DIGEST


Department of Surgery, Kawakita General Hospital, 1-7-3 Asagaya-kita Suginami-ku, Tokyo, 166 Japan.


The accuracy of diagnosis of metastatic lymph nodes for rectal carcinoma has not improved. A low echogenic lesion more than 5 mm in size detected by endorectal ultrasonography is preoperatively assessed as a metastatic lymph node. What does a low echogenic lesion more than 5 mm in size correspond to histologically?

Methods. Forty-seven patients with lower rectal carcinoma (Term I, 1986-1990) and 48 patients with lower rectal carcinoma (Term II, 1991-1995) undergoing endorectal ultrasonography were reviewed. Surgically resected rectal specimens from 40 patients with rectal carcinoma underwent ultrasonography. Low echogenic lesions more than 5 mm in size were taken from resected specimens and were stained with hematoxylin and eosin and histologically examined. Vessel invasion was graded from 0 (not invasive) to 3 (most invasive).

Results. Among the 55 patients studied, 3 had Stage T2, N0, M0 rectal carcinomas and 35 had Stage T3, N0, M0 carcinomas. 5 (14.3 percent) of whom had echographic evidence of small spots. Thirteen patients had Stage T3, N1/2, M0 carcinomas. Twelve had Stage T4a, M0 carcinomas, and four patients had T3, N1/2, M1 carcinomas, all with small spots. Vessel invasion of Grade 2 or higher was observed around the carcinoma in 24 of 21 patients who had small spots. Ten of 13 patients with many spots at the margin of the carcinoma (a spot grade of + ) histologically had marked venous or lymphatic invasion (an invasion Grade 3). The presence of small spots was closely associated with massive venous or lymphatic invasion (a vessel invasion grade of 2 or more). Four patients had synchronous liver metastases, and small spots were found in all four. Distant metastases and local recurrences were found in 11 of 21 patients with small spots. We found no recurrence in any patient without small spots on endorectal ultrasonography.

Conclusions. Small spots indicate the presence of massive venous or lymphatic invasion and a high risk of postoperative recurrence.


Department of Surgery, Kawakita General Hospital, 1-7-3 Asagaya-kita Suginami-ku, Tokyo, 166 Japan.


Purpose. We observed small spots at the margin of rectal carcinomas on endorectal ultrasonography. Our aim was to study the relationship between ultrasonographic evidence of these spots and histologic characteristics of disease and postoperative recurrence.

Patients and methods. The study group comprised 55 patients, 36 men and 19 women. With rectal carcinoma as confirmed by biopsy. The patients were followed up at three-month intervals for six months to three years and six months after the operation. Endorectal ultrasonography was performed in the usual manner. Surgically resected specimens were stained with hematoxylin and eosin and histologically examined. Vessel invasion was graded from 0 (not invasive) to 3 (most invasive).

Results. Among the 55 patients studied, 3 had Stage T2, N0, M0 rectal carcinomas and 35 had Stage T3, N0, M0 carcinomas. 5 (14.3 percent) of whom had echographic evidence of small spots. Thirteen patients had Stage T3, N1/2, M0 carcinomas. Twelve had Stage T4a, M0 carcinomas, and four patients had T3, N1/2, M1 carcinomas, all with small spots. Vessel invasion of Grade 2 or higher was observed around the carcinoma in 20 of 21 patients who had small spots. Ten of 13 patients with many spots at the margin of the carcinoma (a spot grade of + ) histologically had marked venous or lymphatic invasion (an invasion Grade 3). The presence of small spots was closely associated with massive venous or lymphatic invasion (a vessel invasion grade of 2 or more). Four patients had synchronous liver metastases, and small spots were found in all four. Distant metastases and local recurrences were found in 11 of 21 patients with small spots. We found no recurrence in any patient without small spots on endorectal ultrasonography.

Conclusions. Small spots indicate the presence of massive venous or lymphatic invasion and a high risk of postoperative recurrence.


Department of Diagnostic Radiology, National Cancer Center Hospital, 1-1, Tsukiji, 5-chome, Chuo-ku, Tokyo 104, Japan.


Background. Nonfunctioning islet cell tumors (NFICTs) usually reach a large size prior to detection, at which stage patients have some symptoms or signs. Recently, NFICTs have been discovered in asymptomatic patients with increasing frequency owing to advances in diagnostic imaging techniques. This study investigated clinical, imaging and pathological features in recent cases of NFICT. Methods. The medical records, radiographs and pathological specimens of 16 patients with NFICT who were evaluated between April 1991 and March 1996 were reviewed.

Results. Tumor sizes ranged from 0.8 to 17 cm (average, 5.2 cm). Five patients (31%) had some symptoms or signs at the time of diagnosis; however, the other 11 (69%) had no symptoms. Of 10 patients with a tumor of size 5 cm or less, nine were asymptomatic and all tumors were histologically benign. In contrast, in six patients with a tumor larger than 5 cm, four had some symptoms and five tumors were malignant. The detection rates of pancreatic tumor mass on ultrasonography and computed tomography were 94% (15/16) each. All 14 patients in whom the tumor was completely resected survived without recurrence; however, the remaining two patients with liver metastases died following recurrence.

Conclusions. US and CT are useful in detecting NFICTs even if the tumor is small and the patient is asymptomatic. The detection of NFICTs of small size and their complete removal are essential for a successful cure.


Department of Surgery, UCHSC, Box C-311, 4200 E. Ninth Ave., Denver, Colorado 80262.


Background. In colorectal cancer, intraoperative ultrasound (IOUS) is superior to other imaging studies in characterizing hepatic metastases. The value of IOUS in detecting liver metastases from pancreatic cancer has not been evaluated previously.

Methods. Between 1990 and 1995, IOUS was prospectively employed to evaluate the liver for metastases in 32 patients with resectable pancreatic adenocarcinoma. Preoperatively, all patients had computed tomography (CT) and 22 patients had CT portography.

Results. At exploration, 5 of the 32 patients (15%) had extrapancreatic disease, 3 (9%) with liver implants. IOUS did not identify any additional hepatic metastases. Four preoperative studies were suspicious for metastatic disease in the liver. In these 4 patients, no hepatic metastases were identified by exploration or intraoperative ultrasound.

Conclusions. We no longer routinely perform hepatic IOUS when evaluating patients with pancreatic adenocarcinoma for pancreaticoduodenectomy. When a preoperative study indicates possible hepatic involvement, IOUS can confirm the presence or absence of liver metastases.

Diagnosis and Initial Management of Blunt Pancreatic Trauma Guidelines From a Multinstitutional Review. EL Bradley III, PR Young Jr, MC Chang.

Chief of Surgery, Buffalo General Hospital, 100 High St., Buffalo, NY 14203.


Objective. The authors’ objective was to resolve the current controver sies surrounding...
the diagnosis and management of blunt pan-
creatoduodenal trauma (BPT). Summary Background Data. The diagnosis of BPT is notoriously difficult: serum amylase has been claimed to be neither sensitive nor specific, and recent anecdotal reports have suggested that computed tomography. The therapy of BPT has been controversial, with some suggesting selective observation and others advocating immediate exploration to prevent a delay-induced escalation in morbidity and mortality. Methods. The authors conducted a retrospective chart review of documented BPT from six institutions, using a standardized binary data form composed of 187 items and 237 data fields. Results. A significant correlation between pancreas-specific morbidity and injury to the main pancreatic duct (MPD) was noted. Patients requiring delayed surgical intervention after an unsatisfactory period of observation demonstrated notably higher pancreas-specific mortality and morbidity rates, principally because of the incidence of unrecognised injuries to the MPD. Although detection of MPD injuries by computed tomography was no better than flipping a coin, endoscopic pancreatography was accurate in each of the five cases in which it was used. Conclusion. The principal cause of pancreas-specific morbidity after BPT is injury to the MPD. Parenchymal pancreatic injuries not involving the ductal system rarely result in pancreas-specific morbidity or death. Delay in recognizing MPD injury leads to increased mortality and morbidity rates. CT is unreliable in diagnosing MPD injury and should not be used to guide therapy. Initial selection of patients with isolated BPT for observation or surgery can be based on the determination of MPD integrity.

Appendicitis: The Impact of Computed Tomography Imaging on Negative Appendectomy and Perforation Rates. EJ Balthazar, NM Rofsky, R Zuckerk.

Patients requiring delayed surgical intervention after an unsatisfactory period of observation demonstrated notably higher pancreas-specific mortality and morbidity rates, principally because of the incidence of unrecognised injuries to the MPD. Although detection of MPD injuries by computed tomography was no better than flipping a coin, endoscopic pancreatography was accurate in each of the five cases in which it was used. Conclusion. The principal cause of pancreas-specific morbidity after BPT is injury to the MPD. Parenchymal pancreatic injuries not involving the ductal system rarely result in pancreas-specific morbidity or death. Delay in recognizing MPD injury leads to increased mortality and morbidity rates. CT is unreliable in diagnosing MPD injury and should not be used to guide therapy. Initial selection of patients with isolated BPT for observation or surgery can be based on the determination of MPD integrity.

Division of Pediatric Surgery, Surgical Department B, The National Hospital, Oslo, Norway.


Objective. The aim of the present study was to examine the sensitivity of prenatal ultrasound diagnosis in neonates referred for surgery, and to test whether a prenatal versus postnatal diagnosis influenced mode of delivery and neonatal outcome of these infants. Patients. Thirty-six consecutive neonates with congenital diaphragmatic hernia, abdominal wall defects, bladder exstrophy and meningomyelocele were included.

Results. The sensitivity of prenatal ultrasound diagnosis for the congenital malformations was 7/36 (19%) at 17-18th week of gestation, and overall 13/36 (36%). Overall sensitivity was 2/8 in neonates with congenital diaphragmatic hernia, 6/12 in neonates with abdominal wall defects. 5/13 in neonates with meningomyelocele, whereas none of three cases with bladder exstrophy were detected prenatally. No significant improvement in neonatal morbidity was found comparing the prenatally and postnatally diagnosed groups. The neonatal survival rate was 10/13 (77%) in the prenatally diagnosed group and 22/23 (96%) in the postnatally diagnosed group (p = 0.12).

Conclusions. The sensitivity of prenatal ultrasound in diagnosing the congenital malformations under study in a low risk population was 19% at 17-18th week of gestation and 36% throughout the pregnancy. Prenatal diagnosis altered management of labor, but caused no improvement in neonatal outcome.

INTerventionnel


Service de Chirurgie Vasculaire, Hôpital Sud, 46 Boulevard de Bulgarie, Boîte Postale 56129, 35036 Rennes Cedex, France.


Methods. Sixteen patients (mean age 26.3 years; range 18-38) with palmar hyperhidrosis underwent CT-guided fine needle aspiration under local anesthesia with computed tomographic guidance. After opacification of the injection site at T3 with lipomarin 200, phenolization was performed with 10 ml 6% phenol.

Results. Good immediate results evaluated on the basis of venous dilatation, and dryness and warmth of the skin were obtained in 23 cases (80%). There were 6 immediately unsuccessful procedures in 4 patients. At 20 months, good results, assessed on the basis of objective criteria and subjective patient self-evaluation were obtained in 22 cases (75% including immediate failures). Computed tomography-guided thoracic sympathectomy performed under local anesthesia is an effective treatment for palmar hyperhidrosis. Morbidity is low and hospital stay is short.

Conclusions. Our findings suggest that thoracic sympathectomy should be indicated as the first intention procedure when surgery is required in patients with palmar hyperhidrosis.

CT-Guided Fine Needle Aspiration and Needle Core Biopsy of Skeletal Lesions. Complementary Diagnostic Techniques. RL Koscick, CA Petersilge, JT Makley, FW Abdul-Karim.

Institute of Pathology, University Hospitals of Cleveland, 11100 Euclid Avenue, Cleveland, Ohio 44106, U.S.A.


Objective. To compare the diagnostic sensitivity and specificity of fine needle aspiration (FNA) to thoracic sympathectomy (NCB) and to attempt to determine if a complementary role exists for the two modalities.

Study design: Skeletal lesions in 144 patients were evaluated with concomitant FNA and NCB over a 21-year period. FNAs and NCBs were divided as diagnostic of neoplasm, normal or inflammatory (i.e., osteomyelitis), or unsatisfactory. The results of each modality were then reviewed and compared.

Results. In the 144 total cases, a diagnosis was possible in 79% (114) cases. FNA and NCB concurred in 73% (83) of diagnostic cases. Concordance was 87% between diagnostic NFA (83) and NCB (95). The two modalities agreed in 78% of cases diagnosed as metastatic carcinoma and in 59% of primary malignant tumors (17) (excluding Ewing's sarcoma). FNA alone was diagnostic in 8% (9) of cases, including 5 metastatic carcinomas, 2 chondrosarcomas, 1 Ewing's sarcoma and 1 case of osteomyelitis. This represented 24% of the 38 cases in which NCB was unsatisfactory (11) or normal (27). NCB alone was diagnostic in 19% (22) of cases, including 11 metastatic carcinomas, 3 osteosarcomas, 1 chondrosarcoma, 1 spindle cell sarcoma (not otherwise specified), 1 Ewing's sarcoma, 2 capillary hemangiomas, and 3 cases of osteomyelitis. This represented 43% of the 51 cases in which FNA was misinterpreted (2), unsatisfactory (33) or normal (16). NCB more specifically typed a metastatic lesion or suggested a primary focus in 21% (12) of the 58 cases in agreement. It also more specifically subtyped 50% (5) of the 10 primary malignant tumors of bone. Conclusion. Given these findings, NCB is more specific in the evaluation, grading and typing of skeletal lesions, in particular malignant primary bone tumors. Overall, there is excellent agreement between FNA and NCB, especially in the evaluation of benign primary bone tumors. Most important, FNA improved the diagnostic yield in 24% of cases when NCB was normal or unsatisfactory, obviating the need for rebiopsy. FNA should be performed concurrently with NCB in the evaluation of skeletal lesions since the two modalities are complementary.


Departments of Radiology, Massachusetts General Hospital 32 Fruit Street, Boston, Massachusetts 02114.


Osteoid osteoma, a benign bone tumor, has traditionally been treated with operative excision. A recently developed method for percutaneous ablation of the tumor has been proposed as an alternative to operative treatment. The relative outcomes of the two approaches to treatment have not previously been compared, to our knowledge. The rates of recurrence and of persistent symptoms were compared in a consecutive series of eighty-seven patients who would have been managed with operative excision and thirty-eight patients who were managed with percutaneous ablation with radiofrequency. Patients who had a spinal lesion were excluded. The minimum duration of follow-up was two years. There was a recurrence, defined as the need for subsequent intervention, after operative treatment in six (9 per cent) of sixty-eight patients who had been managed for a primary lesion and in two of nineteen who had been managed for a recurrent lesion. The average length of the hospital stay was 4.7 days for the patients who had a primary lesion and 5.1 days for those who had a recurrent lesion. There was a recurrence after percutaneous treatment in four (12 per cent) of thirty-three patients who had been managed for a primary lesion and in none of five who had been managed for a recurrent lesion. The average length of the hospital stay was 0.2 day for these thirty-eight patients. With the numbers of patients who were managed in four categories of cases, including 11 metastatic carcinomas, 2 chondrosarcomas, 1 Ewing's sarcoma and 1 case of osteomyelitis. This represented 43% of the 51 cases in which FNA was misinterpreted (2), unsatisfactory (33) or normal (16). NCB more specifically typed a metastatic lesion or suggested a primary focus in 21% (12) of the 58 cases in agreement. It also more specifically subtyped 50% (5) of the 10 primary malignant tumors of bone. Conclusion. Given these findings, NCB is more specific in the evaluation, grading and typing of skeletal lesions, in particular malignant primary bone tumors. Overall, there is excellent agreement between FNA and NCB, especially in the evaluation of benign primary bone tumors. Most important, FNA improved the diagnostic yield in 24% of cases when NCB was normal or unsatisfactory, obviating the need for rebiopsy. FNA should be performed concurrently with NCB in the evaluation of skeletal lesions since the two modalities are complementary.
The effect of shoulder magnetic resonance imaging on clinical decision making. J.S. Sher, J.P. Iannotti, G.R. Williams. University of Pennsylvania School of Medicine, Department of Orthopedics, Shoulder and Elbow Service, Penn Musculoskeletal Institute, Presbyterian University Hospital, University of Pennsylvania Health System, 415 N. 34th St, Philadelphia, PA 19104.

One hundred cases were prospectively evaluated to determine the impact of magnetic resonance imaging on clinical decision making in an orthopedic practice devoted to the treatment of disorders about the shoulder. Each was analyzed for changes in the clinical diagnosis or treatment. A change that either changed the primary diagnosis or type of treatment or required nonoperative or nonoperative treatment was classified as category one. If additional clinically relevant findings were noted on the imaging studies without altering the primary diagnosis, or if the form of treatment was modified but not changed from operative or nonoperative, it was considered category two. Among the 100 imaging studies reviewed, category one and two changes were observed in 11 and 7 cases, respectively. Magnetic resonance imaging was particularly helpful in diagnosing ganglion cysts about the shoulder, a category one change in three of three cases. For specific diagnoses a category one or two change was observed in 17% (10 of 59), 29% (4 of 14), 8% (1 of 13), and 100% (2 of 2) for rotator cuff disease, glenohumeral instability, adhesive capsulitis, and biceps disease, respectively. In 35 cases magnetic resonance imaging was considered to be unnecessary for the diagnosis or treatment of the patient. For the 65 patients who underwent magnetic resonance imaging, category one and two changes were noted in 10 and 5 patients, respectively. Statistical significance was demonstrated for category one changes in the entire group (100 cases) and in the subgroup recommended for magnetic resonance imaging (65 cases) (p < 0.05), indicating that the judicious use of magnetic resonance imaging can have a significant increase its impact on clinical decision making. Magnetic resonance imaging was found to be of limited diagnostic value in patients with an isolated primary clinical diagnosis of adhesive capsulitis, glenohumeral or acromioclavicular arthritis, brachial plexopathy, and cervical degenerative disk disease.


Objective. A prototype of a positioning device created especially for the diagnostic imaging of the patellofemoral joint was developed in order to achieve reproducible examination conditions. Design. For this purpose a clinical trial on healthy test persons was carried out under real examination conditions. Background. A special real-time MRI technique (Local-Look-technique) makes the analysis of active functional motion images possible. A prerequisite for this technique is accurate reproducible positioning of the knee joint in the MRI unit. Methods. This positioning device was evaluated during a total of 50 examinations of the knee joints of five healthy test persons. The right patellofemoral joint of each test person was examined twice at different time points in order to check the reproducibility of all examination conditions. Comparing two examination series from the same individual, reproducibility of MRI slices was guaranteed by using identical anatomical landmarks. Image quality and test-retest reliability were analyzed on the computer screen. Results. Optimal desired fixation of the leg in the MRI unit was achieved in 65 cases (92%) and was plashed in all cases. The extent of motion of the knee joints ranged from 38° (n = 2) to 40° (n = 3) of flexion to full extension, which was satisfactory for the evaluation of the patellofemoral joint. Free movement of the patella and the lower leg was observed. The active functional MRI examination using this device was satisfactory and reproducible as assessed by test-retest reliability. Conclusions. The positioning device is a useful development in achieving active functional real-time MRI evaluation of the knee and patellofemoral joint. This diagnostic tool, reproducible, non-invasive examination can now be easily performed. The reproducibility and high reliability as well as its simplicity of operation render this diagnostic tool suitable for use in orthopedics and traumatology.


Occult osteochondral lesions (bone bruises) have been documented on magnetic resonance imaging in more than 80% of patients sustaining acute anterior cruciate ligament ruptures. Despite the high prevalence of these lesions, little is known about the histologic changes in the adjacent articular cartilage. Ten patients with acute anterior cruciate ligament ruptures who had a preoperatively documented (by magnetic resonance imaging) geographic bone bruise were selected. In the supine position, a sagittal MR image was obtained of the right knee. The exact histologic changes of the articular cartilage included softening (dimpling), fissuring, or overt chondral fracture. Histologic examination revealed degeneration of the chondrocytes and loss of tidoluline blue staining in the articular cartilage (loss of proteoglycan). There was necrosis of osteocytes in the subchondral bone, and empty lacunae were visible. This study defines the exact histologic changes of the articular cartilage overlying a geographic bone bruise secondary to an acute anterior cruciate ligament tear. Our findings suggest that a geographic bone bruise found on magnetic resonance imaging indicates substantial damage to normal articular cartilage homeostasis.


Objective. To investigate the sensitivity of echography vs magnetic resonance imaging (MRI) or computed tomography (CT) for detecting extraocular extension of choroidal malignant melanoma.

Design and Setting. Retrospective review at a university referral center.

Participants. All patients with histopathologically proven extraocular extension of choroidal malignant melanoma were reviewed. Of the remaining 10 patients, all underwent ocular echography preoperatively, 5 underwent orbital MRI, and 2 underwent orbital CT scanning to evaluate for extraocular extension of tumor. Extraocular tumor extension was demonstrated in 10 patients (100%) with echography and in 2 (29%) of patients with CT (0 of 2 patients). In no instance did MRI or CT demonstrate extraocular tumor extension that was not identified with echography. Conclusion. At this institute, ocular echography is more sensitive than MRI or CT for the detection of extraocular extension of choroidal malignant melanoma.
Study of the inferior oblique muscle of the eye by MRI
P Bouret, D Carrie, JM Garcier
Service de Radiologie, CHRU de Clermont-Ferrand, BP69, F-63003 Clermont-Ferrand, France.
The utility of the inferior oblique muscle's radiographic study using a FLASH 3D sequence in magnetic resonance imaging (MRI). Twenty eyes (ten healthy volunteers aged 21-32 years, without any history of significant ocular pathology) were explored by MRI (1 Tesla; cranial coil) and comparisons were made between spin echo (SE) T1 sequence (through the neuro-ocular and coronal planes; thickness of slices = 3 mm) and a gradient echo FLASH 3D sequence (thickness of slices = 1 mm). This enabled a mm by mm reformation of the inferior oblique muscle through the frontal-oblique plane, made possible by new SE T1 sequences through the same plane. Position, height, and signal of the m. were estimated. The mean frontal angle formed by the muscle and the sagittal axis measured 295° for the right eye and 275° for the left eye. The muscle was always identifiable in the reformate despite its thin dimensions: 1.9 mm (1.5-2.8) on the right and 2 mm (1.7-2.5) on the left, in low signal silhouetted by the high signal of orbital fat. Thus, thanks to mm by mm reconstructions using FLASH 3D sequence, a good radiographic study of the inferior oblique oblique muscle by MRI is possible. This could be useful particularly for the strabismus of children.

ORL
The lesions of the pterygopalatine and infratemporal spaces.
Computed tomography evaluation.
Q Yu, P Wang, H Shi, J Luo, D Sun.
Department of Radiology, Ninth People's Hospital, School of Stomatology, Shanghai, Republic of China.
Objective. The purpose of this study was to categorize the computed tomography features of lesions affecting the pterygopalatine fossa and infratemporal fossa and thus aid in the diagnosis of these lesions.
Design. Eighty-six patients with lesions of the pterygopalatine fossa and infratemporal fossa were examined with computed tomography; the lesions were confirmed by both surgery and biopsy. The patients were divided into three groups: group I consisted of patients in whom the lesions had originated in one or both fossae; group II, of patients in whom the lesion originated in other oral and maxillofacial regions but showed extension into the pterygopalatine and infratemporal fossae; and group III, of patients in whom the lesions had multicentric origins.
Results. Of the cases in group I, demarcation was confined to both fossae in 4 patients, and involvement of the adjacent structures was shown on computed tomography images in 7 patients. Involved structures included the maxillary sinus (4 sides), nasal cavity (3 sides), mandibular ramus (6 sides), buccal space (2 sides), base of the skull (5 sides), palate (3 sides), and parapharyngeal space (5 sides). In the 70 cases in group II, computed tomography images showed that lesions had infiltrated both fossae using the following routes: (1) 40 lesions in the maxillary sinus had infiltrated posterolaterally into 26 pterygopalatine and 39 infratemporal fossae; (2) 2 nasal cavities and three nasopharynx tumors had infiltrated laterally or anterolat erally into 5 pterygopalatine and one infratemporal fossa; (3) lesions originating in mandibular rami (9 lesions), buccal regions (4 lesions), parapharyngeal spaces (1 lesion) and parotid glands (1 lesion) had intruded medially into 15 infratemporal fossae; (4) two temporal bone tumors had encroached inferi orly on two infratemporal fossae; (5) four palate tumors had led to involvement of three pterygopalatine and four infratemporal fossae; and (6) four inflammatory diseases of the facial spaces involved two pterygopalatine and four infratemporal fossae. Group III lesions (6 cases) had infiltrated laterally or anterolaterally into five pterygopalatine and one infratemporal fossa. The equations obtained with logistic regression analysis showed A predictive values of –1.5 < λ < 0.5 as effective cutoff-points criteria, and were considered to be a reliable indicator for differentiating small nodules with predictive values outside of –1.5 < λ < 0.5 were 83%, 97% and 95%, respectively. Ultrasonographic evaluation of small cervical lymph nodes in head and neck cancer.
Department of Oral and Maxillofacial Surgery, Institute of Clinical Medicine, University of Tsukuba. 1-1-1 Tennoudai, Tsukuba-shi, Ibaraki-ken 305 Japan.
To establish sonographic criteria for differentiating metastasis and nonmetastasis in small cervical lymph nodes, correlations between sonographic parameters and histological diagnosis were statistically examined in 117 lymph nodes with metastasis and nonmetastasis. Using a 629 MHz to 10 mm in the sonographic findings, consisting of 26 metastatic and 91 nonmetastatic nodes. The equations obtained with logistic regression analysis showed A predictive values of –1.5 and 0.5 as effective cutoff-points criteria, and were considered to be reliable indicators for differentiating small nodules with predictive values outside of –1.5 < λ < 0.5 were 83%, 97% and 95%, respectively.

Low-field magnetic resonance imaging for implant dentistry.
CF Gray, TW Redpath, FW Smith.
Department of Biomedical Physics and Bioengineering, University of Aberdeen, Foresterhill, Aberdeen AB25 2ZD, Scotland, UK.
Objective. To evaluate the use of a low-field magnetic resonance scanner for assessment of available bone for placement of osseo-integrated dental implants.
Methods. Eleven Patients were examined to assess suitability for implant sites using a 0.2 tesla “open” scanner. Imaging, surgical templates were constructed with gadolinium markers to allow accurate location of the implant sites.
Results. In all cases, localisation of potential implant sites was easily made and full information in all three planes readily available. Artefacts were few and localised (noted on one site in one case only). Vital structures (nerves and vessels), and the implant site's geometry of the floor of the maxillary sinus were clearly seen. Cortical bone delineated from cancellous. The appearance of soft tissues in the scan allowed the surgeon to assess the final profile of the patient.
Conclusion. Low-field magnetic resonance imaging has definite potential for pre-implant assessment. Full sectional information is readily available at any desired plane without need for reformating. The information for accurate and safe implant placement is clear. The technique uses no ionizing radiation. Further work is needed to evaluate spatial distortion caused by magnetic susceptibility effects at air tissue interfaces. But our calculations indicate that at low field, using an appropriate protocol, the effect will not be substantial.

Endolaryngeal high-frequency ultrasound.
C Arens, B Eister, H Glanz, W Waas.
Department of Otorhinolaryngology, Justus Liebig University of Giessen, Feulenstrasse 10, D-35385 Giessen, Germany.
High-frequency ultrasound can provide high-resolution imaging for diagnosing diseases of the head and neck. Over the last few years, a virtual technical evolution has led to the development of small and flexible ultrasound transducers with even greater anatomic resolution. The aim of the present study was to evaluate the efficacy of this new technique for imaging normal and altered anatomical structures of the endolarynx. Specially developed high-resolution, real-time ultrasound transducers (10 and 20 MHz) placed on the tip of endoluminal catheters were inserted into 0 autopsied larynges and five laryngectomy specimens. A standardized examination process the endolarynx was analyzed in a real-time mode. Using this technique, exact 360° cross sections of the larynx were obtained, detailed than it has ever been possible to image the structures of the endolarynx with ultrasonography. Depending on the frequency used, all anatomical structures could be visualized up to a depth of 2 cm. In laryngeal cancer the depth of tumor as well as its relationship to the laryngeal framework could be clearly recognized. These findings suggest that this new endoluminal sonographic procedure represents a potentially important diagnostic tool in the assessment of laryngeal carcinoma.
Peritoneal Metastases in Children with Cancer.
SC Kaste, N Marina, RFryrear.
Department of Diagnostic Imaging, St. Jude Children’s Research Hospital, 332 N. Lauderdale, Memphis, TN 38105-2794, USA.
Background. This study attempted to evaluate the childhood malignancies associated with computed tomography (CT) detected peritoneal metastases as well as the diagnostic imaging characteristics of these metastases as shown on CT.
Methods. The authors reviewed all available pathology specimens and abdominal/pelvic CT scans of patients identified as having peritoneal metastases at three childhood cancer centers. Patient demographics, primary diagnosis, and CT characteristics of such metastases were evaluated.
Results. Peritoneal metastases were identified by CT in 32 children with cancer either at diagnosis (n = 20) or up to 6.2 years from diagnosis (n = 12). On CT, peritoneal disease appeared as a mass in 26 cases, as studding in 11 cases, as peritoneal enhancement in 15 cases, and as diffuse caking in 4 cases (15 patients had > 1 category of peritoneal metastasis). Thirteen patients had concurrent metastases in other sites with epithelioid carcinoma, leiomyosarcoma, pheochromocytoma, neuroblastoma, melanoma, and peripheral neuroectodermal tumor.
Conclusions. Peritoneal metastases have variable appearance on CT, but most commonly appear mass-like. They are associated with a wider range of primary diagnoses than reported previously. The outcome varies with the type of the primary tumor and its responsiveness to existing therapies.

CT and MR imaging of cerebral tuberous sclerosis.
Y Inoue, Y Nemoto, R Murata.
Department of Radiology, Osaka City University Medical School, 1-7-7 Asahimachi, Abeno, Osaka, 545 Japan.
Tuberous sclerosis is a heredofamilial neurocutaneous syndrome, or phakomatosis, with multisystem involvement including the brain, kidney, skin, retina, heart, lung, and bone. The brain is the most frequently affected organ in tuberous sclerosis. Brain lesions in tuberous sclerosis are of three kinds: cortical tubers, white matter abnormalities, and subependymal nodules. We report the computed tomography (CT) and magnetic resonance (MR) features of the brain lesions in patients with tuberous sclerosis. CT clearly demonstrates calcified subependymal nodules. MR imaging demonstrates more clearly cortical, and white matter lesions than CT, since MR imaging shows excellent image contrast between various normal structures and high sensitivity in detecting pathological states due to intrinsic differences in proton density and in particular, in proton relaxation times of tissues. Possible pathogenesis of this disorder is also discussed.

RACHIS

The Lumbar Anterior Epidural Cavity: The Posterior Longitudinal Ligament, the Anterior Ligaments of the Dura Mater and the Anterior Internal Vertebral Venous Plexus.
O Plaisant, JL Sarrazin, G Cosnard, H Schill, C Gillot.
Institut d’Anatomie, Paris V. France.
The contents of the anterior epidural cavity were studied to elucidate the relationship between veins, ligaments, and membranous formations. Anatomical, radiological and histological studies on human specimens after latex or gelatin/gadolinium venous injection at the level of the lumbar spine show that the posterior longitudinal ligament is a cross-shaped membrane which includes the septum, the superficial part extending into the intervertebral foramen and the anterior ligaments of the dura mater. The anterior epidural cavity contains two medial and two lateral spaces. The two medial cavities enclose anterior and medial venous plexuses, which together receive the basivertebreal veins; the two lateral cavities receive the anterior longitudinal veins. Contents of the medial cavities are drained by the lateral internal vertebral veins. Contents of the lateral cavities pass freely between the two. The lateral cavity connects with the intervertebral canal and dorsally into the posterior epidural space.

CH Herr, PA Ball, SK Sargent, HB Quinton.

Dartmouth-Hitchcock Medical Center, 1 Medical Center Drive, Lebanon, NH 03756.


A prevertebral soft tissue measurement exceeding 4 to 5 mm at C3 on a lateral spine radiograph is considered to be evidence of cervical spine injury. The objective of this study was to determine the sensitivity of the prevertebral soft tissue measurement at C3 in patients with proven cervical spine fractures or dislocations and to determine if this measurement correlates with the location or mechanism of injury. Consecutive patients 16 years of age or older who were admitted from July 1988 to June 1995 to a tertiary referral hospital with a discharge diagnosis of cervical spine fracture or dislocation were retrospectively studied. Patients were excluded if an interpretable lateral cervical radiograph taken within 24 hours of the injury was unavailable, medical records were unavailable or incomplete, the injury was caused by penetrating trauma or attempted hanging, or retropharyngeal air was present on the lateral radiograph. For each study patient, the earliest available lateral radiograph was obtained, and the prevertebral soft tissue measurement at the inferior aspect of C3 was recorded. All medical records and reports of imaging studies were reviewed. Two hundred thirty-two patients were identified and 21 were excluded, leaving 212 study patients. Injuries were classified as high (C1 to C2), low (C3 to C7), anterior, or posterior. For each patient the mechanism of injury was inferred from the fracture pattern according to established criteria or, if all patients the sensitivity of a prevertebral soft tissue measurement at C3 of > 4 mm was 66% (95% confidence interval [CI] 99,72). For C1 to C2 (n = 71) and C3 to C7 (n = 136) injuries, the sensitivities were 86% (95% CI 56,77) and 64% (95% CI 56,72), respectively. For anterior (n = 95) and posterior (n = 70) injuries the sensitivities were 64% (95% CI 54,74) and 64% (95% CI 52,75), respectively. There was no statistically significant difference in the prevertebral soft tissue measurement at C3 for high versus low injury, anterior versus posterior injury, or mechanism of injury. These results show that the prevertebral soft tissue measurement at C3 is an insensitive marker of cervical spine fracture or dislocation and does not correlate with the location or mechanism of injury.

Les fractures d’isthme après laminoarthrectomie. Étude rétrospective d’une série de 31 patients.

P Guigu, I Desserts, G Morvan, M Benoist, B Lassale, A Deburge.

Service de Chirurgie Orthopédique, Hôpital Beaujon, 100 Bd du Général Leclerc, 92110 Clichy.


Purpose of the study. Pars interarticularis fractures is one possible source of pain after laminarthrectomy. The purposes of this study were: to describe the pars defect, to determine its distribution in the cases, to compare the results on plain radiographs and in 70% of cases on CT imaging, calculation of the amount of bone just above the inferior articular process that was resected, analysis of the postoperative stability of the spine both on static and dynamic radiographs. Any remaning disc herniation or stenosis were also noted.

Results. 39 pars interarticularis fractures were disclosed. These fractures were identified as a linear luency on plain radiographs or on reformed CT imaging view. Asymetric widening of the facet joint space just below the pars defect was easier to observe and was present in 78% of the cases on plain radiographs and in 79 per cent on CT imaging. After initial surgery 12 slipping appeared. In all of these cases pars fracture was bilateral at the same level or associated to a complete evaluation before and at the same level. The amount of bone resected just above the inferior facet process was 66% per cent in average, range from 45 to 84 per cent. All the patients complained for low back pain and/or leg pain. 68% of cases symptoms occurred within one year after surgery, at an average onset of 7.6 months postlaminectomy. 27 patients were reoperated Revision surgery was in all cases a posterolateral fusion with or without instru- mentation; new decompression was performed in 15 cases. At last follow-up, according to our classification, results were very good in 9 cases; good in 15 cases and fair in the remaining 3 cases. Improvement rate obtained after the initial surgery was 75 per cent in average, it was 59 per cent after revision surgery, difference was statistically significant.

Conclusion. Pars interarticularis fractures may be a source of postlaminectomy pain. They appear to be caused primarily by an excessive resection (more than one half) of the bone immediately superior to the inferior articular process at the level of the laminectomy. These results suggest that caution in resection of this bone or additional posterolateral fusion in case of large resection of pars interarticularis, can avoid the problem. Asymmetric widening of the joint space just bellow the defect seems to be the key to this diagnos- sis in the postoperative lumbar laminectomy patient with persistent or recurrent pain.


J Guyotat, Ph Bret, E Jouanneau, A-C Ricci, Cl Lapras.

Service de Neurochirurgie B, Hôpital Neurologique, 59, boulevard Pinel, BP Lyon-Montchat, 69394 Lyon, Cedex 03.

Neurochirurgie 1998;44:75-82.

A series of 25 adult patients surgically treated for a tethered cord syndrome is reported. Preoperatively 19 patients presented with a sensorimotor deficit in their lower limbs. 17 with sphincter disturbances. 12 with pain and/or neuroorthopedic symptoms and 9 with cutaneous lumbar anomalies. At surgery, an isolated anomaly (lipoma, anomalous or adhe- rent filum terminale) was disclosed in 18 patients. In the remaining 7, a more complex form of dysraphism was disclosed. Follow-up ranges from 3 months to 20 years (mean 6.5 years). Ten patients improved. 6 were stabi- lized and 9 showed continuous worsening. The best results were obtained in patients in whom the cord tethering resulted from an anomalous filum terminale. Results were sig- nificantly worse in patients suffering long standing symptomatology and showing either radiologically or surgically mixed mecha- nisms of cord tethering. Early surgical correc- tion should be ideally undertaken in patients suffering from minor neurological deficits and in whom magnetic resonance imaging imag- inates a low conus medullaris attached by a short thickened filum terminale.

Les auteurs rapportent une série de 25 pa- tients adultes opérés d’une moelle attachée. En préopératoire, un déficit sensitivo-moteur des membres inférieurs était noté 19 fois. Des troubles sphinctériens 17 fois, des douleurs et des signes neuro-orthopédiques 12 fois, des signes cutanés 9 fois. Chez 18 patients, l’intervention a permis de découvrir une ano- malie isolée (lipome, anomalie de l’ampoule du filum: 8 cas, adhérence fibreuse 2 cas) et chez 7 une dysraphie plus complexe. Le recul de la série varie de 3 mois à 20 ans (moyenne : 6,5 ans): 10 patients ont été améliorés, 6 stabilisés, 9 ont continué à se dégrader. Les résultats les plus satisfaits ont été obtenus sur les moellés attachées par un filum terminale anormal avec 75 % d’amé- lioration. Chez ces patients, le traitement chirurgical systémique et le plus précoce possible est justifié. Chez les autres, l’indica- tion doit être plus nuancée et tenir compte de l’état clinique préopératoire et de l’étiologie de la fixation médullaire bien visualisée par l’imagerie préopératoire.

SÉNOLOGIE

20 MHz ultrasonic imaging for quantitative assessment and documentation of early and late postradiation skin reactions in breast cancer patients.

A Warszawski, EM Röttinger, R Vogel, N Warszawski.

Department of Radiotherapy, University of Ulm, 89070 Ulm, Germany.


Background and purpose. In dermatology high-resolution ultrasonic systems proves to be valuable in following up genuine and ex- perimental inflammatory dermatoses. The opportunities of 20 MHz ultrasonic imaging for quantitative assessment of early and late postradiation skin reactions are investigated. Material and methods. Between April and November 1996, 96 high resolution ultra- sound examinations of the skin in 29 patients treated for breast cancer at the University of Ulm were analyzed. Two times 20 and 60 Gy were applied. The time interval between the completion of radiotherapy and ultrasonic examination was 3 months in 18 patients and 6-135 months in 11 patients. For
examinations we used a digital high resolution ultrasound system with a ceramic 20 MHz transducer. Irradiated and non-irradiated skin were compared.

**Results.** A change of thickness and texture of the dermis depending on the time interval between the completion of radiotherapy and ultrasonic examination and on the administered radiation dose was found. There were significant differences between irradiated and non-irradiated skin regarding the dermal thickness in early (P < 0.001) as well as in late (P = 0.0018) reactions. Echogenicity of the upper and lower corium of irradiated skin decreased in early and late reaction. In upper corium the greatest reduction of signal intensity occurred in early reactions (P = 0.0001). Early reactions of the lower corium differed significantly from late changes (P = 0.001).

**Discrepancies between visible skin reactions described by examining physicians and ultrasonically proven changes were obvious mainly in late reactions.**

**Conclusions.** There are specific textures of early and late postradiation skin reactions in comparison to non-irradiated skin. High resolution digital 20 MHz ultrasound is non-invasive and quantitative, and in contrast to physical examination, an easy reproducible method for assessing and documenting early and late skin reactions during and after radiotherapy treatment.

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**Diagnostic value of contrast-enhanced computed tomography for diagnosing the intraductal breast cancer.**

S Akashi-Tanaka, T Fukutomii, K Miyakawa, N Uchiyama, H Tsuda.

Department of Surgical Oncology, National Cancer Center Hospital, 1-1 Tsukiji 5-chome, Chuo-ku, Tokyo 104, Japan.


**Background.** It is important to reduce local residual cancer to avoid local recurrence after breast conserving treatment. We therefore tried to detect the intraductal components and small invasive foci of breast cancers by contrast-enhanced helical computed tomography (CE-CT).

**Methods.** In 122 women whose breasts were examined by CE-CT preoperatively, intraductal spread detected on ultrasound (US), examination by CE-CT preoperatively, intraductal components, and detected radiation dose was found. There were unequivocally malignant in only 57 of the 190 cases, i.e. a sensitivity of 31.3%. When including the probably malignant scores, the sensitivity increased to 73.1%. The sensitivity of the 15 gauge core biopsy was 86.5%; when excluding the non-invasive results it decreased to 84.6%. The study included too small a number of benign lesions to allow assessment of specificity. The yield of the triple diagnostic approach is low and is surpassed by core biopsy. However, even the results of core biopsy may be considered together with the results of physical examination and imaging. Core biopsy is a reliable substitute for FNA to obtain a definitive preoperative diagnosis.

**SYSTÈME NERVEUX**

**Intracranial hypotension syndrome: neuroimaging in five spontaneous cases and etiopathogenetic correlations.**

E Ferrante, M Riva, A Gatti.

Department of Neurology, Ospedale Niguarda Ca’ Granda, Piazza Ospedale Maggiore, 3 20162 Milan, Italy.


Intracranial hypotension (IH) is essential or, more frequently, secondary. This syndrome is characterized by severe postural headache and low opening cerebrospinal fluid (CSF) pressure; although other symptoms may exist. In this study five patients are investigated. Neuroimaging showed: on computerized tomography scan (CT), poor visualization of the cerebral sulci with small ventricles; on magnetic resonance imaging (MRI), subdural fluid collections with enhancement on the convexity, along the tentorium and in the upper cervix after administration of contrast medium and downward displacement of the brain. Radionuclide cisternography was normal in the two patients who underwent this treatment as well as the meningioma biopsy in another patient. In all patients the opening CSF pressure was low or unmeasurable. The clinical syndrome spontaneously recovered contextually to normalization of neuroradiological findings. The possible pathogenesis (dural border cell layer tear) was discussed and the importance of diagnostic confirmation with MRI and measurement of CSF pressure when IH is thought to be present was underlined.

**Clinical, neurophysiological, and magnetic resonance imaging correlations in multiple sclerosis.**

G Comi, M Filippi, M Rovaris, L Leocani, S Medaglini, T Locatelli.

Department of Clinical Neurophysiology, University of Milan, Scientific Institute H San Raffaele, Via Olgettina 60, 20132 Milan, Italy.

J Neurol Neurosurg Psychiatry 1998; 64(Suppl. 1):S21-S25.

Magnetic resonance imaging (MRI) has a pivotal role in diagnosis of multiple sclerosis and is being increasingly used as a paraclinical measure to assess treatment efficacy in clinical trials. However, the correlations between clinical and MRI findings in patients with multiple sclerosis are weak and, therefore, newer MR techniques are being developed to increase both MRI sensitivity for detecting disease activity and its pathologic specificity for better assessing disease evolution. Evoked potentials (EPs) can be used to confirm the diagnosis of multiple sclerosis and their abnormalities correlate with symptoms and signs referable to involvement of the corresponding nervous pathways. However, their use is limited when assessing disease progression and monitoring clinical trials in multiple sclerosis.

Both magnetic resonance imaging (MRI) and evoked potentials (EPs) provide information which cannot be obtained by clinical evaluation, especially for assessing disease activity. Nevertheless, both these paraclinical techniques cannot substitute for clinical measures of disability when assessing disease progression and monitoring phase III clinical trials in multiple sclerosis.

**Intracranial chondrosarcoma: review of the literature and report of 15 cases.**

AGGC Korten, HJW ter Berg, GH Spincemaille, RT van der Laan, AM Van de Wel.

Maaslandziekenhuis, PO Box: 5500, 6130 MB Sittard, The Netherlands.


The available data in the literature (177 cases), two current clinical patients, and cases which occurred in The Netherlands (13) were reviewed concerning the clinical presentation, pathological features, radiological data, and treatment options of chondrosarcoma of the cranial base.

The mean age of patients was 37 years, the male/female ratio 1:1.1. The most frequent complaints were diplopia with ocular motordisorders (51%), headache (31%), and decreased hearing, dizziness, and tinnitus with stastacoustic dysfunction (21%). The mean duration of symptoms before diagnosis was 27 months.
The chondrosarcomas were located in the petrosal bone in 37% (47 cases), in the occipital bone and clivus in 23% (30 cases), in the sphenoid bone in 20% (25 cases) and to a lesser extent in frontal, ethmo-dal, and parietal bones (14%). In 6% (eight cases) the primary location was in dural tissue. Radiological examinations showed bone destruction and variable calcification (CT), involvement of neuronal and vascular structures (MRI), and mostly hypovascularity on angiography. On histological examination 51% of tumors were classified as grade I, 11% grade II, 30% mesenchymal, and 8% myxoid. The mesenchymal type was the most malignant as illustrated by a strong tendency to intradural and cerebral growth and possibly occurrence in younger age groups. The treatment of choice until recently was surgery because of the critical location and local aggressive nature. Regrowth of tumor after surgery occurred in 53% of the patients (average after 32 months). Charged particle irradiation gave a five year survival of 83-94% and a local control rate of 78%-91%. Both in surgery and radiotherapy there is treatment related morbidity and mortality that should be considered when offering these therapies. Recent promising results imply that charged particle radiotherapy, in combination with surgery, may be the therapeutic choice of the future.


S Charabi, J Thomsen, M Tos, B Charabi, M Mantoni, SE Borgesen.

Department of Otologyngy, Gentofte University Hospital, Høllerup, Danmark.


The growth of vestibular schwannoma (VS) was investigated in a series of 123 patients with 127 tumors in the period 1973-1993. The material was reanalysed and updated 3 years later in 1996. By termination of the first observation period (mean 3.4 years), 94 tumors (74%) exhibited measurable growths, 23 tumors (18%) no measurable growth and 10 tumors (8%) negative growth. By the end of the extended observation period (mean 3.8 years), tumor growth was observed in 104 tumors (82%), no tumor growth in 15 tumors (12%) and negative growth in eight tumors (6%). Several growth patterns were noticed; h O PET whilst patients were performing a visual attention task. We 15 O PET whilst they showed significant alteration of relative cerebral blood flow during the task determined using statistical parametric mapping to 11 adults and 3 children), without motor deficit, presenting with various intra cortical atypical activation paradigms were used, controlateral to the lesion: ballastic opposition of the fingers, flexion-extension of the foot and click of the tongue. Four patients, without motor deficit, with cortical homunculi were used as control group to look for non specific activations. In all cases, the histopathology of the tumor was known accurately.

Intracranial Aneurysms: A Review of Endovascular and Surgical Treatment in 248 Patients.

KA Leber, GE Klein, M Trummer, HC Eder. Dept. of Neurosurgery, Karl-Franzens-Universität, Graz, Austria.

Minim Invas Neurosurg 1998;41:81-5.

We reviewed the medium-term results of endovascular treatment of intracranial aneurysms and compared patient selection and results with those of open surgery. Between January 1992 and December 1995, a total of 248 consecutive patients were treated for 297 aneurysms (61 unruptured and 236 ruptured). 162 aneurysms in 142 patients (mean age, 48.5 years) were treated microsurgically and 134 aneurysms in 106 patients (mean age, 54.2 years) were treated by endovascular embolization with Cuglielmi detachable coils (GDC). The mean follow-up was 2.6 years (range, 1.5 to 4.5 years). There was no significant difference in patient population and selection in terms of sex, age or location of aneurysms between both methods. Both modalities achieved excellent results (defined as no neurological deficit) in patients with unruptured aneurysms and with no or minor deficits after surgery and endovascular occlusion. Patients with moderate deficits after SAH had excellent outcomes in 49% after open surgery, and 47% after embolization. Poor grade patients had, equally, as well an acceptable as a poor outcome, between 0% and 50%. There was no significant difference between the outcome of surgical or endovascular patients. We conclude that GDC embolization is not associated with a higher risk of morbidity and mortality than open surgery. This risk may even be lower for lesions in surgically unfavorable locations. The GDC technique is a less invasive, effective option to prevent rebleeding in early stage, even in poor-grade patients. However, these encouraging medium-term results have to be confirmed by a longer observation period.

Évaluation préchirurgicale des tumeurs cérébrales par IRM fonctionnelle.

FE Roux, JP Ranjeva, K Boulanour. Service de Neuroradiologie, Hôpital Purpan, 31059 Toulouse Cedex.


Purpose. To evaluate the capabilities and the limitations of motor functional magnetic resonance imaging (FMRI) in the presurgical planning of the cerebral tumors located in or near the motor homunculus and to correlate each type of activation with the histologic characteristics of each tumor. Materials and methods. FMRI was performed in 17 patients (14 adults and 3 children), without motor deficit, presenting with various intra cortical atypical activation paradigms were used, controlateral to the lesion: ballastic opposition of the fingers, flexion-extension of the foot and click of the tongue. Four patients, without motor deficit, with cortical homunculi were used as control group to look for non specific activations. In all cases, the histopathology of the tumor was known accurately.

Results. In 11 patients with infiltrating tumors, the activated areas were clearly displaced. They were often intra- tumoral and scattered in correlation with the degree of infiltration. Two patients with non infiltrating tumors (meningioma) showed extratumoral shift of the activated areas. Four patients presenting cerebral tumors far from the homunculus motor did not show intratumoral activation. The supplementary motor area and the ipsilateral motor cortex in each case showed activation. The task of the tongue was often artifact- ed, probably because of the head motion.

Conclusions. These preliminary results suggest that the histopathologic characteristics of a tumor and especially its microscopic structure plays a role, with others factors, on the motor functional area organization. In a small number of cases, the data obtained from the FMRI could be used intraoperatively, with a neuronavigation system.

Cerebral activation in malformations of cortical development.

MP Richardson, MJ Koepf, DJ Brooks.

Epilepsy Research Group, Hammersmith Hospital, London, UK.

Brain 1998;121:1295-304.

Malformations of cortical development (MCD) are an important aetiology of localization-related epilepsy. Previous MRI and [11]CJluzyme PET studies have shown widespread structural and neuroreceptor abnormalities beyond the region of MCD that is visually apparent on MRI. We investigated the ability of brain regions affected by MCD to participate in normal cognitive and motor tasks and compared the responses seen in such patients with those in normal subjects. We studied five patients known to have MCD affecting the occipital region and seven normal subjects using H2[15]O PET whilst they were performing a visual attention task. We also studied five right-handed patients known to have MCD affecting the left frontal lobe and seven right- handed normal subjects, using H2[15]O PET whilst they were performing a motor learning task with the right hand. The patient and normal control data were examined using statistical parametric mapping to determine the ability of the brain region affected by MCD to participate in the task and also to detect evidence for atypical organization of cortical function in association with the MCD. Eight of the ten patients with MCD showed significant alteration of relative regional cerebral blood flow during the task compared with ‘rest’ in the affected brain regions. These regions included focally dysgenetic cortex, the cortex lining schizencephalic clefts, heterototic cortical matter, and the cortex overlying band and subependymal dysplasia. In addition there was a significant alteration in the overall activation pattern in five patients compared with the normal control groups; in all five patients this atypical organization involved regions of cortex that appeared entirely normal on MRI. We conclude that regions of MCD may participate in normal cognitive functions but widespread cortical atypical organization may be seen. These findings have implications for surgical planning in any such patients.
CT imaging in adults with neurofibromatosis-1: Frequent asymptomatic plexiform lesions

JH Tonsgard, SM Kwak, MP Short, AH Dachman.

Department of Pediatrics, MC 3055, University of Chicago, 5841 S. Maryland, Chicago, IL 60637.

Neurology 1998;50:1755-60.

Objective. The authors examined the incidence and radiologic characteristics of plexiform neurofibromas in neurofibromatosis-1 (NF-1) to define a cohort at greatest risk for malignant nerve-sheath tumors. Background: Plexiform neurofibromas are a frequent complication of NF-1. They can impair function, produce disfigurement, and be the site for the development of malignant nerve-sheath tumors. The incidence and natural history of plexiform neurofibromas is unknown.

Methods. CT imaging of the chest, abdomen, and pelvis was performed in 91 of 125 consecutive adults (age, > 18 years) with NF-1.

Results. Twenty percent of patients had plexiform neurofibromas of the chest in the paraspinal, mediastinal, or supraclavicular area. Approximately 40% of patients had abnormal abdominal or truncal scans. The paraspinal, sacral plexus, sciatic notch, and perirenal regions were the most common sites. Most plexiform neurofibromas were asymptomatic. Imaging also revealed a number of tumors, including malignant nerve-sheath tumors, adrenal tumors, carcinoids, and schwannomas.

Conclusions. The frequency of plexiform lesions and other tumors in NF-1 indicates that clinicians should monitor young adults carefully; however, imaging characteristics alone cannot reliably distinguish benign from malignant lesions.

High-Resolution Computed Tomography of Bronchiolitis Obliterans Syndrome after Bone Marrow Transplantation.

GC Ooi, WCG Peh, M Ip.

Departments of Diagnostic Radiology, University of Hong Kong, Queen Mary Hospital, Hong Kong.


High-resolution computed tomography (HRCT) has been described as useful in assessing bronchiolitis obliterans (BO) syndrome in the transplanted lung. Currently, BO syndrome is diagnosed if lung function deterioration shows persistent or progressive irreversible airflow obstruction, with FEV1 of less than 80% of baseline values, without clinical evidence of infection. The aim of this study is to assess the value of HRCT in evaluating BO syndrome after allogeneic bone marrow transplantation (BMT). Fourteen HRCT scans were performed in 6 women and 3 men with moderately severe irreversible airflow obstruction, with a 1.7 cm difference in FEV1 between the best and worst test, and a forced expiratory flow rate at 25% to 75% of the predicted value of less than 80% of baseline values.

The aim of this study was to investigate by computed tomography (CT) whether asbestosis, diffuse pleural thickening and/or pleural plaques are statistically associated. We also tried to find criteria to differentiate between diffuse and circumscribed pleural thickening. From 231 exposed workers, only those subjects whose radiograph showed neither bilateral calcified pleural plaques nor small pulmonary opacities higher than 1/1 grade according to the 1980 International Labour Office (ILO) Classification were considered. Scans were assessed for the presence of subpleural curvilinear lines, septal and intralobular opacities, parenchymal bands, honeycombing, rounded atelectasis, pleural plaques and diffuse pleural thickening.

CT scans revealed pleural and/or lung abnormalities in 99 workers. Pleural plaques were unilateral in one-third of cases with plaques. Diffuse pleural thickening, parenchymal bands and rounded atelectasis were unilateral in, respectively, 62 and 69 and 75% of cases with the abnormality. Septal and intralobular opacities were always bilateral. CT signs could be grouped into three patterns: 1) septal and intralobular lines, and honeycombing corresponding to pulmonary fibrosis; 2) pleural plaques corresponding to parietal pleural fibrosis; and 3) diffuse pleural thickening, rounded atelectasis and parenchymal bands corresponding to visceral pleural fibrosis.

In these workers with a normal or near-normal radiograph, three groups of subjects with different responses were distinguished. Crow’s feel and rounded atelectasis help to differentiate plaques from diffuse thickening.

Thin-section helical computed tomography of the bladder: initial clinical experience with virtual reality imaging.

S Hussein, JA Loeffler, RK Babayan, HM Fenlon.

King Faisal Specialist Hospital and Research Centre, MBC 28, Department of Radiology, P.O. Box 3354, Riyadh 11211, Saudi Arabia.


Objectives. To evaluate the application of virtual reality imaging of the bladder (virtual cystoscopy) in the detection of bladder masses.

Methods. Six patients (mean age 61 years, range 43 to 75) with hematuria and positive findings on conventional cystoscopy were studied by means of thin-section helical computed tomography of the air-distended bladder. Using volume-rendering algorithms, interactive intraluminal views of the bladder mucosa were generated (virtual cystoscopy). Results of virtual cystoscopy were compared with those of conventional cystoscopy in each case.

Results. Twenty-six (100%) of 26 masses (mean size 1.7 cm, range 0.3 to 6), detected on conventional cystoscopy, were visualized on virtual cystoscopy. Twelve of 26 masses measured less than 1 cm in maximum diameter. All masses were pathologically proven transitional cell carcinomas. Virtual cystoscopy was well tolerated by all patients, and no complications occurred.

Conclusions. Our results indicate that virtual cystoscopy is an accurate technique for detection of intrinsic bladder masses. It may represent a radiologic adjunct to conventional cystoscopy for initial evaluation of patients with hematuria and for surveillance of patients after bladder tumor resection.
In vitro measurement of kidney size: comparison of ultrasonography and MRI.

J Bakker, M Olieve, R Kaatge, EE de Lange, FJA Beek.

Department of Radiology, University Hospital Utrecht, Heidelberglaan 100. Utrecht 3584 CX The Netherlands.


In this in vitro study, the accuracy and repeatability of magnetic resonance imaging (MRI) and ultrasound (US) in assessing renal length and volume were determined. US and MR images of 20 cadaver pig kidneys were obtained twice and evaluated by two observers for each modality. The fluid displacement method provided the "gold standard." Renal volumes were calculated from the US and MR images using the ellipsoid formula. Additional volume calculations after segmentation of the kidney on MR images were done using the voxel-count method. Volumes calculated with the ellipsoid formula resulted in an average of 24% underestimation (range 5%-48%) of the renal volume for both US and MRI. With the voxel-count method, no significant deviation from the true renal volume was encountered. Repeatability was also better with MRI than with US. For reliable calculation of renal size in vitro, MRI with use of the voxel-count method is preferred.

Magnetic resonance imaging (MRI) for localization of the prostatic apex: comparison to computed tomography (CT) and urethrography.

M Milosevica, S Voruganti, R Blend.

Department of Radiation Oncology, Ontario Cancer Institute/Princess Margaret Hospital and University of Toronto, 610 University Avenue, Toronto, Ontario, M5G 2M9, Canada.

Radiotherapy and Oncology 1998;47:277-84.

Background and purpose. It is necessary to include the entire prostate in the high dose treatment volume when planning radical radiation for patients with prostate cancer. We prospectively compared magnetic resonance imaging (MRI) to computed tomography (CT) and urethrography as means of localizing the prostatic apex.

Materials and methods. Thirty patients with clinically localized prostate cancer had a sagittal T2-weighted MRI scan and a conventional axial CT scan performed in the treatment position prior to the start of radiotherapy. Twenty of these patients had a static retrograde urethrograph performed at simulation. The position of the N. MRI and CT apices were localized independently by two radiation oncologists. In addition, the MRI apex was localized independently by a diagnostic radiologist. The urethrograph apex, defined as the tip of the urethral contrast cone, was easily identified and was therefore localized by only one observer.

Results. There was good interobserver agreement in the position of the MRI apex. Interobserver agreement was significantly better with MRI than with CT. There were no systematic differences in the position of the MRI and CT apices. However, the MRI apex was located significantly above and behind the urethrogram apex. There was poor correlation between MRI and urethrograph in the height of the apex above the ischial tuberosities. There was 83% agreement between MRI and CT and 80% agreement between MRI and urethrograph in the identification of patients with a low-lying apex. The apex, as determined by MRI, was < 2 cm above the ischial tuberosities and therefore potentially under-treated in 17% of the patients.

Conclusions. MRI is superior to CT and urethrography for localization of the prostatic apex. All patients undergoing radiotherapy for prostate cancer should have localization of the apex using MRI or a technique of equal precision to assure adequate dose delivery to the entire prostate and to minimize the unnecessary irradiation of normal tissues.

DIVERS

A comprehensive physical image quality evaluation of a selenium based digital x-ray imaging system for thorax radiography.

JH Lauanders, SM Kenygelics, AR Cowen.

FAXIL, Department of Medical Physics, Great George Street, LEEDS, West Yorkshire, LS1 2X, United Kingdom.


A selenium based digital x-ray system dedicated to chest radiography has been installed by the UK Department of Health's Medical Devices Agency at Leeds General Infirmary, UK, to undergo a comprehensive evaluation, including the physical image quality. The unifying characteristics which define the overall image quality of a system are the following: sensitometric response, modulation transfer function, and noise power spectrum. These have been measured objectively on preprocessed digital data acquired under relevant radiographic conditions. The image data is further processed prior to hard copy display. The displayed image quality may only be measured subjectively: threshold contrast detail detectability is such a measure which can be related to the objective measures of image quality. The objective imaging characteristics suggest that Thoravision has a significant advantage over conventional radiography imaging systems. However, subjective measures have demonstrated that the image processing can have a significant effect on the perceived image quality. Thoravision has the potential to deliver a significantly improved image quality to clinicians with no increase in radiation exposure to the patient, or image quality may be maintained with a reduction in radiation exposure. Digital image processing is central to the efficiency with which it achieves this.


JM Fontaine, FB Mohamed, C Gottlieb, DJ Callans, FE Marchlinski.

Allegheny University Hospitals-MCP Division, 3300 Henry Avenue, Philadelphia, PA 19129.


Magnetic resonance imaging (MRI) generates potent electromagnetic forces in the form of a static, gradient, or pulsed radiofrequency magnetic field that can result in pacemaker malfunction. This report documents a case of rapid cardiac pacing during MRI in a patient with a dual chamber pacemaker. Although the mechanism of rapid cardiac pacing is unclear, it was directly related to radiofrequency pulsing. We postulated that the lead acts as an antenna for radiofrequency energy that interacts with the pacemaker’s output circuit, thus, causing cardiac pacing at a cycle length representing a multiple of the repetition time; or perhaps rapid pacing is related to induced currents generated between the MRI unit and the pacing lead.

Postoperative Textilomas: Review of 14 Cases.


Service of General Surgery, University Hospital of Getafe, Madrid, Spain.


Background. Textile materials of surgical origin are found in the abdominal cavity in between 1/1300 and 1/1500 laparotomies, in spite of preventive measures. It is very difficult to ascertain the exact incidence due to the lack of descriptions in the literature.

Methods. Fourteen cases of postoperative foreign bodies or textilomas are reported. The cases were collected from two hospital centers between 1985 and 1997.

Results. There were 12 intra-abdominal cases, 1 thoracic and 1 paravertebral. In 8 (57.1%) diagnosis was made preoperatively by radiological techniques. The mortality rate was 14.2% with 2 deaths due to multiorgan failure in one case and sepsis in the other. Both patients were over 70, with malignant pathology. The morbidity rate was 21.4%, wall abscesses which evolved favorably being the most frequent cause of complications.

Conclusions. Prevention of this complication is the best treatment. It is advisable to use textile material with radiopaque contrast, to count the pieces of material to be used and perform an X-ray before the laparotomy is closed specially in emergency (bleeding and trauma patients) because in these complex cases the possibility of material being left behind is more advisable.

Whole-body positron emission tomography using fluorodeoxyglucose for staging of lymphoma: effectiveness and comparison with computed tomography.

KDM Stumpe, M Urbinelli, HC Steinert, Ch Glanzmann, A Buck, GK von Schulthes.

Nuclear Medicine, University Hospital, CH-8091 Zurich, Switzerland.


The purpose of this study was to evaluate whole-body positron emission tomography (WB-PET) as a staging modality in Hodgkin's disease (HD) and non-Hodgkin lymphoma (NHL) and to compare it with computed tomography (CT) in a retrospective study.

Seventy-one WB-PET studies using fluorodeoxyglucose (FDG) and 49 CT examinations were performed in 19 women and 31 men.
Transaxial images were acquired and reformatted coronally and sagittally in PET. CT sections were obtained from the skull base to the pelvic floor. The written reports of the imaging data were compared with a reference standard constructed on the basis of all the data on the individual patients, including clinical follow-up of at least 6 months. The sensitivity and specificity of PET were, respectively, 86% and 96% for HD (n = 53), and 89% and 100% for NHL (n = 18). For CT sensitivity and specificity were 81% and 41% for HD (n = 33) and 86% and 67% for NHL (n = 16). Differences between PET and CT sensitivities were not significant, while in HD there was a significant difference in the specificity of PET and CT examinations, mainly because CT was unable to distinguish between active or recurrent disease and residual scar tissue after therapy. FDG tumour uptake was found in high- as well as low-grade NHL patients. In conclusion, PET appears to be highly sensitive and specific for staging of lymphoma. It is at least as sensitive as CT, and more specific, particularly in patients undergoing restaging, where a well-recognized diagnostic dilemma in CT is the presence of a post-therapeutic residual mass.