes, K. Amplatz; University of Minnesota and United Hospitals, St. Paul, MN. *Invest Radiol* 16:7-12, 1981

The production of a reproducible myocardial infarction in dogs should be safe and reliable. The authors of this paper describe the compression of an Ivalon plug around a catheter wire. The plug is coated with dextran to allow 60-90 sec for its placement before it begins to expand. The placement technique produced no early cardiac deaths, and the infarcts seen at postmortem were in the locations predicted at the time of plug placement.

Prospective Evaluation for Pneumonectomy Using Perfusion Scanning—Follow-Up beyond One year. P. G. Boysen, J. O. Harris, A. J. Block, G. N. Olsen; VA Med. Ctr., Gainesville, FL. *Chest* 80: 163-166, 1981

Thirty-eight patients with a forced expiratory volume in one second (FEV_1) of less than 2.0 l or maximum voluntary ventilation of 50% or less of that predicted were further evaluated by quantitative radionuclide perfusion studies of the lung. If the predicted FEV_1 following surgery was greater than 0.8 l, the patient was approved for pneumonectomy. At one year following pneumonectomy 23 patients (61%) were alive, though nine of these had metastases. Only one of these 15 first-year deaths was attributed to respiratory failure. At the end of 2 yr, 13 patients (34%) were alive. Of the 38 patients, 12 had a predicted postoperative FEV_1 of 0.8 to 1.0 l and eight of these (67%) were alive at 1 yr. Ultimately, the cause of death was available in 29 of the patients. Respiratory failure accounted for five of these deaths. The predicted postoperative FEV_1 was not reported for any of these patients.

Sensitivity of Scintigraphy for Detection of Pulmonary Capillary Albumin Leak in Canine Oleic Acid ARDS. H. J. Sugerman, A. M. Strash, J. I. Hirsch, F. L. Glauser, K. K. Shirazi, D. E. Sharp, L. J. Greenfield; Med. Col. of Virginia, Richmond, VA. *J Trauma* 21: 520-527, 1981

In this study, normal dogs received 15-20 mCi Tc-99m-labeled human serum albumin intravenously. Each animal was then imaged by gamma camera for 30 min during which time a control lung:heart radioactivity ratio (0.54 ± 0.10) was computed. The ratio remains constant in normal lung, since radiolabeled albumin leaves lung and cardiac blood pools at the same rate. At the end of the 30 min, oleic acid in a dose of 0.01, 0.05, 0.10, 0.15, or 0.20 ml/kg was administered intravenously to elicit pulmonary microvascular injury. In that situation, a continuously rising lung:heart ratio (named slope of injury) ensued over the next five- to ten-minute interval, indicating a pulmonary capillary protein leak. Such slope was directly related to the dose of oleic acid administered, including the lowest dose studied, ($r = +0.97$, $p < 0.004$). Standard chest radiographs over 90 min after the 0.05 ml/kg dose were negative. A slight pulmonary infiltrate was noted at 90 min after 0.10 ml/kg and at 30 min after 0.20 ml/kg. A significant infiltrate was apparent 90 min after 0.20 ml/kg. While alveolar epithelial membrane permeability studies failed to show decreased albumin half-times from the 0.01 ml/kg dose, a decrease was seen after the 0.05 and 0.10 ml/kg doses. Wet:dry bloodless lung weight ratios were generally proportional to the dose of oleic acid. Following cannulation of the right lymphatic duct, a significant increase in lymph flow was seen at all doses of oleic acid. Likewise, light microscopy revealed injury proportional to all dose levels studied. These authors feel that their sensitive scintigraphic method may prove useful in evaluating the adult respiratory distress syndrome (ARDS) in which the initial pathophysiologic event is thought to be a pulmonary capillary "leak."

The Diagnoses of Renal Osteodystrophy: A Comparison of Technetium-99m-Pyrophosphate Bone Scintigraphy with Other Techniques. E. M. Hodson, R. B. Howman-Giles, R. A. Evans, G. Bautovich, E. E. Hills, K. Sherbon, B. D. Bach, J. S. Horvath, D. J. Tiller; Camperdown, Australia. *Clin Nephrol* 16:24-28, 1981

The authors compared skeletal scintigraphy, biochemical data, and bone histology to determine the usefulness of scintigraphy in the evaluation of renal osteodystrophy. Seventeen hemodialysis patients and 11 controls were included in the study. Biopsy material was obtained from the right superior iliac spine. Serum levels of calcium, phosphorus, alkaline phosphatase, and parathyroid hormone were determined before dialysis. Radiograms of the hands, pelvis, and shoulder region were examined for subperiosteal erosions and Looser's zones. Twenty millicuries of Tc-99m PPI were injected 1 hr before dialysis. A gamma camera whole-body scan was obtained 1 hr after dialysis. The camera was interfaced to a computer. Scans were scored semiquantitatively by assigning scores from 0 to +4 to each of eight skeletal areas. Furthermore, a quantitative regional analysis was calculated by comparing counts of the hands, ilium, and the fourth lumbar vertebra with those of a 100- μ Ci standard. A bone-standard ratio was obtained. The authors found that bone histology was abnormal in all dialysis patients. Scan scores and the mean bone-standard ratio were significantly elevated in uremic patients, compared with controls. However, while the bone-standard ratio correlated well with an osteoid-osteoclast index, it failed to correlate with any individual histologic parameter. The authors conclude that bone scans do not provide therapeutically useful information about the existence, type, or severity of renal osteodystrophy.

Radionuclide Cystography Significance of Retention Time of Refluxed Radiolabel. I. Nissenkorn, I. Gil, C. Servadio, E. Lubin; Belinson Med. Ctr., Petah Tikvah, Israel. *J Urol* 126:448-451, 1981

Thirty-six patients with vesicoureteral reflux were studied by radionuclide cystography utilization of Tc-99m sulfur colloid

(Tc-99m SC) to evaluate the significance of the time between voiding and complete disappearance of radionuclide tracer that refluxed from the kidney (retention time). With the patient in the standing position, saline with 1 mCi Tc-99m sulfur colloid was instilled into the bladder by gravity until the patient experienced pressure and a desire to void. After the catheter was removed, the patient was instructed to empty the bladder. The bladder and renal areas were imaged during the time of filling and voiding, and subsequently imaged at 7, 10, 15, 20, and 30 min after voiding. Twenty-four to 48 hr after Tc-99m SC cystography, each patient was studied by relative differential renal function with Tc-99m DTPA. Sequential renal scans and renal histograms were obtained. The criteria for renal functional impairment were: (a) abnormalities on IVP and (b) <45% of total function contributed by one kidney (by dynamic renal function study and creatinine clearance). Twenty-one renal units in 11 patients had evidence of renal impairment (Group A). The remaining 19 patients in the 24 affected renal units showed no sign of renal damage (Group B). In 91.7% of the normally functioning kidneys of the Group B subjects, retention time was less than 5 min, whereas in 86% of the impaired kidneys of Group A patients, retention time was more than 10 min and in 56% it was more than 20 min. The retention of Tc-99m SC particles (1–5 μ) may be analogous to the retention of similar size bacteria and suggests a possible pathophysiologic explanation for the development of renal dysfunction due to the presence of bacteria in the kidney after reflux. The authors concluded that the prolonged retention of radiocolloid in the kidney correlates with decreased renal function, and if prolongation of retention time of more than 10 min is discovered but there is no renal function damage, the patient may benefit from surgical therapy.

Metabolic Mapping of the Brain's Response to Visual Stimulation: Studies in Humans. M. E. Phelps, D. E. Kuhl, J. C. Mazziotta; University of California, Los Angeles, CA. *Science* 211:1445–1448, 1981

This article reports the effects of visually complex scenes on glucose metabolism in the visual cortex of the brain as mapped by 2-¹⁸F-fluorodeoxy-D-glucose (FDG) in cross-sectional positron tomographic images. Scanning was performed 40–50 min post-injection of 5–10 mCi of FDG. The increase in glucose metabolic rate over dark values ranged from approximately 10% for white light to around 100% for a complex scene. Such large changes are only seen otherwise in epileptic seizure foci. A great deal of functional information can be acquired from tracer studies. The cover of the issue portrayed six sections comparing brain glucose metabolism under various kinds of visual stimulation.

Improved Human Chorionic Gonadotropin Detection with Carboxyl-Terminal Radioimmunoassay of the Beta Subunit on Concentrated 24-hr Urine in Patients with Testicular Cancer. N. Javadpour, H. C. Chen; NCI Surgery Branch, Bethesda, MD. *J Urol* 126:176–178, 1981

These authors developed a double-antibody radioimmunoassay (RIA) for urinary human chorionic gonadotropin (HCG) using an antiserum raised against the unique carboxyl-terminal peptide of the HCG beta-subunit (residues 123–145). For RIA, HCG was first extracted from a 24-hr urine collection by a kaolin-acetone procedure. Sensitivity of RIA was 19.4 ng HCG/ml sample. In 20 normal subjects, urinary HCG was <70 ng/ml. Serum level of HCG determined by a separate double-antibody RIA was considered elevated if over 1 ng/ml. Serum levels of HCG were elevated in all 15 patients with testicular cancer prior to initial therapy. After surgery, radiotherapy, or chemotherapy, serum levels of HCG in all patients reverted to normal. Then, five of those

patients who had an elevated urinary HCG but normal serum HCG received no further treatment but underwent serial urine and serum HCG measurements. After 4–7 mo, serum HCG became elevated in all cases, and recurrent tumor became clinically detectable. In the other ten patients, who had an elevated urinary HCG but a normal serum HCG, chemotherapy was given causing a decline to normal in urinary HCG levels. In those ten patients, there has been no evidence of tumor recurrence during a minimum follow-up of 2 yr. In the urinary HCG RIA, no cross reaction with luteinizing hormone occurs, thus yielding high assay specificity. These authors feel their urinary HCG RIA is most useful in revealing candidates for chemotherapy in whom serum HCG is normal and tumor is clinically undetectable.

Serum Concentrations of Erythropoietin Measured by Radioimmunoassay in Hematologic Disorders and Chronic Renal Failure. C. G. Zaroulis, B. J. Hoffman, I. A. Kourides; Mt. Sinai Hosp. and Med. Ctr., New York, NY. *Am J Hematol* 11:85–92, 1981

These authors describe their clinical radioimmunoassay (RIA) for serum erythropoietin (EP). Highly purified EP was iodinated with I-125 antiserum to human urinary EP produced in rabbits. For the RIA, serum (5–300 μ l) and antiserum were incubated at 4°C for 2 days before and 2 days after addition of I-125-EP. Goat antirabbit gamma globulin was then added to the mixture and incubated a further 20 hr at 4°C, then centrifuged. Radioactivity in drained precipitates was measured in an automatic gamma counter. Sensitivity of the RIA was 5 mU EP/ml serum. While human thyroid-stimulating hormone and albumin did not cross react in the RIA, the minimal cross reactivity of human gamma globulins (GG) was negated by addition of GG to the standards. In 19 normal adults, serum EP was found to be 29 ± 17 mU/ml (mean \pm 1 s.d.) (range < 18–81). Nine children and young-adult patients with severe aplastic anemia had 3487 ± 2243 mU/ml (range 984–6434). Three men with untreated polycythemia vera each had a value <18 mU/ml. In 11 adults with chronic renal failure, serum EP was 40.5 ± 30 mU/ml with the observed range of <18–115 overlapping the normals. Within 4 hr of transfusion of red blood cells to three anemic cancer patients, their serum EP levels dropped, suggesting that measured EP was biologically active. The authors feel that their RIA is a tool for investigating the role of EP in hematopoiesis.

Radioimmunoassay of Human Plasma Somatostatin. K. Mackes, M. Itoh, K. Greene, J. Gerich; Mayo Med. School and Mayo Clinic, Rochester, MN. *Diabetes* 30:728–734, 1981

There are at least three difficulties in radioimmunoassay of somatostatin in human plasma: (a) heterogeneous human plasma somatostatin-like immunoreactivity; (b) degradation of both native somatostatin and tyrosylated analogs used as tracers in the unextracted plasma; and (c) presence of a somatostatin-binding protein and other yet poorly defined substances in the plasma interfering with antibody binding. To avoid the above problems, the present studies were undertaken extracting human plasma by gel filtration before assay. Gel filtration of human plasma and subsequent radioimmunoassay of column eluates using five different antisera uniformly demonstrated two fractions of somatostatin-like immunoreactivity (SLI) in plasma. One fraction eluted in the void volume and had an apparent molecular weight in excess of 150,000 daltons. This material comprised most of the plasma SLI, and decreased immunoprecipitability of both N-tyrosine- and tyrosine-11-I-125-somatostatin. The second fraction (peak II) coeluted with synthetic somatostatin, diluted in parallel with synthetic somatostatin, and did not appreciably degrade either I-125-tyrosylated analog. Synthetic somatostatin added to plasma was recovered nearly completely in peak II SLI. Infused synthetic somatostatin increased peak II SLI but did not alter peak I SLI. With

this method, mean plasma somatostatin concentrations (peak II SLI) in postabsorptive normal volunteers ranged from approximately 40–100 pg/ml, depending on the antibody system used. These concentrations are similar in magnitude to those reported to affect reputed target tissues of somatostatin *in vitro* and are thus consistent with a possible hormonal function for the peptide. The authors concluded that gel chromatography of human plasma before assay can be used to circumvent problems of immunoheterogeneity, degradation, and nonspecific interference while providing adequate recovery.

Radioimmunological Determination of Urinary Melatonin in Humans—Correlation with Plasma Levels and Typical 24-hr Rhythmicity. U. Lang, M. Kornemark, M. L. Aubert, L. Paunier, P. C. Sizonenko; University of Geneva, Geneva, Switzerland. *J Clin Endocrinol Metab* 53:645–650, 1981

Detailed clinical investigation of melatonin secretion using plasma or cerebrospinal fluid samples has been hampered by the predominantly nocturnal secretion of the hormone. Urinary melatonin determinations by radioimmunoassay (RIA) offer an attractive alternative particularly useful for studies in neonates and children. Blood samples and urine specimens obtained from healthy adult volunteers during determined time periods were stored at -20°C without preservatives before analysis. Urinary extracts of melatonin obtained in the usual manner were found to contain significant quantities of cross reacting substances. Extraction at pH 4.0 with subsequent wash using 0.1 M NaOH proved to be a very important purification step and eliminated essentially all cross reacting derivatives from the urinary extract. Displacement and recovery analysis as well as mass fragmentation analysis proved the validity of the RIA. The lower limit of detection by this method is 8.8 ± 0.93 pg (SE) melatonin. Comparison of plasma levels at 2400^h with urinary excretion from 2100–2700^h showed a correlation factor of 0.74 ($P < 0.01$). There was wide variation in plasma and urinary melatonin values between individuals, but the patterns of melatonin secretion were found to be quite constant throughout the year. Multiple-timed urine samples confirmed the existence of a circadian rhythm of melatonin excretion in urine with maximal excretion between 2300–0300^h. The value obtained for excretion during that interval showed a linear correlation ($r = 0.752$, $P < 0.005$) with the total 24-hr urinary melatonin excretion.

The Accuracy of 99-Molybdenum Assays in 99m-Technetium Solutions. C. C. Williams, J. G. Kereiakes, L. W. Grossman; Eugene L. Saenger Radioisotope Laboratory, University of Cincinnati College of Medicine and the FDA Nuclear Medicine Laboratory, Bureau of Radiological Health. *Radiology* 138:445–448, 1981

The sound practice of nuclear medicine requires that the eluate from ^{99}Mo - $^{99\text{m}}\text{Tc}$ radionuclide generators be tested to determine the amount of Mo-99 present prior to use of Tc-99m pharmaceuticals for clinical studies. The accuracy of these measurements is particularly important in light of the lowering of acceptable levels to less than 0.15 μCi (5.55 kBq) of Mo-99 per mCi (37 MBq) of Tc-99m at the time of administration (The United States Pharmacopeia, 20th Revision, 1979). In this work three unidentified commercial dose calibrators were tested with respect to their accuracy in measuring the amount of Mo-99 present in the eluates of Mo-Tc generators. In addition, a Ge(Li) detector was used to measure the spectrum of high-energy photons penetrating through the sides and bottom of the Mo-99m assay shields. The spectra obtained with the Ge(Li) detectors revealed that one of the assay shields did not have sufficient thickness of lead to prevent substantial numbers of Tc-99m photons from penetrating the shield. Therefore, the accuracy of that dose calibrator would be

questionable when large amounts of Tc-99m or low activities of Mo-99 were present. All three dose calibrators gave different responses to the low-level linearity tests for known amounts of Mo-99 in the presence of Tc-99m. One performed reasonably well with a linear response and no threshold. Most of the actual data points were within 25% of the correct values. The second dose calibrator also yielded values within 25% but only above a threshold of 11–17 μCi (410–630 kBq). The third dose calibrator yielded measurements within 30% above a threshold of 12–17 μCi . Below the threshold the third calibrator was very noisy. Similar results for all three calibrators were obtained for Cr-51 sources. The authors concluded that two of the three dose calibrators can be used for Mo-99 breakthrough tests if the eluate contains at least 1 Ci (37 GBq) of Tc-99m. However, because of the threshold exhibited by two of the calibrators tested, false-negative Mo-99 breakthrough tests may be exhibited for low levels of Mo-99. Incorrect readings may also be obtained for low levels of other nuclides such as Cr-51.

Film Reciprocity Law Failure in Scintillation Camera Imaging. L. W. Grossman, R. J. Van Tuinen, J. B. Druger, K. L. Scholz; FDA, Nuclear Medicine Laboratory, Cincinnati General Hospital, Cincinnati, OH. *Radiology* 138:697–700, 1981

Despite the availability of computers in nuclear medicine, many physicians still utilize analog images for diagnosis. In this study a radially symmetrical transmission step-wedge was used to generate H and D curves under different conditions simulating clinical studies. Images were obtained on Kodak NM film from a P-31 phosphor using a point source of Tc-99m and the step-wedge in contact with the detector. Optical density measurements were made with a 3-mm aperture to provide an average value. Repeat measurements usually agreed to within 0.03 density units of the mean. When the total imaging time was changed, significant changes in film speed and small changes in film contrast were observed. Speed was highest for the short exposures and least for long exposures; film contrast was slightly lower for the long exposures. It was found that an increase by a factor of 10 in imaging time produced a decreased film speed that could be largely compensated for with a one *f*-stop change in aperture. Dot focus (CRT dot size) also had a strong effect on film speed when the same exposure time was used. A decrease in film speed by a factor of nearly 2 was observed when the dots were unfocused. A light-sensitive silicon diode was used to measure the actual light output from the CRT for unfocused and sharply focused dots; no significant difference was noted. It is believed that these decreases in film speed are due to decay of the latent image in grains that have not received a sufficient number of light photons for development. To achieve accurate exposure of scintiphotos, it is necessary to control exposure time, CRT dot size, and intensity carefully.

Gallbladder Wall Thickness Distortion by Ascites. B. J. Lewandowski, F. Winsberg; Montreal General Hospital, Montreal, Quebec, Canada. *Am J Roentgenol* 137:519–521, 1981

In a series of eight cases the authors studied the effect of ascites on gallbladder wall thickness. The findings indicated that the presence of ascitic fluid in contact with the gallbladder wall was not responsible for apparent gallbladder wall thickening but that decentering of the beam and improper angulation could produce considerable false thickening. The authors suggest that actual gallbladder wall thickening is secondary to the hypoalbuminemia that frequently accompanies ascites rather than to the fluid itself. Real-time scanning is felt to produce the most accurate measurements of gallbladder wall thickness. *In vivo* and *in vitro* studies are presented.

Sonography of the Low-Lying Placenta: Value of Trendelenburg and Traction Scans. R. B. Jeffrey, F. C. Laing; San Francisco General Hospital, San Francisco, CA. *Am J Roentgenol* 137: 547-549, 1981

A prospective study of 217 patients yielded 50 in whom conventional studies failed to image the termination of placenta and the region of the internal cervical os. Application of gentle traction on the fetal head combined with a maternal Trendelenburg position produced adequate visualization of the termination of the placenta and the internal cervical os in 49 of the 50 patients. No untoward discomfort or risk was encountered. The technique was limited to fetuses in the cephalic presentation. Representative scans are provided.

The Role of Real-Time Scanning in Antenatal Fetal Surveillance. B. S. Schifrin, V. Gentes, R. C. Gergely, R. Eden, K. Roll, J. Jacobs; Univ. of Southern California Medical Center, Los Angeles, CA. *Am J Obstet Gyn* 140:525-530, 1981

Real-time evaluation of physiologic fetal parameters was compared with established evaluations of fetal well being such as the nonstress test and contraction stress test. A 10-min period of observation was used, and the criteria for a normal study included at least one episode of breathing lasting 60 sec, three discrete episodes of fetal motion and at least one episode of extension of the extremities. The largest pocket of amniotic fluid was required to be greater than 1 cm in vertical diameter and the fetal limbs were normally found in position of full flexion. The authors concluded that a normal fetal-well-being study was as reliable an indicator of a good fetal outcome as the reactive nonstress test, and far more reliable than the contraction stress test in discriminating the truly abnormal fetus. In general, abnormal results were poor indicators of poor fetal outcome save when all parameters were affected.

The Value of Ultrasonic Scanning in the Differentiation of Acute Post-Transplant Renal Failure. A. Barrientos, O. Leiva, R. Diaz-Gonzalez, G. Polo, L. M. Ruilope, J. M. Alcazar, J. L. Rodicio, V. Borobia, J. Navas; Ciudad Sanitaria de la Seguridad Social 1 de Octubre, Madrid, Spain. *J Urol* 126:308-312, 1981

The authors studied 43 renal transplant patients encompassing 32 episodes of acute rejection and 17 of acute tubular necrosis. Baseline studies were obtained within the first 36 hr post transplantation and repeated every 2 to 3 days throughout the interval of oliguria or nonoliguric renal failure. Seventy-five percent of the patients with acute rejection demonstrated an increase in the prominence of the central echoes of the renal sinus, whereas 77% of those with acute tubular necrosis demonstrated a decrease in the echogenicity of the central sinus complex. The size of the kidney increased in all instances regardless of the cause of renal failure, and the thickness of the parenchyma increased in 93% of those with acute rejection. The authors suggest that differentiation between acute tubular necrosis and acute rejection can be made by analysis of the central sinus echoes.

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Current Imaging Tests

G.T. Krishnamurthy, M.D.

Nuclear Energy and the Public Health

Wil Nelp, M.D.

WE CORDIALLY INVITE YOU TO SUBMIT SCIENTIFIC PAPERS FOR PRESENTATION AT THE MEETING. Please contact Dr. Peter Ronai, Salem Hospital Memorial Unit, 655 Winter St. SE, Salem, OR 97309. Tel: (503)370-5472.

COMMERCIAL COMPANIES are invited to participate. Space will be available for table-top displays. Please contact the Pacific Northwest Chapter Office.

AMA Category 1 credit for physicians will be available.

There will be a Chapter General Business Meeting on Saturday, March 13, 1982 at the scheduled lunch.

For further information and hotel and registration cards, please contact: Jean Parker, Administrator, Pacific Northwest Chapter, SNM, P.O. Box 40279, San Francisco, CA 94140. Tel: (415)647-0722 or 647-1668.

Second High Country Nuclear Medicine Conference

March 27-April 3, 1982

The Lodge at Vail

Vail, Colorado

The program will be devoted to the use of Single Photon Computed Tomography. The program will feature talks by individuals who have experience with the systems of GE, Picker, and Technicare. The quality-control problems of SPECT systems as well as applications of these systems will be discussed.

There will also be a presentation on newer tomographic techniques—nuclear magnetic resonance.

For further information contact:

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Penrose Hospital
2215 North Cascade Avenue
Colorado Springs, CO 80907