Predictive ability of duplex ultrasonography for internal carotid artery stenosis of 70%-99%: a comparative study.


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This study prospectively compared the accuracy of published duplex ultrasonographic criteria for 70%-99% internal carotid artery (ICA) stenosis according to the North American Symptomatic Carotid Endarterectomy Trial (NASCET) method to determine angiographic stenosis. From March 1, 1995 to December 1, 1995, all patients considered for carotid endarterectomy (CEA) were studied with carotid duplex ultrasound and carotid angiography within 1 month of the ultrasound study. Duplex measurements of ICA peak systolic velocity (PSV), end diastolic velocity (EDV), and ratio of the ICA to common carotid artery (CCA) PSVs were recorded. Degree of stenosis on angiography was determined using NASCET criteria. A MEDLINE search to identify duplex ultrasound criteria to predict NASCET defined 70%-99% ICA stenosis was carried out. In addition, the original University of Washington criteria for critical stenosis (≥80%) was also examined. The accuracy of these criteria was determined with angiographic results and the positive predictive value (PPV) of each criterion were compared. Ninety-nine patients with 185 carotid bifurcations were available for comparison. The different duplex criteria for determining NASCET defined 70%-99% ICA stenosis were: ICA pSV > 175 cm/sec or PSV < 40 cm/sec, PSV > 230 cm/sec, ratio of ICA to CCA PSVs > 4, PSV > 130 cm/sec plus EDV > 100 cm/sec, and PSV > 270 cm/sec plus EDV > 110 cm/sec. When compared with angiography, the calculated PPVs for these criteria were 71% (73/103), 81% (71/88), 85% (67/78), 88% (62/70), and 90% (57/63), respectively. The University of Washington criteria for critical stenosis had the highest PPV to predict a 70%-99% angiographic stenosis.
fied these anatomic sites of tumor in 87% of patients, with 89% and 80% accuracies for pelvic and abdominal disease, respectively. Tumor resection was performed in 71 patients (85%), but was not in 13 patients because of locally unresectable disease (40% in 8 and metastatic disease in 5). The accuracy of predicting tumor-related operability was 85%. With regard to adjacent organ resection, CT was accurate in determining the need for segmentectomy or hysterectomy, but overestimated the need for urinary organ resection. Based on histological examination of resection margins, CT correctly staged (n = 45) or overstaged (n = 9) 54 patients (84%) and the remaining 30. The ability of CT to preoperatively predict a locally advanced tumor after preoperative radiation therapy as not being fixed was 30%, fixed but resectable 75%, and fixed but not resectable 25%.

Conclusions: Computed tomography is generally reliable at identifying disease as being confined to one region, and for predicting the need for adjacent organ resection. It is less discriminating for predicting local tumor resectability.

Dual-energy CT in the diagnosis and quantification of liver trauma: limited clinical value in comparison to ultrasound scan and single-energy CT, with special reference to iron overload.


Background/Aims: It has been suggested that dual-energy CT could differentiate irregular fatty liver from other hypodense lesions. We compared dual-energy CT to ultrasound scan and single-energy CT in the diagnosis and quantification of fatty liver, with special reference to iron overload.

Methods: Twenty-seven patients were included according to ultrasound: fatty liver (n = 16) and normal liver (n = 11). Single and dual-energy CT were performed. Attenuation measurements of hepatic lobes and control tissues were taken at 140 kV and 80 kV. CT-guided liver biopsy was done in fatty liver patients, the degree of infiltration was estimated, and the histologic iron overload determined (iron overload, n = 11; iron-free, n = 5).

Results: The mean changes in attenuation for the right hepatic lobe were: normal liver: −0.8 (ns); iron overloaded fatty liver: 1.5 (ns); and iron-free fatty liver: 7.7 (p <0.0053). A spleen-liver attenuation differential threshold of 12H (140 kV, single-energy CT) and a right hepatic lobe 140 kV to 80 kV attenuation differential threshold of 9 H (dual-energy CT) were specific for fatty liver. Histology confirmed all cases of fatty liver diagnosed by ultrasound, independently of iron overload. Ultrasound did not differentiate cases of irregular fro diffuse fatty liver detected on CT. Iron overload produced a masking effect in CT, decreasing its sensitivity: fatty liver was diagnosed in 67% of cases by single-energy CT and in 20% by dual-energy CT. Degree of fatty infiltration correlated with single-energy CT.

Conclusions: Ultrasound diagnosed fatty liver best. Single-energy CT quantifies fatty infiltration, and best differentiates the irregular from the diffuse forms; Dual-energy CT is limited by poor sensitivity, especially in iron overload.

H. Leon Pachter, MM Knudson, B Ersig


Introduction: Nonoperative management is presently considered the treatment modality of choice in over 50% of adult patients sustaining blunt hepatic injuries managed nonoperatively over the last 5 years. Seventy-two percent of the injuries resulted from motor vehicle crashes. The mean injury severity score for the entire group was 20.2 (range, 4-75), and the American Association for the Surgery of Trauma-computed axial tomography scan grading was as follows: grade I, 19% (n = 76); grade II, 31% (n = 124); grade III, 36% (n = 146); grade IV, 10% (n = 42); and grade V, 4% (n = 16). There were 27 deaths (7%) in the series, with 59% directly related to head trauma. Only two deaths (0.4%) could be attributed to hepatic injury. Twenty-one (5%) complications were documented, with the most common being hemorrhage, occurring in 14 (3.5%). Only 3 (0.7%) of these 14 patients required surgical intervention, 6 were treated by transfusions alone (0.5 to 5 U), 4 underwent angi-embolization, and 1 was further observed; Other complications included 2 bilomas and 3 perihepatic abscesses (all drained percutaneously). Two small bowel injuries were initially missed (0.5%), and diagnosed 2 and 3 days after admission. Overall, 6 patients required operative intervention: 3 for hemorrhage, 2 for missed enteric injuries, and 1 for persistent sepsis after unsuccessful percutaneous drainage. Average length of stay was 13 days. Nonoperative management of blunt hepatic injuries is clearly the treatment modality of choice in hemodynamically stable patients, irrespective of grade of injury or degree of hemoperitoneum. Current data would suggest that 50 to 80% (47% in this series) of all adult patients with blunt hepatic injuries are candidates for this form of therapy. Exactly 98.5% of patients analyzed in this study successfully avoided operative intervention. Bleeding complications are infrequently encountered (3.5%) and can often be managed nonoperatively. Although grades IV and V injuries composed 14% of the series, they represented 66.6% of the patients requiring operative intervention and thus merit constant re-evaluation and close observation in critical care units. The optimal time for follow-up computed axial tomography scanning seems to be within 7 to 10 days after injury.

Hyperchoeic appearance of hepatic parenchyma on ultrasound examination of patients with blunt hepatic injury.

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Methods and Main Results: We performed US examinations in 831 consecutive patients admitted to our hospital for blunt abdominal trauma and identified 33 with a geographic hyperchoeic pattern in the liver. We correlated the appearance with computed tomographic images and with clinical, angiographic, and scintigraphic data. All patients with a geographic hyperchoeic pattern showed mild computed tomographic evidence of hepatic injury (Mirvis grade 2, 69%; Mirvis grade 3, 31%). Excluding patients who required urgent surgery for other reasons and patients in shock, patients with the geographic hyperchoeic pattern were managed conservatively with no complications.

Conclusion: The geographic hyperchoeic pattern of liver parenchyma on US examination of trauma patients is a mild injury that, of itself, does not require surgical therapy.

Factors predictive of the healing of pancreatic pseudocysts treated by percutaneous evacuation.

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Hepato Gastroenterology 1998;45:536-540.

Background/Aims: Pseudocyst formation is a well-known complication of pancreatitis which develops over 1 to 4 weeks in approximately 15% of patients. Nearly-one-third of pancreatic resolve spontaneously;
Results: There is a prognostic value associated with the location of the pseudocyst, the amount of pseudocyst liquid and the concentration of proteins, potassium, lipase and amylase in the evacuated material.

Conclusion: Analysis of the aforementioned parameters provides an early forecast of the outcome of percutaneous evacuation.

Magnetic resonance imaging and MR angiography of endoluminally treated abdominal aortic aneurysms

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Objectives: To evaluate magnetic resonance imaging (MRI) with gadolinium-based contrast medium-enhanced MR angiography (MRA) for the follow-up of endoluminally treated abdominal aortic aneurysms.

Design: MRI/MRA, angiography and computed tomography (CT) were performed 1 month after endoluminal stent-graft placement. MRI/MRA was repeated at 6 and 12 months postoperatively, and CT was added to confirm unexpected findings.

Materials: Fifteen male patients with endoluminally treated abdominal aortic aneurysms. Methods: MRI with MRA, spiral CT with transverse images and angiography were performed.

Results: MRI/MRA demonstrated changes of stent-graft morphology, aortic neck- and aneurysmal diameter, stent-graft blood flow, stent-graft leakage, blood flow in lumbar arteries, intra-aneurysmal thrombus, periadventitial and vertebral body infarction. For most of these features MRI/MRA provided more information than angiography and/or CT. MRI was the only method demonstrating thrombus reorganization and vertebral body infarction.

Conclusions: MRI with MRA provides the relevant information needed for follow-up of endoluminally treated abdominal aortic aneurysms (AAA). This may be the method of choice because of its use of contrast media with very low nephrotoxicity, lack of ionising radiation and non-invasiveness.

OSTÉO-ARTICULAIRE

Noninvasive assessment of bone density and structure using computed tomography and magnetic resonance

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For several reasons, including low cost and radiation dose, simplicity, and the ability to image several skeletal sites, dual X-ray absorptiometry (DXA) is the most widely employed technique for diagnostic and serial assessment of integral bone mass in osteoporosis and other metabolic bone diseases. However, three-dimensional imaging modalities such as quantitative computed tomography (QCT) and magnetic resonance (MR) imaging offer the ability to separately examine different factors that may play independent and important roles in osteoporosis. These factors include the density of the trabecular and cortical compartments as well as the pattern of trabecular microarchitecture. New developments in QCT include volumetric approaches for precise compartmental assessment of cortical bone, the normal femur as well as thin-slice tomography of the vertebral body for assessment of trabecular texture. In addition, ultrahigh resolution CT scanners (spatial resolution ñ50-150μ) have been developed for imaging of trabecular structure in specimens and in some cases for the peripheral skeleton (distal radius and phalanges). High resolution MR measurements may be employed for assessment of the trabecular texture at a range of peripheral sites, including the calcaneus, distal radius, and phalanges.

Contrast enhanced magnetic resonance imaging for femoral neck fracture

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Clinical Orthopaedics and related research Number 350, pp 179-186.

Femoral head perforation was evaluated in 29 patients after acute femoral neck fracture using contrast enhanced fat saturation magnetic resonance imaging. The patients were followed up with T1 and T2 weighted spin echo magnetic resonance imaging without fat saturation, which is suitable in detecting avascular necrosis. T1 mean interval from injury to the initial contrast enhanced fat saturation magnetic resonance imaging was 24.5 hours. The mean age at the time of injury was 69 years, and the mean followup was 26.9 months. Three distinct patterns of femoral head enhancement were recognized in the acute phase after fracture. When the whole femoral head was well enhanced (Type 3, n = 11), no avascular necrosis developed. In contrast, when the head showed no enhancement (Type 1, n = 3), avascular necrosis developed in all patients. In patients with partial enhancement (Type 2, n = 12), avascular necrosis developed in five patients. These data showed the current method provided and accurate prediction of the development of avascular necrosis in the patients with Type 1 and Type 3 enhancement. However, overall predictive value was 59% (17 of 29 patients) because of the uncertainty in the assessment of fracture healing (Type 1, 2), and additional study is needed for this method to become routine in clinical use.

Ultrasound for the early diagnosis of tibial fracture healing after static interlocked nailing without reaming: clinical results

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Objective: Based on the results of a pilot study indicating the potential value of ultrasound (US) as a diagnostic tool for the early assessment of fracture healing, the related need for secondary operative procedures in patients treated by statically locked intramedullary (IM) nailing without reaming, a protocol was established for a larger scale prospective trial. The purpose of this study was to evaluate the outcome of this follow-up trial.

Design/Methods: All skeletally mature patients admitted to the Henry Ford Hospital (Detroit, Michigan) from January 1993 to August 1994 who had sustained an acute fracture of the tibial shaft and who were treated by statically locked IM nailing without reaming, were candidates for study. Forty-seven patients with fifty fractures that could be evaluated by US were included. The adopted determinants for fracture healing were complete disappearance of the IM nail on US examination performed at six weeks postoperatively, or progressive disappearance of the nail noted between the initial six-week study and a second nine-week US examination, both in conjunction with periosteal callus formation. Radiographs were obtained to monitor maintenance of reduction and to further evaluate fracture healing.

Results: Of thirty-eight fractures with a positive US (thirty-two at six weeks, six at nine weeks), thirty-seven healed uneventfully, a positive predictive value of 97 percent. Radiographic fracture healing was not evident until, on average, nineteen weeks after injury. The single false-positive fracture progressed to nonunion. Of the twelve fractures with negative US studies, ten underwent secondary procedures (nine dynamization, one bone graft), with four progressing to...
nonunion. Two patients refused secondary surgery; screw failure occurred in both. Otherwise, there were no hardware failures in this series.

**Conclusions:** The results of this study indicate that US may provide important prognostic information concerning fracture healing after unreamed tibial nailing, upon which subsequent treatment can be based.

The fibular incisure of the tibia on CT scan: a cadaver study.

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Twenty cadaver lower limbs were used for CT assessment of the fibular incisure of the tibia. The length of the syndesmotic facet is shorter in the anterior (11.20 ± 1.90 mm) than in the posterior (14.89 ± 2.72 mm) (P < 0.001). The angle between anterior and posterior facets is 135.18 ± 9.27°. The depth of the fibular incisure of the tibia is 4.29 ± 1.26 mm. The vertical distance of tibiofibular overlapping is 7.81 ± 1.93 mm. The distance between anterior margin of the tibia and anterior margin of the fibula is 17.40 ± 3.61 mm. The distance between the medial fibular border and the lateral border of the posterior tibia is 2.01 ± 0.49 mm. The syndesmotic notch could be divided into two groups: significant concave surface and shallow concave surface. The position of the fibula in the incisural notch may depend on the depth of the fibular incisure of the tibia during traumatic forces applied on the syndesmosis. CT can display the tibial tubercles and clearly demonstrates the fibular incisure of the tibia and the interior of the tibiofibular space.

**Do the radiological changes of classic ankylosing spondylitis differ from the changes found in the spondylitis associated with inflammatory bowel disease, psoriasis, and reactive arthritis?**

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**Objective:** In 1971 McEwen and colleagues suggested that the radiological changes of classic ankylosing spondylitis (AS), and the changes of the spondylitis associated with inflammatory bowel disease differ in several respects from the radiological features of psoriatic and reactive spondylitis. The findings of this study have never been confirmed. The aim of this study was to replicate the McEwen study comparing films blinded to diagnostic group.

**Methods:** The study population comprised 91 patients with classic AS, 15 patients with regional enteritis, 16 patients with ulcerative colitis, five patients with sexually acquired reactive arthritis, two with post-dysenteric arthritis, and 34 with psoriatic arthritis. Blinded reading of spinal radiographs was undertaken, scoring for severity, symmetry, paravertebral ossification, size of syndesmophytes, ligamentous calcification, squaring, discitis, pseudo-compressions, syndesmophytes, and ankylosis.

**Results:** Comparison of the four groups—classic, entheropathic, psoriatic, and reactive AS—showed differences with respect to symmetry of sacroiliitis, symmetry of lumbar spinal involvement, and frequency and size of syndesmophytes. Zygopophyseal joint involvement was more frequent in the lumbar spine in classic and entheropathic spondylitis but no between group differences were found with respect to synovitis, squaring, apophyseal joint involvement and ligamentous calcification in the lumbar spine, and other areas.

**Conclusions:** These differences may be important in understanding various hypotheses are proposed to explain these differences including biomechanical, biochemical, and genetic factors.

**Quantitative assessment of the rheumatoid synovial microvascular bed by gadolinium-DTPA enhanced magnetic resonance imaging.**


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**Objective:** To examine the relation between rate of synovial membrane enhancement, intra-articular pressure (IAP), and histologically determined synovial vascularity in reactive arthritis, using gadolinium-DTPA enhanced magnetic resonance imaging (MRI).

**Methods:** Dynamic gadolinium-DTPA enhanced MRI was performed in 31 patients with knee synovitis (10 patients IAP study, 21 patients vascular morphometry study). Rate of synovial membrane enhancement was quantified by line profile analysis using the image processing package ANALYZE. IAP was measured using an intra-compartmental pressure monitor system. Multiple synovial biopsy specimens were obtained by blind biopsy technique. Blood vessels were identified immunohistochemically using the endothelial cell marker QBend30 and quantified (blood vessel numerical density and fractional area).

**Results:** Median blood vessel numerical density and fractional area were 77.5/mm² (IQR: 69.3-110.7) and 5.8% (IQR: 3.4-8.5) respectively; The rate of synovial membrane enhancement (median 2.74 signal intensity units), IQR 2.0-3.8) correlated with both blood vessel numerical density (r = 0.46, p < 0.05) and blood vessel fractional area (r = 0.55, p < 0.02). IAP did not influence the rate of enhancement.

**Conclusions:** Gadolinium-DTPA enhanced MRI may prove to be a valuable technique for evaluating drugs that influence angiogenesis.

**MRI high-signal intensity in the menisci of asymptomatic children**

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We reviewed retrospectively the MRI examination of 108 knees of 80 children to identify the prevalence of a high signal in the menisci of those without symptoms. There were 51 males and 57 females with a mean age of 12.2 years (8 to 15). The prevalence of a high signal within the menisci was 66%, significantly higher than that in an adult group (29%). The prevalence decreased with age grade 2 and grade 3 changes were observed in 80% of menisci at ten years of age, in 65% at 13 years and in 35% at 15 years. The prevalence of high signals also decreased with increased skeletal maturity at the knee.

We emphasise the importance of awareness of the high prevalence of a high signal intensity in the menisci of children, especially in early adolescence.

**Treatment of flexor tendon sheath ganglions using ultrasound imaging.**


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Forty-one patients with a symptomatic digital mass or swelling of suspected ganglionic origin were examined by ultrasound. Findings were classified into 4 groups: group 1, solitary cyst appearing as a well-defined solitary oval anechoic mass (27 digits); group 2, multiple cysts having multiple oval anechoic masses (3 digits); group 3, solid tumour indicating a heterogeneous hypoechoic mass (6 digits); and group 4, tenosynovitis with no abnormal echo mass (5 digits). Treatment was determined by lesion classification. In group 1, 26 of the 27 solitary cysts were punctured, and a jelly-like material was aspirated from 24 cysts. Postaspiration ultrasound examination revealed that a cyst was still present in 2 cases, and these were excised surgically. In group 2, all the cysts were surgically removed. A ganglion with multiple cysts was confirmed on pathological examination. In group 3, the lesions were removed surgically; among the diagnoses were tendon sheath ganglion, giant-cell tumor of tendon sheath, neurilemmoma, and hemangioma. In group 4, no abnormal masses had appeared at follow-up examination. The 24 patients whose ganglions were treated by aspiration, as well as the 8 patients whose ganglions

were excised, were monitored for more than 12 months. None of these 32 patients experienced residual pain or lesion recurrence. These results indicate that ultrasound is useful, in cases in which flexor tendon sheath ganglion are suspected, for assisting in diagnosis and determining whether patients should undergo aspiration or surgical excision.

Predicting outcome in very low birthweight infants using an objective measure of illness severity and cranial ultrasound scanning.


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aim: To investigate the feasibility of developing an objective tool for predicting death and severe disability using routinely available data, including an objective measure of illness severity, in very low birthweight babies.

Method: A cohort study of 297 premature babies surviving the first three days of life was made. Predictive variables considered included birthweight, gestation, day cranial ultrasound appearances and 3 day CRIB (clinical risk index for babies) score. Models were developed using regression techniques and positive predictive values (PPV) and likelihood ratios (LR) were calculated.

Results: On univariate analysis, birthweight, gestation, 3 day CRIB score and 3 day cranial ultrasound appearances were each associated with death. On multivariate analysis, 3 day CRIB score and 3 day cranial ultrasound appearances remained independently associated. A 3 day CRIB score > 4 along with intraventricular haemorrhage (IVH) grade 3 or 4 was associated with a PPV of 64% and an LR of 9.8 (95% confidence limits 3.5, 27.9). Only 3 day CRIB score and 3 day cranial ultrasound appearances were associated with severe disability in univariate analysis. Both remained independently associated on multivariate analysis. A 3 day CRIB score > 4 along with IVH grade 3 or 4 was associated with a PPV of 60% and an LR of 24.2% (95% CI 4.4, 133.3).

Conclusion: Incorporating objective measures of illness severity may improve current prediction of death and disability in premature infants.

Comparison of prenatal ultrasound and postmortem findings in fetuses and infants with central nervous system anomalies.

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Detection of fetal developmental abnormalities by ultrasound examination of pregnant women has become a specialized field of medicine. Quality control of this field requires detailed examination of aborted fetuses. In 408 fetuses and infants with developmental anomalies, the prenatal ultrasound and findings were compared with the postmortem findings. This study focuses on 140 central nervous system (CNS) anomalies. Criteria
for inclusion were an ultrasound examination at the National Center for Fetal Medicine (NCFM) and an autopsy performed during the period 1985-94. Results of the ultrasound and autopsy examinations were systematized into six different categories.

Hydrocephaly and anencephaly were the most frequent abnormalities, totaling an average of 15% of all the CNS anomalies. In 20 cases (14%), the CNS anomalies were associated with other important anomalies or chromosomal aberrations. In 125 of the cases (89%), there was a complete concordance between the ultrasound and autopsy diagnoses. Of the 15 CNS cases with discrepant results, seven (47%) remain undetermined. The authors have used decision analysis technique to determine whether the use of ultrasound as an initial screen in vomiting infants is cost effective when compared with the UGI as the only study.

Methods: Two diagnostic strategies were compared: 1) UGI alone and 2) ultrasonography followed by an UGI series in 50% of the cases, a specific diagnosis was not made either pre- or postnatally. Follow-up was incomplete in one case. In 32 (91%) of the 35 cases, prenatal sonographic examination correctly predicted the prognosis, although in only 1 (31 per cent) of the 35 cases was the suggested prenatal diagnosis proven to be correct. The difficulty of making an accurate prenatal sonographic diagnosis in fetuses with suspected skeletal dysplasias throughout gestation, especially in the third trimester, and the importance of comprehensive multidisciplinary postnatal assessment in these cases is emphasized.

The role of ultrasonography in the diagnosis of pyloric stenosis: a decision analysis.

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Background/Purpose: The appropriate role for ultrasonography (US) as a replacement for the upper gastrointestinal series (UGI) in vomiting infants was the primary focus of this study. The authors have used decision analysis techniques to determine whether the use of ultrasound as an initial screen in vomiting infants is cost effective when compared with the UGI as the only study.

Methods: Two diagnostic strategies were compared: 1) UGI alone and 2) ultrasonography followed by an UGI series in 50% of the cases when ultrasonography scan was negative for pyloric stenosis. The test sensitivity (US, 0.9; UGI, 1.0) and test specificity (US, 1.0; UGI, 1.0) and the incidence of pyloric stenosis among vomiting infants presenting to the community pediatrician (0.30) or after the most recent examination by an experienced examiner (0.02 to 0.18) were obtained from a review of the literature. The relative charges for ultrasonography and UGI were obtained from a national survey from which the cost ratio of US to UGI was estimated to range from 0.67 to 1.81 with a median of 1.06.

Results: Under these baseline assumptions, UGI was the preferred strategy. The results of the decisions analysis were sensitive to, or dependent on, assumptions made regarding the incidence of pyloric stenosis, the US to UGI cost ratio, the sensitivity of the US, and the proportion of patients that proceed to UGI when the US scan was negative for pyloric stenosis. When at least 50% of patients whose US scan was negative for pyloric stenosis proceeded to a UGI, UGI remained the preferred strategy for all cost ratios examined (0.6 to 1.7). Even when no patients proceeded to UGI, the cost ratio of US to UGI had to be less than 0.7 under the typical incidence (0.30) of pyloric stenosis among vomiting infants presenting to the community pediatrician for US to be cost effective. Finally, only UGI was indicated when an olive was not appreciated by an experienced examiner.

Conclusion: Under assumptions that fit most critically relevant circumstances, the UGI as the initial study is the most cost-effective radiological diagnostic test in the evaluation of the vomiting infant.

Prenatal sonographic diagnosis of skeletal dysplasias—a report of the diagnostic and prognostic accuracy in 35 cases.

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Sonographic assessment of the skeleton is a routine part of fetal anomaly screening. We report a series of 35 cases seen during a 7-year interval in which a skeletal dysplasia was suspected prenatally. In seven (20 per cent) of the 35 cases, a specific diagnosis could not be made either pre- or postnatally. Follow-up was incomplete in one case. In 32 (91 per cent) of the 35 cases, prenatal sonographic examination correctly predicted the prognosis, although in only 1 (31 per cent) of the 35 cases was the suggested prenatal diagnosis proven to be correct. The difficulty of making an accurate prenatal sonographic diagnosis in fetuses with suspected skeletal dysplasias throughout gestation, especially in the third trimester, and the importance of comprehensive multidisciplinary postnatal assessment in these cases is emphasized.

RACHIS

Pathoanatomic mechanisms of degenerative spondylolisthesis. A radiographic study.

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Study design: A retrospective case-control study was performed using the radiographs taken at the first hospital visit in two groups: in one group, spondylolisthesis developed after the first hospital visit, and, in the other, spondylolisthesis had not developed over 10 years.

Objectives: To determine possible radiographic differences between these two groups to clarify the pathoanatomic mechanisms of anterior slipping.

Summary of background data: The etiology of degenerative spondylolisthesis, for example, underlying pathoanatomic mechanisms such as dysfunction of the disc or horizontalization of the lamina and the facets, has been difficult to resolve, because radiographs taken before the occurrence of the slip have not been available in previous investigations.

Methods: Sixty-nine patients with spondylolisthesis in whom degenerative spondylolisthesis developed after the first hospital visit and for whom radiographs taken before the slip were available were studied retrospectively. In 63 patients slipping did not develop over 10 years, with or without intervertebral instability; these patients were studied as a control group. The radiographs taken before and after the occurrence of the slip in the patients with spondylolisthesis were examined and compared with those without spondylolisthesis. Dysfunction of the disc, horizontalization of the lamina and the facets, and the sagittal alignment of the facet joints were assessed in each group.

Results: Patients in whom anterior slipping developed had signs indicating that horizontalization of the lamina and the facets had occurred before the slip. However, the patients in whom spondylolisthesis did not develop had no horizontalization of the lamina and the facets at the first hospital visit or during the follow-up period. There was no significant difference in dysfunction of the disc between the cases with and without spondylolisthesis. Sagittal alignment of the facet joints was seen more frequently in the patients in whom slipping occurred than in patients with no spondylolisthesis, but approximately 40% of the patients in whom slipping occurred did not demonstrate sagittal alignment.

Conclusion: Horizontalization of the lamina and the facets is a pathoanatomic risk factor that can predispose for the development of degenerative spondylolisthesis. If dysfunction of the disc occurs in addition to these conditions, spondylolisthesis may develop.

SENOLOGIE

A prospective analysis of office-based breast ultrasound.

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Arch Surg 1998;133:504-508.

Objective: To determine the usefulness of office-based breast ultrasound.

Design: Prospective, nonrandomized study.

Setting: Academic-affiliated community teaching hospital.

Patients: Among 653 consecutive patients seen in our office during a 30-month period, we performed 660 ultrasound examinations. The presenting complaint included a palpable mass in 53%, abnormal mammogram in 39%, and nipple discharge or retraction in 14%.

Intervention: Ultrasound examination was performed using a handheld 7.5 MHz linear array transducer. Findings and pertinent cli-
nicopathologic data were recorded prospectively in our Breast Ultrasound Registry.

Main outcome measure: Contribution of breast ultrasound to diagnosis and treatment.

Results: The sonogram was normal in 201 cases (30%), showed duct ectasia in 20 cases (3%), a simple cyst or seroma in 101 cases (15%), and a focal complex or solid abnormality in 338 cases (51%). Among the last group, 114 (87%) of 118 lesions thought to be benign on ultrasonography proved to be benign, whereas 13 (12%) of 111 indeterminate and 72 (75%) of 96 sonographically suspicious lesions proved to be cancer (including 13 cases with normal mammograms). Ultrasonographic features of malignancy included an aneupoterosior-to-later dimension ratio of 1 or greater, heterogeneously hypoecholicity, irregular shadowing, and fuzzy and/or jagged margins. Ultrasound-guided needle biopsy accurately diagnosed 46 benign nonpalpable lesions and 20 malignant nonpalpable lesions.

Conclusions: These data suggest that ultrasonography is a useful adjunct to clinical and mammographic evaluation of breast disease.

Breast ultrasound identifies cysts, aids in differentiating benign from malignant lesions, and facilitates office needle biopsy of nonpalpable abnormalities, permitting timely and cost-effective patient care.

Breast masses: color Doppler, power Doppler, and spectral analysis findings.

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Purpose: To determine the diagnostic efficacy of power Doppler sonography (PDS) with spectral analysis for breast diseases, we retrospectively compared PDS and color Doppler sonography (CDS) in patients with breast lesions.

Methods: One hundred thirty-eight women with palpable breast lesions were examined with PDS (65 women) and/or CDS (73 women). We calculated peak velocity, enddiastolic velocity, pulsatility index (PI), and resistance index (RI).

Results: On a 4-point subjective visual vascularity scale, PDS demonstrated higher vascularity than did CDS. Although smaller and more subtle vessels could be detected only with PDS, the PI and RI differed significantly between malignant and benign lesions when either PDS or CDS was used. However, logistic regression analysis showed that high PI and RI were associated with malignancy only when CDS was used. When PDS was used, PI was significantly higher in invasive ductal carcinoma with fibrous stroma and ill-defined margins (associated with a poor prognosis) than in invasive ductal carcinoma without fibrous stroma or with well-defined margins.

Conclusion: Doppler spectral analysis of malignant breast lesions using PDS may contribute to the determination of prognosis.

The role of ultrasound in breast cancer screening. A consensus statement by the European group for breast cancer screening.

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The members of the European group for breast Cancer Screening have considered the use of ultrasound in breast diagnosis and breast cancer screening. After wide consultation and a detailed literature review, the consensus of the Group on the role of ultrasound is as follows: current evidence indicates that ultrasound of the breast is an important adjunct to mammography and clinical examination in the further assessment of both palpable and im palpable breast abnormalities. However, the use of ultrasound in population screening of asymptomatic women is associated with unacceptable high rates of both false positive and false negative outcomes. At present there is little evidence to support the use of ultrasound in population breast cancer screening at any age.
Important pathologic abnormalities of the temporal lobe were identified in 16 (35%) of the 46 patients with standard MRI scans done outside an epilepsy center and in 44 (96%) with our special protocol MRI scans. In the 29 patients for whom adequate surgical specimens were available and results of standard MRI scans were normal, our special protocol MRI scans showed the abnormality in 27 (93%).

**Conclusions:** Conventional neuroimaging studies are inadequate for diagnosing hippocampal sclerosis although they fairly readily detect low-grade tumors and vascular malformations. Magnetic resonance imaging scans for the evaluation of patients with refractory temporal lobe epilepsy should be done with a special temporal lobe protocol and read by physicians experienced with the findings in hippocampal sclerosis. Health care dollars are wasted on neuroimaging done for refractory temporal lobe epilepsy outside epilepsy centers.

**Temporal lobe developmental malformations and epilepsy. Dual pathology and bilateral hippocampal abnormalities.**

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Temporal lobe developmental malformations (TLDM) with focal cortical dysplasia and balloon cells may coexist with mesial temporal sclerosis. The true incidence of this dual pathology is unknown. Our aim was to assess the frequency of amygdala (AM)-hippocampal abnormality in a homogeneous population with this specific developmental malformation. MRI-based volumetry of the AM an hippocampal formation (HF) 30 patients with unilateral TLDM and intracranial partial epilepsy was performed. A volume normalization process defined a normal range of HF and AM volumes in control subjects, and enabled the detection of bilateral volume loss. Normalized volumes detected HF atrophy in 26 patients (nine unilateral and 17 bilateral) and AM atrophy in 18 patients (three unilateral and 15 bilateral). Visual analysis detected unilateral HF abnormality in 21 patients and bilateral abnormality in two. When compared with a group of patients with temporal lobe epilepsy and pure hippocampal sclerosis (N = 30), where volumetry revealed bilateral HF atrophy in 18%, a significant difference in the frequency of bilateral HF atrophy was found (p < 0.001). Dual pathology is frequent in patients with TLDM (87%), and the AM-HF abnormality is often bilateral (57%). Our data suggest that more widespread and potentially epileptogenic lesions coexist with visibly detectable unilateral TLDM. This has implications for the selection of patients for temporal lobe surgery and may influence surgical strategies.

**Comparison of magnetic resonance imaging with neuropathological findings in the diagnosis of HIV and CMV associated CNS disease.**

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J Neurol Neurosurg Psychiatry 1997;62:346-351.

Objectives: To compare the results of clinical assessment and MRI with neuropathological findings in the diagnosis of HIV and cytomegalovirus (CMV) associated CNS disease.

Methods: A retrospective study of 35 patients (22 with HIV who were examined at necropsy between four and 70 (median 20) days after neurological assessment and MRI. Results: Of the 35 patients, 19 had diffuse white matter hyperintensity on T2 weighted MRI, six of whom also had focal lesions. Nine other patients had focal white matter lesions and seven had changes in cortical atrophy only. Necropsy in the 19 with diffuse white matter hyperintensity showed HIV leukoencephalopathy (HIVLEP) with encephalitis in 10, CMV encephalitis in three, both HIVLEP/HIV encephalitis and CMV encephalitis in one, lymphoma in three, and non-specific inflammation in two. Necropsy in the 16 other patients witout diffuse white matter hyperintensity showed CMV encephalitis in six, HIV encephalitis (without HIVLEP) in two, CMV encephalitis and HIVLEP/HIV encephalitis in one, lymphoma in one, and non-specific inflammation in two. Necropsy in the 16 other patients witout diffuse white matter hyperintensity showed CMV encephalitis in six, HIV encephalitis (without HIVLEP) in two, CMV encephalitis and HIVLEP/HIV encephalitis in one, lymphoma in one, and non-specific inflammation in two.

Conclusion: Diffuse white matter hyperintensity on MRI can be due to either HIV or CMV Associated pathology or non-specific abnormalities.

**Seasonal pattern of spontaneous cervical artery dissection.**

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Object: The etiology of spontaneous cervical artery dissection is poorly understood; however, it may involve genetic and environmental factors. The purpose of this study was to determine whether seasonality of spontaneous cervical artery dissection exists.

Methods: The seasonal pattern of spontaneous cervical artery dissection was analyzed in a group of 200 consecutive patients (104 females and 96 males with a mean age of 44.9 years) who were evaluated using the Rayleigh test during the period from 1970 to 1990. The majority of patients resided in the midwestern section of the United States, where large seasonal fluctuations in climate occur. A circannual periodicity was found in the frequency of spontaneous cervical artery dissections with a peak occurring in October (p < 0.02). The seasonal variation was substantial, with approximately 58% more patients suffering a cervical artery dissection during autumn than during other seasons.

Conclusions: A seasonal pattern of spontaneous cervical artery dissection exists with a peak occurring in October. The cause of the seasonality remains to be explained; however, weather-infectious disease-related factors may provide etiological leads.

**Magnetic resonance angiographic and clinical features of extracranial vertebral artery dissection.**

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J Neurol Neurosurg Psychiatry 1998;64:474-481.

Objectives: Clinical data and neuroradiological findings of 19 patients with 20 vertebral artery dissections were analysed to describe the features of time of flight magnetic resonance angiography (MRA) for the diagnosis and follow-up of this vascular disorder.

Methods: All patients underwent a combined MRA and MRI protocol with 1.5 T scanners, using a three dimensional flow compensated gradient echo sequence for MRA. Duplex sonography was performed on all patients and selective angiography was available from 17 vertebral artery dissections.

Results: MRI showed ischaemic lesions of the brain in 18 of 19 patients (95%). In the acute and subacute stage, MRA detected signal abnormalities within the dissected vertebral artery in 94% (16/17) and MRI was specific for a dissection in 29% (5/17). Sensitivity of selective angiography was 100% and specificity was 35% (6/17). Combination of the results of both methods increased the specificity to 50%. Duplex sonography was sensitive in 79% (15/19), but lacked specific results. Follow up magnetic resonance in 16 patients showed recanalisation of the dissected vessel in 10 (63%), persistent occlusion in five (31%), and a dissecting aneurysm in one (6%) patient.

Conclusions: Magnetic resonance improves the triage for selective angiography and discloses complementary information for the diagnosis of vertebral artery dissection. If magnetic resonance identifies a double lumen or a mural haematoma with a stenosis or aneurysmal dilatation, invasive procedures can be omitted.
Metho ds: A mobile computed tomo- graphic scanner has been developed in which the scan plane is selected by means of gantry translation, rather than by translation of the patient itself. This permits to perform tomographic scanning in situ of any patient who is positioned on a radiolucent surface that fits within the inner diameter of the gantry. We report the design of an initial experience with this scanner as used with adapters for intraoperative and bedside computed tomography (CT).

Methods: The scanner is equipped with wheels, draws power from wall outlets (120 V, 20 A) in combination with batteries, and has a translating gantry; Preclinical studies of image quality were performed with phantoms. An operating table adapter was built for use with a radiolucent cranial fixation device. A bedside adapter was built that holds the head and shoulders of a patient in the intensive care unit.

Results: The preclinical phantom studies showed satisfactory image spatial resolution (0.8 mm) and low-contrast resolution signal-to-noise relative standard deviation (0.37%). Experience to date with 12 patients had confirmed the feasibility of intraoperative CT in the patient. This method was used on 26 patients, with which confirmed the feasibility of routine bedside CT in the intensive care unit.

Conclusion: With these adaptations, mobile CT may increase the efficiency of intraoperative scanning by making it available to multiple operating rooms without committing to any room for an entire operation and may increase the efficiency and safety of CT of critically ill patients who currently need to leave the intensive care unit to travel to a fixed CT installation and back.

Proton magnetic resonance spectroscopy for detection of axonal injury in the splenium of the corpus callosum of brain-injured patients.

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Object: This study was conducted to determine whether proton magnetic resonance spectroscopy (MRS) is a sensitive method for detecting diffuse axonal injury, which is a primary sequela of traumatic brain injury (TBI). Diffuse axonal injury is characterized by selective damage to white matter tracts that is causes in part by the severe inertial strain created by rotational acceleration and deceleration, which is often associated with motor vehicle accidents. This axonal injury is typically difficult to detect by using conventional imaging techniques because it is microscopic in nature. The splenium was selected because it is a site vulnerable to shearing forces that produce diffuse axonal injury.

Methods: The authors used proton MRS to evaluate the splenium, the posterior commissure of the corpus callosum, in normal control volunteers and in patients with TBI. Proton MRS provided an index of neuronal and axonal viability by measuring levels of N-acetyl aspartate (NAA).

Conclusions: A majority of mildly brain injured patients, as well as those more severely injured, showed diminished NAA/creatine (Cr) levels in the splenium compared with normal control volunteers. The patients displaying lowered NAA/Cr in the splenium were also likely to exhibit lowered NAA/Cr in lobar white matter. Also, the levels of NAA/Cr in the splenium of normal volunteers were higher compared with those found in lobar white matter. Decreases in NAA/Cr levels in the splenium may be a more accurate indicator for diffuse axonal injury. A proton MRS examination may be particularly useful in evaluating mildly injured patients with unexplained neurological and cognitive deficits. It is concluded that MRS is a sensitive tool in detecting axonal injury.

Proton magnetic resonance imaging to predict progression of traumatic epidural and subdural hematomas in the acute stage.

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Objective: We investigated the possibility of predicting the progression of traumatic epidural hematomas (EDHs) and subdural hematomas (SDHs), in the acute stage, by using postcontrast magnetic resonance imaging (MRI) with gadolinium-diethylene-triaminepentaacetic acid.

Methods: From January 1996 through December 1996, 41 patients with 43 hematomas (21 EDHs and 22 SDHs) underwent postcontrast MRI within 24 hours after injury. T1-weighted MRI was performed by using the spin echo method, after the administration of 0.1 mmol/kg gadolinium-diethylene-triaminepentaacetic acid, immediately after computed tomographic scanning.

Results: All of the enhanced hematomas were enlarged, whereas nonenhanced hematomas, except for two SDHs with bleeding tendencies, remained unchanged or decreased in volume. The prediction rates for enlargement with this method were 100% (15 of 15) for EDHs and 81.8% (9 of 11) for SDHs. The specificity was 100% for both types of hematomas. The enlargement rates for diffusely enhanced hematomas were statistically greater than those for nonenhanced hematomas. All of the patients with diffusely enhanced hematomas, which were found during surgery to exhibit active bleeding points, experienced consciousness deterioration.

Conclusion: We conclude that diffuse enhancement indicates extravasation from broken vessels that continue to bleed and that diffusely enhancing hematomas will be rapidly enlarged. We think that postcontrast MRI can be very useful for predicting the progression of acute EDHs and SDHs.

Airway wall thickness in patients with near fatal asthma and control groups: assessment with high resolution computed tomographic scanning.

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Background: Airway wall thickening has been observed in post mortem studies of patients with asthma. Assessment of airway wall thickening by high resolution computed tomographic (HRCT) scanning has been reported in experimental studies. We have used HRCT scanning to measure airway wall thickness at the segmental and sub-segmental levels in 40 patients with asthma and 14 normal control.

Methods: The subjects were prospectively divided into four age and sex matched groups: 14 patients with a history of near fata attack of asthma (NFA; group 1), 12 patients with moderate asthma (group 2), 13 patients with mild asthma (group 3), and 14 normal control (group 4). All subjects were non-smokers. High resolution (1 mm collimation) CT scans of the chest were done at five different levels.

Results: The mean (SD) forced expiratory volume in one second (FEV1) was 0.89 (0.24) for group 1, 0.87 (0.25) for group 2, 0.89 (0.24) for group 3, and 0.90 (0.24) for group 4. The ratio of airway wall thickness to the outer diameter (T/D) and the percentage wall area (WA%) defined as (wall area/total airway area) × 100 were used to compare airway wall thickness between the groups. The mean (SD) T/D and WA% were 0.27 (0.05) and 78.9 (9.2)% for group 1, 0.27 (0.05) and 78.8 (9.2)% for group 2, group 3 had a higher T/D and WA% than group 1, 0.27 (0.05) and 78.9 (9.2)% for group 2. The differences (95% CI) between the groups in T/D and WA% were not significantly different between groups 1 and 2. However, both groups 1 and 2 had higher T/D and WA% than either group 3 or 4 (p < 0.001). The differences were significant between the groups 1 and 3 and 1 and 4 (p < 0.05). The differences were significant for the presence of abnormalities compatible with ILD was male gender (p < 0.04, Student’s t test). In conclusion, changes consistent with ILD in early RA are frequent. The significance of these changes is being determined in a longitudinal study.

The usefulness of computed tomography in the diagnosis of impacted fish bones in the oesophagus

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The usefulness of computed tomography (CT) in the diagnosis of fish bone impaction in the oesophagus was evaluated. Thirty-two patients were examined by plain X-ray followed by direct oesophagoscopy for suspected fish bone impaction. Among 25 cases in which fish bones were actually removed, foreign bodies were not clearly demonstrated by plain X-ray in 14 cases (56 per cent). Eleven cases underwent CT prior to the oesophagoscopy examination. Fish bones were clearly demonstrated by CT in all patients. CT also clearly visualized secondarily-induced inflammatory changes in the neighbouring structures. In order to confirm this result, we made a simulation model of oesophageal fish bone impaction, using fish bones of three different species surrounded by a water bag. In comparison with plain X-ray, CT depicted a superior image of fine fish bones and provides extremely useful information for the management of impacted fish bones in the oesophagus.

Pathologic tumoral malignant of the paroi thoracique antérieure. Etude sur une série de dix cas.

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Objectifs: Rapporter les caractéristiques cliniques et paracliniques des pathologies malignes se traduisant par une tuméfation de la paroi thoracique et touchant le sternum, les jonctions sternocostale, sternoclavulaire ou chondrocostale et/ou les parties molles adjacentes au sternum.


Résultats: Dix dossiers ont été retenus (7 hommes, 3 femmes, âge moyen : 53,1 ans). Un seul patient présentait un antécédent néoplasique (lymphome); pour les 9 autres, la tuméfaction thoracique était révélatrice de la néoplasie qui semblait de connotation maligne. Les cancers étaient constamment d’horaire mixte et la tuméfaction sternale (5 fois) ou parasternale (5 fois). Des signes généraux (fièvre, sueurs, prurit, altération de l’état général) étaient observés dans 5 cas.

Conclusion: Une tuméfaction thoracique peut être en rapport avec une pathologie maligne et être révélatrice de la néoplasie. Ces tumeurs malignes de la paroi thoracique sont cependant rares et les caractéristiques propres des métastases sternales, des lymphomes locauxisés au sternum et à la paroi thoracique et des masses plasmocytaire sternales sont discutées. Les affection « bénignes » (inflammatoires, dégénératives, néo-précoumpreces) de la paroi thoracique susceptibles de se traduire par une saillie et/ou tuméfaction sont rappelées.
Can duplex Doppler ultrasound replace computerized tomography in staging patients with renal cell carcinoma?

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The purpose of this study was to evaluate the accuracy and reliability of duplex Doppler ultrasound (US) and computerized tomography (CT) in staging patients with renal cell carcinoma (RCC). Sixty-six patients were evaluated pre-operatively with duplex Doppler ultrasound and CT. The results were compared with the surgical and histopathological findings. T stage was determined correctly with duplex Doppler US in 45 and 46 cases respectively. In 4 patients with nodal disease duplex Doppler US was correct in 2 patients, 1 was false positive. With CT, 3 patients were staged correctly and 3 were false positive. Of the 14 patients with vascular tumour thrombi, 13 were staged correctly with duplex Doppler US and 12 with CT scan. False positive vascular tumour invasion was seen only with CT in 4 cases. Based on these results we conclude that duplex Doppler US is at least as accurate as CT scanning in the staging of RCC. Also in patients with renal or caval thrombi, duplex Doppler US is highly accurate in establishing the diagnosis and in the determination of the extent of the thrombus.

Role of magnetic resonance imaging in renal transplant recipients with acquired cystic kidney disease.

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Objectives: To evaluate the impact of magnetic resonance imaging (MRI) in renal transplant recipients whose ultrasound (US) examinations of the native kidneys have met the criteria of acquired cystic kidney disease (ACKD).

Methods: The US scans of 840 renal allograft recipients were prospectively studied. In addition, 46 of 169 patients diagnosed with ACKD by US scans underwent MRI examination. MRI protocols included (a) T1 and T2-weighted fast spin echo imaging, (b) T2-weighted gradient echo imaging, and (c) gadolinium-enhanced T1-weighted imaging in 7 patients with evidence of complex cysts. In the case of complex lesions, both US and MRI follow-up examinations were performed between 6 and 12 months after the prior examination.

Results: US examination showed ACKD in 169 of 840 patients. In addition, US revealed 8 patients with renal cell carcinomas (RCC). Of these 8 patients, 7 had evidence of ACKD. The median number of cysts depicted on US examination in native kidneys of renal transplant recipients was 3 (range 0 to 10) on both sides. MRI revealed significantly more and smaller cysts compared to US. The median number of cysts was seven on the left and nine on the right native kidneys, respectively. MRI revealed 18 complex lesions in 7 patients. Thirteen of 18 complex lesions were undetected by US.

Conclusions: MRI is superior to US in depiction of simple and complex lesions of native kidneys in renal allograft recipients. MRI exhibits no overestimation of the prevalence of ACKD on the basis of the US criteria already mentioned. Advantages of MRI do not justify routine screening tests by this imaging modality. However, MRI should be used for further evaluation of complex lesions detected by US.

Diagnostic evaluation of the adrenal incidentaloma: decision and cost-effectiveness analyses.

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The goal of this study was to examine the clinical and economic outcomes of alternative diagnostic strategies for differentiating benign from malignant adrenal masses.

Methods: We used cost-effectiveness assessment derived from decision analysis and the economic perspective of the payer of health care services. One-time evaluation with fine-needle aspiration (FNA) and combinations of chemical-shift MRI, noncontrast CT, 131I-6-iiodomethylnorcholesterol (NP-59), scintigraphy, with or without FNA, in a hypothetical cohort of 1000 patients with incidentally discovered unilateral, nonhypersecreatory adrenal masses. We calculated and compared the diagnostic effectiveness, costs and cost-effectiveness of the alternative strategies based on estimates from published literature and institutional charge data.

Results: At an assumed baseline malignancy rate of 0.25, diagnostic utility varied from 0.31 (CT), to 0.965 (NP-59) and diagnostic accuracy from 0.655 [noncontrast CT using a cut-off attenuation value of ≥ 2 (CT),] to 0.983 (NP-59). The average cost per patient per strategy ranged from $746 (NP-59) to $1745 (MRI ±FNA) for cost and diagnostic accuracy, respectively. The NP-59 strategy was the optimal choice regardless of the expected outcome examined: costs, diagnostic utility, diagnostic accuracy or cost-effectiveness advantage of NP-59 over the other diagnostic modalities.

Conclusion: Based on available estimates of reimbursement costs and diagnostic test performance and using reasonable clinical assumptions, our results indicate that the NP-59 strategy is the most cost-effective diagnostic tool for evaluating adrenal incidentalomas over a wide range of malignancy rates and that additional clinical studies are warranted to confirm this cost-effectiveness advantage.

Interference to medical equipment from mobile phones

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Cellular mobile phones may interfere with hospital equipment. We irradiated five representative pieces of equipment using simulated phone signals and frequencies. Two (an oximeter and a syringe pump) were immune to all cellular phone frequencies used in the clinical environment. A third device was susceptible to one frequency in the clinical environment. These results show that cellular phone technology is not a threat to medical equipment in hospitals.

Conclusions: The effects of cellular phone interference on medical equipment in hospitals should be evaluated.

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