ABSTRACTS OF CURRENT LITERATURE

^{123}I-N(sec. butyl)-p-iodoamphetamine—A New Radiopharmaceutical for Brain Imaging. H. J. Biersack, H. Klünenberg, G. Friedrich, A. Hartmann, K. Reichmann, P. Oehr, C. Winkler, University of Bonn, Bonn, West Germany. *Nucl Comp* 15:124–128, 1984

Distribution studies of ^{123}I-N-(sec.-butyl)-p-iodoamphetamine (BMP) were performed in Wistar rats. Thirty min after radionuclide injection, the maximum activities found were in the lung (18.1%), liver (3.5%), kidney (3.0%), cerebrum (1.9%), and cerebellum (1.8%). The brain nuclide accumulation decreased from 1.9% to 1% after 120 min, whereas the lung activity was 6.4% 2 hr after injection. Within 2 hr, 3.6% of the radionuclide was excreted. Preliminary patient examinations with I-123 BMP demonstrated a lower lung nuclide accumulation compared with IMP 60 min after injection. High radionuclide accumulation was observed in the brain for both substances.

Dual Gated Nuclear Cardiac Images. I. G. Zubal, V. Bizais, G. W. Bennett, A. B. Brill; Brookhaven National Laboratory, NY. *IEEE Trans Nucl Sci* NS-31:566–569, 1984

Cardiac images are obtained gated both by ECG and by respiratory flow. A special software programmable multimode interface is used, which allows up to 12 auxiliary patient signals to be interspersed throughout a list-mode data stream. Respiratory flow is obtained by allowing the patient to breath room air through a turbine spirometer with digital readout coupling directly with the interface. The computer selects R-R intervals that correspond to full expiration, resulting in approximately a 50% data loss. These R-R intervals are reframed from the list-mode data with frames corresponding to equal time intervals after the R-wave. Results from a normal volunteer are presented for a study using 1 mCi of Tl-201. With dual gating, the myocardium appears about 1 cm thinner than it does on the corresponding images gated only by the ECG signal.

Attenuation Correction of Equilibrium Radionuclide Angiography for Noninvasive Quantitation of Cardiac Output and Ventricular Volume. M. A. Petru, S. G. Sorensen, T. K. Chaudhuri, P. Rosen, R. A. O'Rourke. San Francisco, CA. *Heart J* 107:1221–1229, 1984

Twenty-eight patients with chest pain underwent gated equilibrium radionuclide angiography (RA) and cardiac catheterization within 36 hr. The attenuation correction on RA was done by means of a simple geometric method of attenuation distance quantification. A linear attenuation coefficient, 0.16/cm, for 140 keV photons of Tc-99m was used. The attenuation distance was considered to be the distance from the center of the left ventricular chamber to the chest wall in a LAO view in the transverse plane. The attenuation distance as defined agreed with similar measurements obtained during fluoroscopy ($r = 0.86$). In a subgroup of seven patients, measurement of cardiac output by Fick method and RA technique showed excellent correlation over a wide range of cardiac output ($r = 0.91$). RA ventricular volumes correlated with contrast angiographic ventricular volumes in 28 patients (14 having wall motion abnormalities) with correlation coefficient of 0.80. The weaker correlation found for ventricular volume data may be due to inaccuracies in ventricular volume calculation when single-plane contrast angiography is performed on patients with wall motion abnormalities. RN with the described attenuation correction offers an excellent noninvasive technique for obtaining quantitative ventricular volumes and cardiac output, and does not require use of regression equations.

Pharmacokinetics and Hemodynamic Effects of Tiapamil: Exercise Performance, Thallium Stress Scintigraphy, and Radionuclide Ventriculography. M. Eckert, H Pozenel, B. Pilat; Hoffman La Roche & Co., Basel, Switzerland. *J Clin Pharmacol* 24:165–174, 1984

Knowledge of the relationship between the presence of coronary stenosis in individual coronaries and the location of ST depression during exercise and the relationship between ECG and scintigraphic location is important. The purpose of this study was to determine the usefulness of exercise ECG in predicting the site of myocardial ischemia. Fifty-two patients with angiographically documented one-vessel coronary artery disease (CAD) were studied. All patients in this study had reversible perfusion defect by Tl-201 study. These patients were divided into two groups; Group I (28 patients) had left anterior descending CAD and Group II (24 patients) had left circumflex or right CAD. There were no differences between the two groups in age, sex, medication, exercise duration, heart rate systolic pressure, and severity of coronary artery stenosis. The size of the perfusion defect was larger in Group I than in Group II. There was no significant difference between the two groups in the frequency of ST depression in the anterior, inferior, or lateral ECG leads. ST depression occurred in 16 of 28 patients in Group I and 11 of 24 patients in Group II. The sensitivity of the exercise ECG was 52% using 12 leads, 50% using three leads, and 50% using V5 alone. The results indicate that the ECG location of ST depression is not a good indicator of the site of myocardial ischemia. The use of 12 leads does not improve the sensitivity of exercise ECG in patients with CAD.

The Effect of Radioiodine and Antithyroid Drugs on Serum Long Acting Thyroid Stimulator Protector (LATS-P). A Three Year Prospective Study. C. A. Hardisty, A. Fowles, D. S. Munro, Univ. Sheffield, General Hospital Center Clinic, Sheffield, England. *Clin Endocrinol* 20:597–605, 1984

A validated bioassay technique for measurement of serum LATS-protector (LATS-P) levels was used in a prospective 3-yr clinical study involving 46 consecutive patients (37 F, 9 M; age 25–75 yr, mean 44 yr) with thyrotoxicosis. In one group of 29 patients (25 F, 4 M, mean age 37 yr), carbimazole treatment was given for 1 yr and follow-up was continued for 2 yr thereafter. A second group of 17 patients (12 F, 5 M, mean age 56 yr) were studied before and up to 3 yr after a single dose of radioiodine calculated to deliver 3500 rad. Analysis of the sera from serial venous blood sampling in both groups of LATS-P revealed detectable LATS-P levels in 85% of the patients before treatment and in only 41% of the patients at the end of the study. The overall mean LATS-P level fell from 36 μ/ml to 11 μ/ml. In the carbimazole-treated group, the persistence of LATS-P predicted relapse ($p < 0.05$). Two types of LATS-P response to treatment were seen

in the radioiodine-treated group; one subgroup of patients had a transient rise in LATS-P levels whereas the other subgroup had a decline in LATS-P following treatment. No discernible difference in the clinical course was apparent, and transient rise in LATS-P level appeared to have no prognostic significance in the radioiodine treated group. Overall, serum LATS-P showed a correlation with the clinical course of Graves' disease.

CT Assessment of Splenic Involvement by Hodgkin's Disease and Non-Hodgkin's Lymphoma. C. H. Neumann, R. A. Castellino; Stanford University School of Medicine, Stanford, CA. *Tumor Diag* 5:113–115, 1984

The study comprised 86 patients with Hodgkin's Disease (HD) and 12 patients with non-Hodgkin's lymphoma (NHL). A TCT scan of the upper abdomen was performed before and after bolus injection of 50 cc of 60% meglumine diatrizoate, followed by a fast infusion of 300 cc of the tracer. Involvement of the spleen was considered to be present if circumscribed lesions were recognized. The spleen was removed by laparatomy, and serial sectioning and histologic examination performed. Lymphomatous involvement of the spleen was histologically proven in 45 patients (40 HD, 5 NHL). Only one of these patients was correctly classified by CT, with 44 false-negative results. One false-positive reading occurred in a patient with HD. Additionally, the splenic weight was correlated with the diagnosis of splenic involvement. The authors obtained a true-positive rate of 56% and a true-negative rate of 72%, if a weight of 200g was used as threshold for normal. These results reveal that the demonstration of a focal lesion by CT is an uncommon finding when the spleen is involved. The sensitivity improves when the enlargement of the organ is used as a criterion; however, the specificity and accuracy are too low for diagnostic use in patients with HD or NHL.

The Use of Water Ingestion to Distinguish the Gallbladder and Duodenum on Cholescintigrams. I. A. Keller, H. S. Weissmann, L. L. Kaplun, L. M. Freeman; Albert Einstein College of Medicine, Bronx, NY. *Radiology* 152:811–813, 1984

By cholescintigraphic examination, the presence or absence of gallbladder visualization is essential to diagnose acute or chronic cholecystitis. Since the gallbladder may normally overlie the duodenum sweep, it may not be possible to differentiate radioactivity in the gallbladder from that in the duodenum, resulting in diagnostic confusion. To resolve the question of whether visualization was due to gallbladder or duodenum in a Tc-99m DISIDA scintigram, twenty-one consecutive patients underwent the following studies: 225 ml of water were administered orally and then an additional scintiphoto in the anterior projection was obtained. This procedure was also carried out in another 25 patients (controls) examined for acute cholecystitis who had unequivocal visualization of the gallbladder distinct from duodenal activity. In 13 of the 21 patients with initially equivocal gallbladder visualization, the area in question was confirmed to be due to pooling of labeled bile at the junction of the first and second portions of the duodenum. There was pathological confirmation of acute cholecystitis in all of these 13 patients. In the remaining eight patients, persistence of activity in the gallbladder in conjunction with the advance of duodenal activity distally excluded acute cholecystitis. In the 25 control subjects who had unequivocal gallbladder visualization, water ingestion did not decrease gallbladder activity or size. The authors concluded that this simple and reliable technique may be recommended when the question of whether the gallbladder or duodenum is visualized.

Effect of Region Assignment on Relative Renal Blood Flow Estimates Using Radionuclides. C. C. Harris, K. K. Ford, R. E. Coleman, N. R. Dunnick; Duke University Medical Center, Durham, NC. *Radiology* 151:791–792, 1984

Tc-99m diethylenetriaminepentaacetic acid (DTPA) is commonly used in a dynamic study to evaluate relative kidney function. The early phase of DTPA uptake can be used to estimate relative renal artery blood flow by measuring the right-to-left ratios of the initial slopes of the time-activity curves. It was found that the measured parameters are extremely sensitive to the method of selecting the regions-of-interest (ROIs) and image display parameters. When radioactive marker sources were drawn around the kidney for background subtraction, the time-activity curves were scaled down. The best correlation with measured blood flows in animal studies was obtained with a ROI corresponding to the maximum renal outline with a "semi-lunar" background ROI. This technique was also the most reproducible. Definition of the maximum renal outline was accomplished by generating a display translation table that was linear up to 75% of the maximum activity and then dropped to zero for higher activity levels. An investigation is in progress to verify the applicability of these results to clinical studies.

Radionuclide Bone Scanning in the Diagnosis and Management of Condylar Hyperplasia. S. A. Harris, A. A. Quayle, H. J. Testa. Univ. Dental Hospital, Manchester, UK. *Nucl Med Commun* 5, 373–380, 1984

Four patients with maxillomandibular facial disharmony (2 M, 2 F, mean age 16.2 yr) and four controls were evaluated by Tc-99m methyldiphosphonate (MDP) scintigraphy. Three hr after injection of 15 mCi of the tracer, anterior, posterior, lateral, and oblique views were obtained on each patient and control with the aid of a radioactive marker placed on the skin overlying the head of the condyle. A 15-yr-old boy with unilateral left condyle hyperplasia had markedly increased uptake in the region of the left condlye, which was histologically confirmed to be hyperplasia. The images of the second patient with unilateral right condylar hyperplasia showed a marked increase in uptake in both condyles with greater activity on the right side, which was also confirmed histologically to be hyperplasia. In the third patient, a 20-yr-old female with mild prognathism, there was a slight increase in uptake in the right and left condyles with greater uptake on the right side. The images of the fourth patient, a 15-yr-old girl with mandibular prognathism, showed moderately increased uptake in both temporomandibular joints (TMJ). Condylar hyperplasia may lead to various kinds of malocclusion and TMJ symptoms. Radiographs show morphological changes but give no indication as to whether or not growth is still occurring. Scintigraphic studies, however, show the degree of activity in the condyles. The authors concluded, therefore, that scintigraphy may prove a valuable diagnostic aid in the management of patients with condylar hyperplasia.

Elevated Sacroiliac Joint Uptake Ratios in Systemic Lupus Erythematosus. A. A. DeSmet, T. Mahmood, R. G. Robinson, H. B. Lindsley, University of Kansas College of Sciences and Hospital, Kansas City, KS. *Am J Roentgenol* 143:351–354, 1984

Sacroiliitis occurs in many inflammatory disorders including relapsing polychondritis and Whipple's disease. Sacroiliitis has not been reported in systemic lupus erythematosus (SLE), although SLE often causes a polyarticular synovitis. Fourteen patients with active SLE (at least one clinical manifestation, two or more following abnormal laboratory tests (erythrocyte sedmentation rate, platelet count, complement levels, anti-DNA antibody, red blood cell urinary casts) underwent radiographs and radionuclide bone studies. Quantitative bone scintigraphy was obtained by designating a region of interest over the middle of each sacroiliac joint and sacrum. Sacroiliac ratio was calculated by dividing the peak sacral area counts into each of the sacroiliac counts. Normal ratio is 1.35. High ratios reflect increased accumulation at the sacroiliac joints, indicating sacroiliitis or other pathology at the site. Elevated joint ratios were found unilaterally in two

patients and bilaterally in seven patients when their lupus was active. In patients whose disease became quiescent, the uptake ratio returned to normal. Two patients had persistently elevated ratios with continued clinical and laboratory evidence of active lupus. Mild sacroiliac joint sclerosis and erosions were detected on pelvic radiographs in these same two patients. The authors concluded that elevation of sacroiliac joint uptake ratios may occur as a manifestation of active SLE.

Phenolic Aminocarboxylic Acids as Gallium-Binding Radiopharmaceuticals. F. C. Hunt; Lucas Heights Research Laboratories, Sutherland, NSW 2232, Australia. *Nucl Med* 23:123–125, 1984.

Biodistribution studies of the Ga-67 labeled phenolic aminocarboxylates, ethylenediaminedi(o-hydroxyphenylacetic acid) (EDDHA) and N,N′-bis(2-hydroxybenzyl)ethylenediamine N,N′-diacetic acid (HBED), were performed in male BALB/c mice. The animals were sacrified 1 hr after i.v. radionuclide injection, and the tissue concentrations of the three Ga-67 chelates—(^{67}Ga-Br-HBED, ^{67}-Ga-EDDHA, ^{67}Ga-COOH-EDDHA)—were compared with Ga-67 citrate. The radionuclide activity in the blood was lower than 2% of the injected dose for the three compounds, whereas 27% of the total dose was found in the blood after the injection of Ga-67 citrate. Br-HBED and Br-EDDHA were primarily excreted via the hepatobiliary system. The concentration in the liver was 17.57% (HBED) and 3.88% (EDDHA) compared with 5.83% for Ga-67 citrate. Of the Ga-67 labeled Br-HBED and Br-EDDHA, 70.57% and 85.38%, respectively, were found in the gallbladder and the gastrointestinal tract, whereas only 9.9% of the Ga-67 citrate was excreted by way of the gastrointestinal tract. COOH-EDDHA was eliminated by the kidneys (1.85%) and 79.15% of the total activity was accumulated in the urine within 1 hr after radiotracer application.

Radioreceptor Assay of Neuroleptics in Refractory Chronic Schizophrenic Patients. J. P. Lindenmayer, D. Smith, I. Katz, Albert Einstein College of Medicine, Brooklyn, NY. *J Clin Psych* 45: 117–119, 1984

These authors studied 25 chronically hospitalized patients (16 male, mean age 39 yr, range 22–66) with a diagnosis of chronic schizophrenia and a history of multiple previous admissions. The mean length of present admission was 4.6 yr and mean duration of illness 17 yr. The patients were selected because of inadequate clinical response to prolonged treatment with neuroleptic drugs. All patients were receiving constant dosage of at least one neuroleptic drug for at least a week when blood was drawn. The serum was tested in an existing radioreceptor assay (RRA) incorporating tritiated spiroperidol and membranes from the rat corpus striatum. The RRA standard curve ranged from 25 to 620 ng of chlorpromazine equivalents (CPZE)/ml. Interassay coefficient of variation was 18%. Serum CPZE ranged from >1000 to 0 ng/ml. Only four of the patients had serum levels less than 50 ng/ml, and each of those patients had been on a low neuroleptic drug dosage of less than 400 mg of oral CPZE/day. (Other investigators reported that serum levels of neuroleptic drugs less than 50–100 ng/ml were probably inadequate for treating schizophrenic symptoms). When the neuroleptic dosage was increased in those four patients, high CPZE serum levels (>1000 ng/ml) were found in two, of whom only one responded with a decrease in psychotic symptoms. These authors conclude: (a) persistence of psychotic symptoms in these patients is due to lack of response to the drug(s) and is not due to either faulty gastrointestinal absorption or low serum levels of the drug(s); and (b) responsive and resistant forms of schizophrenia may represent distinct neurobiologic processes.

Measurement of Secretory IgA in Serum by Radioimmunoassay in Patients with Chronic Nonalcoholic Liver Disease or Carcinoma. H. A. Homburger, M. Casey, G. L. Jacob, G. G. Klee, Mayo Clinic and Mayo Foundation, Rochester, MN. *Am J Clin Pathol* 81:569–574, 1984

The usefulness of radioimmunoassay (RIA) determinations of human secretory IgA (sIgA) levels in serum was evaluated in patients with chronic active liver disease (CALD) and hepatic metastases. The double-RIA technique utilizes I-125 labeled purified rabbit antihuman secretory component (anti-SC) and purified human sIgA. Cross-reactivity of the system with other immunoglobulins is negligible. No difference in sIgA levels was seen between healthy men and women. Elevated levels of sIgA (above 25 μg/ml) were found in 22 of 38 patients with CALD and in 37 of 40 patients with primary biliary cirrhosis (PBC). The levels of sIgA and alkaline phosphatase (AP) in serum correlated strongly in CALD and PBC, with sIgA levels >118 μg/ml combined with AP levels >496 μ/ml specific for PBC. Above normal concentrations of sIgA were seen in patients with peptic ulcer disease (4/10), chronic pancreatitis (2/5), inflammatory bowel disease (2/10), and benign breast disease (1/10). Above normal sIgA levels were common in patients with colorectal, pancreatic, mammary, or gastric carcinoma and were found predominantly in those with hepatic metastases. The positive predictive value of elevated sIgA levels for hepatic metastases (except in pancreatic carcinoma) was higher than that of an elevated AP level, whereas normal AP levels had greater negative predictive value.

Influence of the Depth Effort on Quantitative Results in Single Photon Emission Tomography with Attenuation Correction. J. Pergrale, C. Berche, D. Iachetti, G. Normand, M. Jattean; LEP, 3, Avenue Descartes, 94450, Limeil-Brevannes, France. *IEEE Trans Nucl Sci* NS-31:516–520, 1984

This article uses computer simulations to test nine different attenuation correction algorithms for single photon ECT of the abdomen. The algorithms are judged on their ability to quantitatively reconstruct areas of varying activity concentration corresponding to the left and right lobes of the liver, the spleen, and a large blood vessel. The mathematical projections are generated four different ways: using constant attenuation and nonconstant attenuation, and with and without a "depth effect." Without the depth effect, the camera resolution is assumed constant with depth, and the pixel values in the projections are formed by rays of constant width. With the depth effect the camera resolution as a function of depth is included so that each pixel value in the projection is formed by a diverging ray through the object. The results show significant differences among the algorithms tested, especially when the simulated projections include the "depth effect." Notably, these simulations do not include the effects of scatter or noise, which are certain to be important.

Interactions of Collimation, Sampling, and Filtering on SPECT Spatial Resolution. B. M. W. Tsui, R. J. Jaszczak, University of North Carolina at Chapel Hill, NC, and Duke University, Durham, N.C. *IEEE Trans Nucl Sci* NS-31:527–531, 1984

The authors address the problems of optimum matrix size and cut-off frequency to use for single photon ECT acquisitions and reconstructions. The analysis is based on frequency content of the images. Transfer functions are presented for three collimators, three matrix sizes, and various window functions applied to the ramp filter during reconstructions. Based on a particular choice of collimator, a matrix size and window function are recommended, which are necessary to match the transfer function of the collimator. High-count phantom studies confirm these recommendations. Problems not addressed are: Which collimator to use, and how the above choices are modified by noise.

A Statistical Analysis of Count Normalization Methods Used in Positron-Emission Tomography. T. J. Holmes, D. L. Snyder, D. C.

Ficke; Washington University, St. Louis, Mo. *IEEE Trans Nucl Sci* NS-31:521–526, 1984

In a simplified form of positron ECT, a ray projection could be defined by the output from a single pair of detectors. In application the detector array often "wobbles," so several pairs of detectors measure the same ray projection. Under these conditions, the estimate of that ray projection should be a weighted average of all the detector pairs associated with it. The authors present an "intuitive" solution and the "maximum likelihood" solution for estimating the ray projection. Both solutions have the same expected value, but the maximum likelihood solution has a smaller variance. The authors consider the problem of weighting (normalizing) of detector outputs, which is necessary because of "wobble" (duty cycle), detector efficiency, and photon absorption. They also consider mathematical implementation where the weights are applied alternatively at different stages of the reconstruction, either to the ray projections, to the back projection, or to the filtered image.

A Modular Scintillation Camera for Use in Nuclear Medicine. T. D. Milster, L. A. Selberg, H. H. Barrett, R. L. Easton, G. R. Rossi, J. Arendt, R. G. Simpson; University of Arizona, Tucson, AZ. *IEEE Trans Nucl Sci* NS-31:578–580, 1984

A modular scintillation camera is described in which each module consists of a 10 × 10 cm NaI(Tl) crystal, optically coupled to 4 PMTs. The spatial resolution of a module is expected to be 3mm, and energy resolution 10% at 140 keV. Each module works as an independent unit, and a camera constructed of such modules can have significantly faster count rate capability than that of a conventional camera. Camera configurations will be very flexible. For example, modules can be distributed around the patient to simultaneously collect data from many angles for SPECT. Design considerations are presented for both an analog-type positioning logic and a digital-hookup table positioning logic. Some results from a prototype module with analog-positioning logic are presented.

Pancreatic Sonography: Past and Present. A. H. McCain, W. A. Berkman, M. E. Bernardino; Emory University School of Medicine, Atlanta, GA. *J Clin Ultrasound* 12:325–332, 1984

The authors review current techniques, findings, and applications of ultrasound in the diagnosis of pancreatic disease. The pancreatic head is visualized in some 77% of scans, and the normal pancreatic duct in approximately 55% of cases. Normal maximal anteroposterior dimensions include 2.0 ± 0.4 cm for the head, 1.6 ± 0.29 cm for the body, and 0.26 ± 0.4 cm for the tail. Echogenicity of the pancreas is lower in children by virtue of less fat content. The primary role of pancreatic sonography in acute pancreatitis is the detection of complications such as pseudocyst formation, phlegmon, and pancreatic abscess. Echogenicity during an episode of acute pancreatitis may be normal or decreased. Echogenicity may be focal or diffuse and may persist although serum amylase returns to normal. Examination of the biliary tree is mandatory because gallstones are detected in 36 to 40% of cases of acute pancreatitis. Ultrasound produces a false-negative rate of 50% to 60% in cases of chronic pancreatitis, and the most common sonographic appearance in this entity is that of a normal gland. The authors feel that the reported accuracy of detection of pancreatic carcinoma of 84 to 91% represents a falsely high estimate by virtue of the late stage of the disease in which the examinations were performed. They suggest that CT is the appropriate initial diagnostic imaging modality for evaluation of pancreatic malignancy. An additional application of ultrasound is in guidance of drainage of pseudocyst and pancreatic abscesses with success rates in avoiding surgery in 50 to 80% of cases. Representative sonograms are provided throughout.

Ultrasonography in the Management of Liver Trauma in Children. A. H. Lam, L. Shulman; Royal Alexandra Hospital for Children, Sydney, Australia *J Ultrasound Med* 3:199–203, 1984

In the follow-up of three children with liver trauma, the authors noted that hypoechoic masses most likely representing hematomas increased in size and decreased in echogenicity over a several week period before ultimately beginning to regress. They suggest that devitalized liver tissue may be isoechoic with normal liver parenchyma and, as necrosis and liquefaction ensue, becomes hypoechoic, thus producing an apparent increase in the size of the hematoma. Over a several week period the hematomas do show spontaneous regression and diminution in size. Therefore, conservative management of selective cases of liver trauma in children is felt to be warranted. Sequential scans are provided with correlative CT scans.

Sonographic Demonstration of the Aberrant Left Hepatic Artery. D. M. Nichols, P. L. Cooperberg; University of British Columbia, Vancouver, B. C., Canada. *J Ultrasound Med* 3:219–221, 1984

In a series of 100 consecutive real-time abdominal examinations, the authors encountered an aberrant left hepatic artery arising from the left gastric artery in 10% of patients. This aberrant vessel is seen on sagittal scans as a round, echo-poor structure in the middle of the normally smooth echogenic line, which represents the fissure for the ligamentum venosum lying between the left and caudate lobes of the liver. On transverse section a vessel is seen running to the right from the cardia of the stomach anterior to the lesser sac. In addition to this variation noted in 10 per cent of the population, the authors describe an accessory left hepatic artery arising from the left gastric artery in addition to the normally placed left hepatic artery arising from the celiac axis. Other variations of replacement of the common and right hepatic arteries are discussed, and representative sonograms and diagrams are provided.

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