

## ABSTRACTS OF CURRENT LITERATURE

**Measurement of Regional Cerebral Blood Volume by Emission Tomography.** R. L. Grubb, M. E. Raichle, C. S. Higgins, J. O. Eichling; Washington University. *Ann Neurol* 4: 322, 1978

Cerebral blood volume (CBV) measurements were performed in ten normal volunteers using computer reconstructed emission tomographic scans. The distribution of carbon-11-labeled carboxyhemoglobin was determined following inhalation of 10-15 millicuries of carbon-11 CO dispersed in a mixture of helium and room air. Following equilibration, scans were obtained 4 and 8 cm above the orbitomeatal (O-M) line. Values for blood carbon-oxide C-11 activity were obtained for each region of interest by comparison of scan data with a time-activity curve generated from serial venous blood samples obtained during the time required for the scans. These values were corrected for detector nonuniformity, radionuclide decay, attenuation, and the ratio of tissue hematocrit to peripheral venous hematocrit. Scans obtained 4 cm above the orbitomeatal (O-M) line yielded higher average CBV than those obtained 8 cm above the O-M line, apparently because of the larger amount of gray matter present in the cross-section at the 4 cm level. CBV was found to be significantly greater in the left cerebral hemisphere in right-handed subjects with left cerebral dominance. This finding represents the first in vivo demonstration of structural asymmetry underlying functional differences in the cerebral hemispheres. Regional differences in CBV were demonstrated in each hemisphere corresponding to variations of CBV in structures composed of gray or white matter. These studies demonstrate the feasibility of safely making quantitative in vivo measurements of CBV in humans.

**Radionuclide Ventriculography. II. Clinical Results—Parameters of Global Ventricular Function.** M. Stauch, H. Sigel, H. Geffers, C. M. Gerst, F. Bitter, W. E. Adam; Ulm, Germany. *Nucl Med* XVII/5: 211-215, 1978

Ejection fraction (EF) was determined with gated blood pool studies and the results were compared with EF calculated from biplane and monoplane cineangiography. Thirty-five patients with valvular disease or coronary artery disease (CAD) were examined. Angiography was carried out in 30° right anterior position after insertion of a pigtail catheter. Radiographic contrast media, 40-50 ml, were injected at 12 ml/sec. A time marker was used to determine heart rate. Twenty-five patients were examined with biplane and ten in monoplane technique. For calculation of ventricular volume from biplane angiography the Simpson rule and the area-length method was used, and the Green method was used for calculation of EF from the monoplane technique. The radioisotope examination was performed in right anterior position after injection and homogenous distribution of 20 mCi Tc-99m HSA. The time activity distribution over the heart was registered. The authors found that EF determinations with the radionuclide procedure and biplane cineangiography calculated with the Simpson rule ( $r = 0.805$ ), with the area-length method ( $r = .88$ ), and with monoplane cineangiography ( $r = .86$ ) resulted in acceptable correlation coefficients. The authors conclude that EF can be determined with sufficient accuracy with radionuclides.

**Assessment of Routine Liver Scanning in Patients with Breast Cancer.** S. N. Wiener, S. H. Sachs. *Arch Surg* 113: 126-129, 1978

The results of liver scans performed on a group of 234 patients

examined during their initial hospital admission for primary breast cancer were analyzed retrospectively in an attempt to clarify the indications for hepatic scintiscanning in this group. The liver scan was normal in 231 of the 234 patients. The authors conclude that the liver scan has little or no value in this group. An additional 192 patients were studied for purposes of followup treatment. In this group 24 patients had abnormal liver scans, of which 19 were true positives. Liver function tests were abnormal in 18 of these 19 patients. The false-positive liver scan interpretations (five of 24 in this study) appeared more likely in the absence of prior comparative scans. The results of liver chemistry studies were valuable in separating the true-positive and false-positive hepatoscans. The authors suggest that routine hepatic scanning for metastatic disease in patients with breast cancer be abandoned unless there is evidence of abnormal liver function.

**Clinical Value of Liver Scans.** A. Grushka, J. T. Galambos; Emory University. *Am J Gastroenterol* 70: 61, 1978

Liver scans performed with Tc-99m sulfur colloid on 200 consecutive patients were reviewed to assess scan influence on diagnosis and management of the subjects. Final diagnosis was established by biopsy, surgery, autopsy, endoscopy, radiology, or by clinical course. The scan was judged useful in 77% of 123 patients with extrahepatic malignancies. That 77% was felt to be an overestimate, however, since the scans were a required component of chemotherapy protocols, and in only 18% of positive scans was there no other indication of liver malignancy such as hepatomegaly or abnormal blood tests of liver function. Of 26 patients with intrinsic liver disease (cirrhosis, alcoholic hepatitis, viral or granulomatous hepatitis, and fatty liver), the scan was useful in only five (19%) and was misleading enough to advise further (and unnecessary) expensive and invasive procedures that delayed diagnosis in four (15%). In the four patients with cholestasis caused by common bile duct obstruction, the scan was judged useless in all. Scans on 79% of 47 patients with miscellaneous final diagnoses were felt to be useless, and an additional 6% were judged to be actually misleading. The authors found no justification for routine use of this liver scan in patients with hepatobiliary disease. The authors concluded that the "overutilization" of these liver scans encountered in their hospital settings probably is characteristic of other institutions as well.

**Ultrasound and Gallium for the Diagnosis of Abdominal and Pelvic Abscesses.** K. J. W. Taylor, D. C. Sullivan, J. F. Mcl. Wasson, A. T. Rosenfield; Yale University. *Gastrointest Radiol* 3: 281-286, 1978

The authors report the results of a retrospective study to compare ultrasonography with gallium scintigraphy in the detection of abdominal or pelvic abscess. Two hundred twenty-two patients with suspected abscess were examined with B mode ultrasound at a frequency of 2.25 or 3.5 Hz. The authors had 70 true positive, 145 true negative, two false positive and five false negative ultrasound findings. Thirty of the 222 patients were referred for gamma camera scintigraphy or examination with a Pho-Con tomographic scanner 48 hr after injection of 6 mCi Ga-67 citrate. Bowels were emptied both nights before the scan. Significant gut activity resulted in repeat scans after 72 hr. The authors found ten true-positive, seven true-negative, and 13 false-positive scintigrams. The false-positive findings occurred in association with pancreatitis, ischemic bowel, inflammatory

bowel disease, diffuse liver disease, chest infection, and radionuclide accumulation in a wound and in the gut. The authors conclude that the high Ga-67 sensitivity can be advantageously used when ultrasound results are equivocal, or when the clinical findings suggest that a negative ultrasound finding may be a false-negative result. Ultrasound's high specificity, high sensitivity, economy, and speed of examination suggest its use as initial screening procedure for abdominal and pelvic abscess.

**Evaluation of Technetium Scanning for Myocardial Contusion.** C. O. Brantigan, D. Burdick, A. R. Hopeman, and B. Eiseman; Denver General Hospital, Colorado. *J Trauma* 18: 460-463, 1978

The authors evaluated myocardial imaging as a diagnostic aid for myocardial contusion. Thirteen adult subjects (11 male) seen in the emergency room with severe blunt chest injury from an automobile accident were studied. Each patient had electrocardiographic evidence of myocardial contusion in the immediate postinjury period but it reverted toward normal within days or weeks. Technetium 99m-labeled pyrophosphate, polyphosphate, glucoheptonate, or HEDP was administered i.v. 0-6 days postinjury. Approximately 1 hr after injection, each patient was imaged by gamma camera in anterior, left lateral, and left anterior oblique projections. Only two of the patients had positive myocardial images. The authors found the myocardial scan as performed to be ineffective for diagnosis of myocardial contusion.

**Radionuclide Kidney Function Evaluation in Management of Urolithiasis.** A. J. Bueschen, L. K. Lloyd, E. V. Dubovsky, W. N. Tauxe; University of Alabama. *J Urol* 120: 16-20, 1978

Seventy-seven patients with renal or ureteral lithiasis underwent 114 renal scintillation camera studies with 300  $\mu$ Ci of I-131 orthoiodohippurate. Radioactivity of the upper abdomen was recorded on computer magnetic tape for the first 25 min after injection of radionuclide. A blood sample was obtained 44 min after injection to calculate the effective renal plasma flow. Serial comprehensive renal function studies were performed in 16 patients with renal stones and eight patients with ureteral stones. The effective renal plasma flow was more sensitive than serum creatinine as an indicator of total renal function. The average change in differential effective renal plasma flow was 1.25% in 10 patients with renal calculi, and the changes in the other six patients ranged from 5 to 41%. Of the eight patients with ureteral calculi who had serial studies seven had an average change in differential effective renal plasma flow of only 1.6% in 17 studies. The maximum activity was often delayed with equal differential effective renal plasma flow in the presence of partially obstructing calculi. No patient had a normal renal camera study with an abnormal IVP except patients with small nonobstructing stones. The IVP also failed to quantitate the amount of decreased unilateral renal function.

**Radioimmunoassay for Serum Myoglobin.** E. C. Adams, K. M. Layman, I. Jaunakais; Ames Co., Miles Lab Inc. *Ann Clin Lab Sci* 8: 330-341, 1978

This report gives detailed methodology for the performance of serum myoglobin assays by a nonequilibrium saturation method using fixed antibodies in a column flow-through format. Gamma globulin from specific antisera to human or monkey myoglobin is coupled to cyanogen bromide activated Sepharose to give a fixed antibody. Myoglobin, purified by electrophoresis on acrylamide gel, is electroeluted and labeled with I-131 using the Chloramine-T method. When serum containing myoglobin is passed through the column, some of the antibody sites are occupied. The remaining antibody sites are available for binding

when the labeled myoglobin is poured through the column. Normal persons showed serum myoglobin levels ranging from 0 to 69 ng/ml. Serum from patients hospitalized and diagnosed as not having myocardial infarction showed levels ranging from 0 to 99 ng/ml. In 19 of 24 patients diagnosed as having myocardial infarction, at least one elevated serum myoglobin level was found—most values ranged from 300 to 500 ng/ml. A serum level of 100 ng/ml is suggested as the dividing line for normal compared with abnormal. The serum myoglobin level rises in the first 6 hr following infarction, peaks in about 12 hr, and falls to normal in 24 hr. Continued or repeated elevations of the serum myoglobin level indicate continued myocardial damage or new attacks.

**Palliative Radiotherapy with Strontium-89 in Case of Extended Formation of Skeleton Metastasis.** J. Kutzner, W. Grimm, K. Hahn; Mainz, Germany. *Strahlentherapie* 154: 317-322, 1978

The authors report their experience using Sr-89 in palliative therapy in endstage malignancy with multiple skeletal tumor lesions. Fifteen patients are reported, four of whom had two Sr-89 applications. Most patients had extended hormonal or cytostatic therapy and had pain that was not influenced with alterations in this regimen. Patients reported upon had prostrate carcinoma, rectum carcinoma, carcinoma of the breast, and plasmocytoma. Each patient received between 0.8 and 2.7 mCi Sr-89. Therapy brought about pain reduction on 16 occasions. Improvement was noted after 24 hr in some, but in others pain easement began as much as a week after therapy. The therapeutic effect lasted from 4 days to 4 mo. Four patients were able to be mobilized as a result of pain reduction. Strontium excretion in the urine was determined for nine patients after injection of 20-25  $\mu$ Ci Sr-89. Urine was collected for 3-6 days. During this time 3-40% of the injected radionuclide was found in the urine. The authors feel that the problems associated with radiation protection limit the use of this therapy. They suggest that Sr-89 be considered for intractable pain caused by diffuse skeletal metastasis.

**Low Serum Vitamin B<sub>12</sub> Levels in Patients Receiving Ascorbic Acid in Megadoses: Studies concerning the Effect of Ascorbate on Radioisotope Vitamin B<sub>12</sub> Assay.** V. Herbert, E. Jacob, K.-T. J. Wong, J. Scott, and R. D. Pfeffer; Veterans Administration Hospital, Bronx, N.Y. *Amer J Clin Nutr* 31: 253-258, 1978

Eighteen adult male patients hospitalized for traumatic spinal cord injury had received 2 g oral ascorbic acid daily as urine acidifier for 0.5-29 mo. Serum Vitamin B<sub>12</sub> level was then assayed on each patient by a radioisotope dilution method using National Formulary intrinsic factor concentrate and coated charcoal. Four of the patients had measured B<sub>12</sub> levels below normal range (200-900 pg/ml). In two of those four, bone marrow examination revealed both a normoblastic pattern on erythropoiesis and a normal deoxyuridine suppression test. It was found that the ascorbate present in serum before the boiling step in the B<sub>12</sub> radioassay could inactivate hydroxocobalamin to a greater extent than cyanocobalamin in serum and thus yield an artificially depressed B<sub>12</sub> measurement. To remedy this situation, the authors suggest a) including either potassium cyanide (2 mg/ml serum) or metabisulfite in the radioassay to inactivate serum ascorbate, or b) performing the radioassay at alkaline pH under which conditions ascorbate is probably rapidly oxidized. It is important to know if the patient with an anomalously low B<sub>12</sub> measurement has been receiving "megadoses" of ascorbic acid (by prescription or as self-medication) when the B<sub>12</sub> radioassay is performed without one of the above modifications.

**Alpha-fetoprotein Concentrations Measured by Radioimmunoassay in Diagnosing and Excluding Hepatocellular Carcinoma.** P. J. Johnson, B. Portmann, R. Williams; King's College Hospital & Medical School, London. *Brit Med J* 2: 661-663, 1978

Serum alpha-fetoprotein (AFP) was measured in patients by a radioimmunoassay having a sensitivity of 2 IU/ml (2 mg/ml). Fifty patients with histologically confirmed primary hepatocellular carcinoma were investigated at diagnosis. (Subjects with cholangiocarcinoma and hemangiosarcoma were excluded from this study.) One hundred patients with histologically confirmed cirrhosis but no malignant change were also studied. Fifty healthy subjects served as controls. All control subjects had AFP concentrations below 10 IU/ml. Twenty-nine of the 30 patients with hepatocellular carcinoma and cirrhosis had AFP-positive sera (> 10 IU/ml) with concentrations ranging from 110 to 508,000 IU/ml; however, only 11 out of 20 patients with hepatocellular carcinoma and no cirrhosis were AFP-positive. Additionally, only three patients out of 50 with liver metastases (primary tumor largely in bronchus, breast, or pancreas) demonstrated elevated AFP levels. Of the 100 cirrhotic patients having no malignancy, only one patient had a raised AFP and that only slightly. These authors emphasize the utility of AFP measurements for detecting and excluding hepatocellular carcinoma in the presence of underlying cirrhosis with minimal false-positive and false-negative results. In the absence of cirrhosis, sensitivity and specificity of the test are lessened.

**Signs of Fetal Death in Early Pregnancy.** G. B. Young, W. N. McDicken; Royal Infirmary of Edinburgh. *J Clin Ultrasound* 6: 244-247, 1978

The authors review the previously described signs of fetal death seen at ultrasonography in the first trimester of pregnancy and discuss several new signs that they believe will be valuable in making this diagnosis. Failure of detection of the fetal heart on the A-scan and TM mode at 7-8 wk gestational age is regarded as a reliable sign of fetal death. Apparent suspension of the fetal parts within the gestational sac, crown-rump lengths persistently small for dates, or low sac to crown-rump length ratios indicate a poor outlook. The enlarging gestational sac with contents that diminish in size was invariably associated with a dead fetus in the experience of the authors. The poorly formed sac with an incomplete wall and adjacent sonolucencies also indicate pregnancy failure. Reproducible linear echoes within the gestational sac the authors believe are produced by gas in the fetal heart, great vessels and cord, indicating fetal demise. This last finding has not been previously described.

**Inflammatory Cysts of the Pelvic Peritoneum.** R. F. Lees, P. S. Feldman, A. N. Brenbridge, W. A. Anderson, A. J. Busch; University of Virginia Medical Center, Charlottesville, Virginia. *Am J Roentgenol* 131: 633-636, 1978

The authors present three cases of young females with pelvic masses. The sonographic appearance was that of a multilocular, thin-walled cystic mass in each case with no evidence of solid tissue components or gravity-dependent debris. The clinical setting common to these cases appeared to be an inflammatory

process and histology of the lesion was that of a mesothelial-lined multilocular cystic mass. Differential diagnostic possibilities would include cystic ovarian neoplasms, cystic lymphangiomas, and, less likely, such entities as duplication of the bowel, hydatid cyst, and pancreatic pseudocyst. The sonography, plain film findings, and gross and microscopic pathology are presented.

**New Observations in Renal Transplants Using Ultrasound.**

M. R. Conrad, R. Dickerman, I. L. Love, T. Curry, P. Peters, A. Hull, M. Lerman, H. Helderman, Southwestern Medical School, Dallas, Texas. *Am J Roentgenol* 131: 851-855, 1978

An increase in the measured volume of the renal transplant reflecting rejection has been previously documented by ultrasonography. The authors present five cases in which cortical changes were seen at ultrasound and correlated with either arteriographic, pathologic, or clinical findings. Areas of sonolucency in the renal cortex can be produced by regions of edema, infarction, and foci of fatty degeneration that accompany chronic rejection. The only instance in which the changes were regarded specifically to represent edema was in a case in which followup sonogram indicated resolution of the cortical sonolucencies. The inference is that of a milder parenchymal change such as edema than the irreversible changes of renal infarction. The authors feel that focal parenchymal sonolucency is not likely to be due to such processes as acute tubular necrosis or cortical necrosis, since both of these tend to affect the entire renal substance in a uniform fashion. The prognostic significance of these focal parenchymal sonolucencies remains to be established.

**Differential Diagnosis of Pelvic Masses by Gray Scale Sonography.** A. C. Fleischer, A. E. James, Jr., J. B. Millis, C. Julian; Vanderbilt University, Nashville, Tenn. *Am J Roentgenol* 131: 469-476, 1978

The authors review a series of 170 surgically proven pelvic masses and provide examples and brief descriptions of characteristic features. Entities such as ovarian cyst, serous cystadenoma, hydrosalpinx, and dermoid cyst are described and illustrated. Solid tumors including uterine leiomyomata, solid ovarian tumors, and "pseudotumors" are also discussed. Considerable overlap is seen between the various entities; two types of pelvic masses demonstrated rather pattern-specific ultrasonographic appearances. A predominantly cystic extrauterine mass with internal septation was highly specific for pseudomucinous cystadenoma. The echogenic appearance and nodular configuration of the leiomyomatous uterus tended to be relatively specific as well. Categorical diagnoses were correct in 91% of the cases following sonographic criteria outlined by the authors, and histologically specific diagnoses were correct in 71% of the cases.

JOHN COUPAL  
PEGGY DOMSTAD  
ANDREW FRIED  
EVISHIN KIM  
University of Kentucky  
Medical Center and  
VA Hospital  
Lexington, Kentucky

JOHN H. CLORIUS  
Deutsches Krebsforschungszentrum  
Heidelberg, Germany