

ABSTRACTS OF CURRENT LITERATURE

Radionuclide Analysis of Right and Left Ventricular Response to Exercise in Patients with Atrial and Ventricular Septal Defects. C. A. Peter, K. Bowyer, R. H. Jones; Duke Univ. Med. Ctr., Durham, NC. *Am Heart J* 105:428-436, 1983

Ten normal subjects, ten patients with ventricular septal defect (VSD), and ten patients with atrial septal defect (ASD) were simultaneously studied for right and left ventricular response to exercise. All radionuclide angiograms were performed with the use of a computerized multicrystal gamma camera. Left-to-right shunt was measured by a gamma variate fit. The normal subjects increased both right and left ejection fraction (RVEF, LVEF), end-diastolic volume, and stroke volume to achieve a higher cardiac output during exercise. Patients with VSD failed to increase RVEF, but increased RV end-diastolic volume and stroke volume. LV end-diastolic volume did not increase, but LVEF, LV/stroke volume, and forward LV output achieved during exercise were comparable to the response observed in normal subjects. In patients with ASD no rest-to-exercise change occurred in either RVEF, RV end-diastolic volume, or RV stroke volume. LV end-diastolic volume failed to increase. Although there was an increase in LVEF, LV stroke volume remained unchanged from rest to exercise. In patients with ASD and VSD the authors concluded that (1) cardiac output was augmented only by increased heart rate, and (2) RV function appeared to be the major determinant of total cardiac output during exercise.

Quantitation of Aortic and Mitral Regurgitation in the Pediatric Population—Evaluation by Radionuclide Angiocardiography. R. A. Hurwits, S. Treves, M. Freed, S. A. Girod, R. L. Caldwell; Kahn Hosp. Med. Ctr., Miami, FL. *Am J Cardiol* 51:252-255, 1983

The purpose of the study is to evaluate the role of radionuclide angiocardiography (RA) in quantification of aortic (AR) or mitral (MR) regurgitation in young patients by (1) a comparison of the RA estimate of regurgitation with the estimate by cineangiography (CIN), and (2) an evaluation of possible change in regurgitation during isometric exercise and after cardiac surgery to correct regurgitation. Forty-eight children and young adults (aged from 1/2 to 26 yr) underwent the study. Forty-seven of the 48 had good correlation between CIN and AR. Stroke:volume ratio (SVT) was defined as counts ejected from the left ventricular region to counts ejected from the right ventricular region; SVT was compared with CIN degree of regurgitation routinely classified as slight, mild, moderate, or severe. RA stroke volume ratio was used to classify severity; (1) the group with equivocal regurgitation differed from the group with mild regurgitation; (2) patients with mild regurgitation differed from those with moderate regurgitation; (3) those with moderate regurgitation differed from those with severe regurgitation. The STR was in response to isometric exercise, remaining constant or increasing in 16 of 18 patients. After surgery to correct regurgitation, SVR significantly decreased from preoperative measurements in all seven patients evaluated. The results from the study demonstrate that a stroke volume ratio >2.0 is compatible with moderately severe regurgitation and that a ratio >3.0 suggests the presence of severe regurgitation. It was concluded that RA should be useful for noninvasive quantitation of AR or MR, helping define the course of young patients with left-side valvular regurgitation.

Clinical Assessment of Left Ventricular Ejection Fraction with Short-Lived ^{195m}Au . F. Fazio, P. Gerundini, A. Maseri, M. C. Gilardi, A. Margonato, L. Alazzi, A. Fregoso, L. Milanese, W. Bencivelli; Università di Milano, Milano, Italy. *J Nucl Med All Sci* 26:105-111, 1982

Two different approaches are currently in use for the quantitative evaluation of cardiac performance: first-pass radionuclide angiography and gated-equilibrium blood-pool studies. The authors evaluated the feasibility of multiple first-pass radionuclide examinations using a $^{195m}\text{Hg} \leftrightarrow ^{195m}\text{Au}$ generator. Forty-six percent of the Hg-195m (half-life 41.6 hr) decays to Au-195m (half-life 30.6 sec, 262 keV), 54% was transformed to Hg-195m (half-life 9.9 hr). Thirty to forty-five percent of the theoretically available Au-195m is eluted by a solution of sodium thiosulphate and sodium nitrate. Each of the nine normal volunteers and eight patients (two with congestive heart failure, six with coronary artery disease) received six consecutive Au-195m first-pass studies. For each examination 14 to 32 mCi of Au-195m in a volume of 2 ml were injected, followed by a flush of 15 ml saline solution. Minimum time between two consecutive studies was 3 min. The data were acquired in the sequence: LAO, anterior, RAO, 30° RAO, anterior, 45° LAO. A Tc-99m first-pass study in 45° LAO, immediately following the Au-195m examination, was used as reference. Left-ventricular ejection fraction (LVEF) was calculated from the data by two observers using a computer system. The reproducibility of Au-195m studies was excellent, as demonstrated by a correlation coefficient of 0.98 between the LVEF values of the first and second Au-195m injection. A correlation coefficient of 0.97 was calculated for the LVEF values of the Au-195m and Tc-99m examinations. The chi square analysis of the time-activity curves of the two nuclides indicates that both have indistinguishable behavior for cardiac first-pass studies. Thus, possible diffusion of Au-195m into the lung does not alter the results. The authors conclude that the eluate of $^{195m}\text{Hg} \leftrightarrow ^{195m}\text{Au}$ generator is preferable for serial assessments of left ventricular function; e.g. exercise stress testing.

Radionuclide Stroke Count Ratios for Assessment of Right and Left Ventricular Volume Overload in Children. M. D. Parish, T. P. Graham, M. L. Born, J. P. Jones, R. J. Boucek, M. Artman, C. L. Partain; Vanderbilt Univ. Hospital, Nashville, TN. *Am J Cardiol* 51:261-264, 1983

The ratio of the left-ventricular (LV) stroke output to right-ventricular (RV) stroke output measured by gated cardiac radionuclide blood-pool study (GCRBS) has been used in adults to estimate the severity of aortic or mitral regurgitation. To evaluate validation of stroke volume ratio by GCRBS in children, 60 children aged 0.5 to 19 yr were studied. Assessment of intra- and interobserver variability in the determination of stroke count ratios revealed differences of $24 \pm 14\%$, and $32 \pm 19\%$, respectively. Twenty-two radionuclide stroke count ratios were compared with cineangiographic stroke volume ratios, resulting in a correlation coefficient of 0.88. Three groups were designated: (1) normal (stroke count ratio of 1.04 ± 0.17)—40 patients with no shunts or valvular regurgitation; (2) LV volume overload (2.43 ± 0.86)—13 patients with mitral or aortic regurgitation or both; and (3) RV volume overload (0.44 ± 0.17)—two with severe tricuspid

regurgitation, three with atrial septal defects, and two with total anomalous pulmonary venous drainage. The authors concluded that GCRBS is an excellent tool for qualitative and quantitative assessment of valvular regurgitation in children.

Left Ventricular Performance During Exercise in Patients with Left Bundle Branch Block—Evaluation by Gated Radionuclide Ventriculography. D. W. Rowe, E. G. Depuey, R. E. Somnemaker, R. J. Hall, J. A. Burdine; Texas Heart Institute, Houston, TX. *Am Heart J* 105:66–71, 1983

Hemodynamic deterioration at rest during intermittent left bundle branch block (LBBB) has been documented in patients with abnormal ventricles but has not been found at rest in patients with otherwise normal hearts. Few data are available regarding left ventricular (LV) performance during exercise in patients with LBBB. To evaluate changes in LV function during exercise in patients with LBBB, 22 patients (ten women, 12 men, mean age 53.5 yr) without a history or physical findings of previous myocardial infarction of LV dysfunction were studied by gated cardiac radionuclide study (GCRS) at rest and during exercise. Nine of 22 patients had 75% diameter narrowing of at least one coronary artery by angiography. Of the remaining 13 patients, GCRS demonstrated wall motion abnormalities in seven patients either at rest or during exercise. Mean resting LV ejection fractions (EF) for patients with and without coronary artery disease (CAD) were 0.59 ± 0.06 and 0.57 ± 0.09 , respectively. In patients without CAD there was no significant increase in LVEF with exercise. In patients with CAD, mean LVEF fell about 12 points with exercise. The authors concluded that LV reserve, as manifested by LVEF response to exercise, is reduced in patients with LBBB even in the absence of CAD or other underlying cardiac disease and that GCRS criteria to exclude the presence of CAD are not applicable in screening patients with LBBB.

Radionuclide Angiocardiographic Analysis of Myocardial Function in Myotonic Muscular Dystrophy. G. B. Hartwig, K. R. Rao, F. M. Radoff, R. E. Coleman, R. H. Jones, A. D. Roses; Duke Univ. Med. Ctr., Durham, NC. *Neurology* 33:657–660, 1983

Radionuclide angiocardiography (RNA) was used to study left ventricular function in ten men with myotonic muscular dystrophy. None of the patients had historical or physical evidence of heart disease and all were under age 50 (nine less than 42 yr old). Twenty-seven normal healthy men (age 20–50) served as controls. RNA was performed after an overnight fast with upright bicycle ergometry and a first-pass technique. Data were obtained using a multicrystal, computerized gamma camera to construct time-activity curves and generate analyses of wall motion. Left ventricular ejection fractions (LVEF) at rest were abnormal (outside 2 s.d. of the normal mean) in two patients, and failed to show normal response to exercise in eight of the ten patients. Wall-motion studies at rest showed generalized hypokinesia in two patients and became abnormal with exercise in four patients, thus yielding abnormal RNA findings in nine of ten patients. Electrocardiographic abnormalities showed no clear relation to the RNA abnormalities, and no evidence of ischemia was seen. The results in this group of patients suggest that exercise-induced myocardial dysfunction is frequent in patients with myotonic muscular dystrophy and interaction of intrinsic myocardial disease with conduction abnormalities should be studied in this group.

Enhanced Detection of Proximal Right Coronary Artery Stenosis with the Additional Analysis of Right Ventricular Thallium-201 Uptake in Stress Scintigrams. J. Gutman, M. Brachman, A. Rozanski, J. Maddahi, A. Waxman, D. S. Berman; Cedars Sinai Med. Ctr., Los Angeles, Ca. *Am J Cardiol* 51:1256–1560, 1983

Thallium-201 (TI-201) stress scintigraphy of the right ventricle

(RV) was assessed along with the right-ventricular ejection fraction (RVEF) response to exercise and cardiac wall-motion studies by blood-pool scintigraphy for usefulness in detecting proximal stenosis of the right coronary artery (RCA). The study of 52 patients included 43 men and nine women (mean age 55 yr), all of whom had coronary arteriography within 3 mo of the scintigraphic studies. Standard protocols were used in the scintigraphic studies and results were assessed by observers unaware of the clinical history or arteriographic findings. TI-201 activity was visually graded by a scoring system as was left-ventricular inferior wall motion. An absolute increase of 5% over the resting value was considered a normal RVEF response to exercise. Proximal RCA stenosis was found at arteriography in 27 patients (Group I) and distal RCA stenosis in five patients (Group II). Normal RCA or less than 50% RCA stenosis was found in 20 patients (Group III). Sensitivity and specificity of RV and LV TI-201 scintigraphy were comparable (59% and 88% compared with 67% and 68%, respectively). Combining the two studies gave a sensitivity of 93% ($p < 0.01$ compared with separate RV or LV analysis). Abnormal RVEF exercise response had 56% sensitivity and 64% specificity. Combination of these latter two studies yielded 81% sensitivity and 48% specificity. Neither of these differed significantly from RV TI-201 stress scintigraphy in the detection of proximal RCA stenosis. Concordant abnormalities in RV and LV TI-201 scintigraphy gave the highest sensitivity (100%) in detection of proximal RCA stenosis.

Changes of Regional Blood Volume After the Application of Nitroglycerin in Patients with Heart Failure: A Study of Functional Whole-Body Scanning. W. Schörner, D. Loos, R. Schneider, R. Felix; Klinikum Charlottenburg of the Freie Universität Berlin, Berlin, West Germany. *Herz/Kreisl* 4:153–158, 1983

Blood pool imaging after in vivo labeling of red blood cells was performed in eight patients suffering from chronic heart failure. A gamma camera equipped with a divergent collimator (105 cm field of view) and a computer system were used to estimate the regional blood volume by a region of interest technique after the administration of 1.6 mg glyceryltrinitrate (GTN). The blood volume was significantly decreased over the heart, the lungs, and the liver after the administration of GTN when the GTN-group was compared with a control group. Besides the well-known increase of regional blood volume in the extremities, scintigraphy demonstrated a significantly higher blood volume over the abdomen after the i.v. injection of GTN. The pulmonary blood volume was decreased after GTN, leading to an improvement of the heart function.

The Correlation of Lung Structure with Function. N. Berend; National Jewish Hospital, Denver, CO. *Lung* 160:115–130, 1982

The correlation between structural and functional changes in different diseases are reviewed. Idiopathic pulmonary fibrosis (IPF) is associated with an increased amount of fibrous tissue in the alveolar and interlobular septae, peribronchiolar tissue, and visceral pleura. The alveolar septum is thickened, and inflammatory cells migrate into the areas of increased fibrous tissues. Cellular debris is frequently seen in the airways, and the small airways are narrowed due to fibrosis or inflammation. The lung volume and diffusing capacity is reduced, and arterial hypoxemia caused by ventilation:perfusion mismatch is reviewed.

The pulmonary fibrosis after the application of bleomycin is similar to IPF. The diffusing capacity is reduced and the pressure-volume curve is shifted. On the basis of experimental studies the observed changes in the pressure-volume relationship were not related to fibrotic changes but may represent the stage of cellular infiltration.

For evaluation of emphysema, an enlargement of air spaces distal to the terminal bronchiole by dilatation or obstruction of the

walls, three main function tests are used: maximum expiratory flow measurement, pressure-volume curve analysis, and the determination of the diffusing capacity for carbon monoxide. When the maximum expiratory flow is plotted against the transpulmonary pressure, the differentiation between decreased elastic recoil with or without the presence of airways disease is possible. Pressure-volume curves (transpulmonary pressure plotted against the percentage of total lung capacity) are reliable in the differential diagnosis of normals, asthmatics, and emphysematous patients. The author emphasizes the role of diffusing capacity measurements for carbon monoxide as the best single test for the diagnosis and assessment of emphysema.

Small airways disease refers to the presence of a number of lesions such as inflammation, fibrosis, goblet cell hyperplasia, mucosal ulceration, intraluminal mucus, constriction and distortion of small airways, and smooth muscle hyperplasia. Small airways (internal diameter less than 2 mm) contribute only 10 to 20% of total airways resistance. Thus lung function tests reflecting total resistance would not be abnormal until extreme increases in small airways resistance occurred. The important tests are frequency dependence of dynamic compliance, single-breath nitrogen test, and maximal expiratory flow-volume curves, breathing a low-density gas mixture. Frequency-dependent compliance (decrease in compliance with increasing respiratory frequency) in the presence of normal overall lung resistance and normal overall static lung compliance is consistent with an increase in resistance in the small airways and thus correlates with small airways disease. Although this test was the first to be introduced as a specific test for small airways disease, the structural correlations of abnormality of this test have not been completely explored. The author concludes that lung function testing should provide information about the development, progression, or regression of lung disease as well as the stage of the disease. For staging, other techniques such as lavage and gallium scanning should be included.

The Influence of Bilirubin, Alcohol, and Certain Drugs on the Kinetics of ^{99m}Tc -Diethyl IDA (EHIDA) in Humans. J. M. Coenegracht, T. L. Oei, P. J. C. van Breda Vriesman; University of Limburg, Maastricht, The Netherlands. *Eur J Nucl Med* 8:140-144, 1983

The authors investigated the kinetics of Tc-99m HIDA on the basis of the mathematical analysis of time-activity curves in 186 patients. After the intravenous injection of 1 mCi Tc-99m HIDA, data were collected for 1 hr in 1 min intervals using a conventional gamma camera. A region of interest was placed over the right liver lobe and care was taken to avoid inclusion of the major intrahepatic bile ducts. According to a two-compartment model the rate of uptake, K_a and the rate of excretion, K_b were determined by means of an iterative algorithm. Twenty persons without evidence of liver disease formed the control group. The final diagnosis, which served as reference, was made by a variety of methods including biochemical studies, oral or intravenous cholangiography, endoscopic retrograde cholangiopancreatography, ultrasound, transmission computed tomography, laparoscopy, hepatic biopsy, and in some cases surgery or autopsy. In normal persons K_a was 0.138 ± 0.043 , K_b 0.031 ± 0.009 , and the time to maximum, T_{max} , was 12.7 ± 1.0 min. The hepatic excretion, represented by K_b , was significantly decreased in patients with nonalcoholic hepatocellular or obstructive liver disease when serum bilirubin concentrations exceed 0.015 mmol/l. The uptake was markedly decreased in these patients only when a severe jaundice (serum bilirubin concentration above 0.140 mmol/l) was present. In obstructive jaundice ($n = 28$) an increase of the uptake rate was observed but not in jaundice of hepatocellular origin ($n = 21$). The differential diagnosis between benign or malignant obstructive jaundice was not significantly improved by the quantitative analysis. An enhanced uptake of the radionuclide was noticed in alcoholics ($n = 33$) and in epi-

leptic patients ($n = 10$) with phenobarbital and diphenylhydantoin therapy. When the alcoholics developed hepatocellular injury, the K_a decreased to normal values, indicating a severe functional alteration of the hepatocytes.

Radionuclide Demonstration of Intrapulmonary Shunting in Cirrhosis. E. R. Bank, J. H. Thrall, D. R. Dantzker; Univ. Michigan Med. Ctr., Ann Arbor, MI. *Am J Roentgenol* 140:967-969, 1983

The association of hepatic cirrhosis with severe arterial hypoxemia is recognized. This case report describes a 71-yr-old black man referred for evaluation of refractory hypoxemia. He had not smoked but probably had been exposed to silica dust occupationally for 19 yr. He described drinking about 240 ml liquor daily for more than 20 yr but had no symptoms suggesting liver disease. Physical examination revealed mild tachycardia, mild tachypnea, generalized cyanosis, and clubbing. The heart, lungs, and spleen were normal, but minimal hepatic enlargement existed. No cutaneous angiomata were present. (Spider angiomata are recognizable in blacks). On liver/spleen scan (radiopharmaceutical not specified), a colloid shift to bone marrow consistent with hepatocellular disease occurred. Pulmonary angiography revealed no arteriovenous malformation; however, vessels were dilated peripherally and had a "spongy" pattern. For a lung image, 4 mCi Tc-99m macroaggregated albumin (Tc-MAA) of 20-50 μm particle diameter was injected i.v. Counts were collected in anterior and posterior views of head and neck, chest, and abdomen and pelvis using gamma camera equipped with moving table. Views were repeated with lungs shielded. Extent of shunting was calculated by averaging anterior and posterior counts from respective sites plus determining ratio of shielded to unshielded and amounted to 60%. When corrected for 3-6% of particles bypassing lung in control patients, pathologic shunting amounted to 54-57%. Using blood gas computations, a 56% pulmonary-to-systemic shunt was predicted. On images, extrapulmonary radioactivity was extensive, particularly in organs with high vascularity, such as brain, kidneys, and thyroid gland. In previously reported cases, hepatic dysfunction (e.g., manifested by jaundice, hepatomegaly, and bleeding disorders) usually precedes the presentation of cyanosis. This patient had none of those symptoms and had a greater degree of hypoxia than that expected on the basis of liver function studies. The absence of cutaneous angiomata was notable also. This case suggests that in hepatic cirrhosis, with or without cutaneous manifestations, a lung perfusion study can reveal and measure the intrapulmonary arteriovenous shunting causing hypoxemia.

The Role of Bone Scanning in Neonatal Rickets. P. D. Saul, D. J. Lloyd, F. W. Smith; Univ. Aberdeen, Aberdeen, Scotland. *Pediatr Radiol* 13:89-91, 1983

This case report describes two infants having neonatal rickets. Both preterm infants had birth weights below 1000 gm and grossly elevated serum alkaline phosphatase level, mainly in the bone iso-enzyme fraction. Bone imaging by Tc-99m-medronate (Tc-MDP) in untreated Subject 1 at 136 days of age revealed poor uptake of radiotracer, multiple rib fractures, and fracture of upper left femur. After 3 wk of treatment with calcium and vitamin D, imaging confirmed healing, showed greater uptake of radiotracer by skeleton, but demonstrated previously unsuspected, fractures of the eighth dorsal and first lumbar vertebrae. In Subject 2 suspected of having rickets and undergoing treatment, bone imaging at 82 days of age revealed general low uptake of radiotracer (indicating defective mineralization), but with increased epiphyseal uptake, consistent with healing rickets. The bone images changed in response to treatment before there was any notable alteration in bone iso-enzyme fraction of serum alkaline phosphatase, thereby serving as a useful aid in measuring response to treatment. Documentation of fractures permits recommendation of proper position of infant during nursing; for example, nursing of Subject 1 in

other than prone or supine position was avoided. Such documentation also precludes parents from being unjustly accused of child abuse when fractures from rickets arise in infants discharged from hospital to home. The authors conclude that bone imaging is useful for diagnosis and management of neonatal rickets by demonstrating extent of disease, response to treatment, and presence of disease-associated bone damage for later comparison should nonaccidental injury be suspected.

Rule of Bone Scanning for Evaluation of Carcinoma of the Cervix. C. R. Kamath, Y. Maruyama, F. H. DeLand, J. R. VanNagell; Univ. of Ky. Med. Ctr., Lexington, KY. *Gynecol Oncol* 15:171-186, 1983

To determine the frequency of metastatic bone lesions in cervical cancer of specific clinical stage and cell type by radionuclide bone scintigraphy or radiography and to compare the survival rates of patients with metastatic bone lesions by positive bone image with the group of patients with positive radiographic studies, all patients treated for carcinoma of the cervix from 1963 to 1981 were included in this study. No in situ or stage 0 patients had positive studies; four out of 272 (1%) were positive in stage I invasive carcinoma; three out of 297 (1%) were positive in stage II; ten out of 163 (6%) were positive in stage III; six out of 62 (10%) were positive in stage IV; 19 out of 187 (10%) were positive with recurrent carcinoma. Bone scans correlated well with positive radiographic studies but 1% false-positive images were seen, mostly showing osteoarthritis. Bone images demonstrate high sensitivity for detecting lesions in the cervical (16%), thoracic (40%), and lumbar (68%) spine. The bone study was much more sensitive and appeared to detect an earlier stage lesion, usually associated with symptoms that could respond to radiation and other treatment and follow a more indolent course than the lesions found in the patients who had a positive radiographic study. The radionuclide-positive patient has better survival than the radiographic positive patient.

Simple Labeling of ω -Phenylfatty Acids by Iodine Isotope Exchange. M. Eisenhut; Heidelberg, Germany. *Int J Appl Radiat Isot* 33, 499-504, 1982

Iodine isotope exchange can be used to label 15- ω (*p*-iodophenyl)-pentadecanoic acid (*p*-IPPA) with I-123. A 95% yield can be achieved in an hour. No further separation, except from iodide, need be accomplished. The *p*-¹²³I-IPPA thus formed was used in a rabbit and gave good uptake and contrast when compared with the commercially available 17-(¹²³I)iodoheptadecanoic acid.

A Simple Synthesis of Bromine-77 Labeled Alkyl Bromides. M. R. Kilbourn, K. D. McElvany, M. J. Welch; Washington University, Washington, DC. *Int J Appl Radiat Isot* 33, 391-392, 1982

Alkyl bromides are synthesized by the treatment of the corresponding alkyl alcohols with sodium or lithium bromide and chloromethylsilane in refluxing acetonitrile by analogy with a benzylic alcohol reaction. The reaction led to 21% to 75% yield in 4 hr, depending on the alcohol used. The products are easily purified by HPLC. This method represents an alternative to the exchange of bromide for iodide.

Closed Contour Extraction Application to Meteorological Pictures. V. Lattuati, D. Lemoine. *Pattern Recognition* 15(3), 145-152, 1982

Cloud data are formatted in 3000 × 3000 pixel images, quantized in six or eight bits. The task was to classify a cloud picture according to cloud families by computer analysis. The characteristic family images were difficult for the computer to distinguish because of blurred boundaries. Ordinary thresholding of the initial images was not a successful strategy. A three-valued image was

constructed and smoothed, using logical tests. Then closed contours were drawn around the areas in the picture. The size and shape of these areas are easily characterized and can themselves be used to classify the image according to its cloud type.

Spectrum of Sonographic Findings in 125 Renal Masses Other Than Benign Simple Cyst. J. W. Charboneau, R. R. Hattery, E. C. Ernst III, E. M. James, B. Williamson Jr, G. W. Hartman; Mayo Clinic & Mayo Foundation, Rochester, MN. *Am J Roentgenol* 140:87-94, 1983

Of 125 renal masses studied, 102 proved to be renal cell carcinoma. One hundred were solid but 40% also contained internal cystic areas. Echogenicity similar to liver or renal parenchyma was seen in 86%, 10% had a lower level of echoes than renal parenchyma, and 4% were hyperechoic, resembling renal sinus fat. Acoustic transmission was unchanged in 82%, decreased in 5%, and increased in 13%. Neither cell type nor histologic findings correlated with sonographic findings. Transitional cell carcinoma had echoes similar to liver or renal parenchyma. A broad range of findings was encountered in other less common conditions such as oncocytoma, abscess, multilocular cyst, multilocularcystic nephroma and renal artery aneurysm. Angiomyolipomas were highly echogenic in seven of nine cases. Two of the three mural nodules encountered in cystic lesions were found to be renal cell carcinoma. Scans representative of the spectrum are provided.

The Succenturiate Placenta. P. Jeanty, C. Kirkpatrick, C. Verhoogan, J. Struyven; Free University of Brussels, Hôpital Erasme, Brussels, Belgium. *J Ultrasound Med* 2:9-12, 1983

The succenturiate placenta, defined as one or more accessory lobes connected to the bulk of the placenta by blood vessels, is an uncommon phenomenon occurring in 0.16-0.28% of pregnancies. Complications of rupture at delivery or retention of an accessory lobe however, are serious. The authors describe four cases in which the succenturiate lobe is seen as separable from the body of the placenta and unconnected by a bridge of placental tissue. All were anteriorly placed in the current study and maternal age was slightly greater than average. This condition should not be confused with a placenta covering two major aspects of the uterine cavity, separated only by a fold or with a Braxton-Hicks contraction. Sonograms and pathological specimens are presented.

Ultrasonography of the Fetal Subarachnoid Space. F. C. Laing, C. E. Stamler, R. B. Jeffrey; University of California Service, San Francisco General Hospital, San Francisco, CA. *J Ultrasound Med* 2:29-32, 1983

In a review of 122 asymptomatic pregnant women, the authors encountered an echogenic line parallel to the inner table of the fetal skull in 83% of fetuses less than 30 wk gestation. This finding was present in only 23% of fetuses after 30 wk and in 3% at term. Most often visualized on transaxial views, it is felt to represent the outer margin of brain, and a sonolucent space of 1 to 3 mm in thickness between this line and the inner table is thought to be the subarachnoid space. Care must be taken not to interpret this normal appearance of the subarachnoid space as an extra-axial fluid collection. The term "pseudosubdural" is applied to this observation and representative examples provided.

Ultrasonographic Analysis of Chronic Intratesticular Pathology. L. Blei, S. Sihelnik, M. A. J. David Bloom, R. Strutzman, J. Chiadis; Uniformed Services University of the Health Sciences, Bethesda, MD. *J Ultrasound Med* 2:17-23, 1983

Twenty-three surgically documented cases of testicular abnormalities are presented with descriptions of the general gross

and microscopic features of the conditions. Certain characteristics were found to be helpful in distinguishing tumor, inflammation, and vascular pathology. Marked increased echogenicity was characteristic of vascular lesions and absent in tumors or inflammatory processes. The rounded anechoic-to-hypochoic appearance was strongly suggestive of tumor. Only inflammatory processes demonstrated bilaterality (33%), and epididymal involvement was most frequently a result of inflammation. Unilateral homogeneously increased echogenicity was seen only with inflammation. Although none of the categories are absolute, these characteristics were found to be useful in determining the likely

nature of a process by ultrasound. Sonograms representative of each pattern are provided.

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- Recent Advances in Brachytherapy Physics*. D.R. Shearer, Ed. New York, NY, American Institute of Physics, 1981, 202 pp, \$50.00
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