Combination Digital Mammography and Digital Breast Tomosynthesis Screening Reduces the Number of Recalled Patients

Screening with digital mammography (DM) and digital breast tomosynthesis (DBT) results in fewer patients being placed into short-interval follow-up by reducing overall recall rates. In a study of 10,728 DM examinations and 15,571 screening DBT examinations, McDonald et al found no significant change in the utilization rate of Breast Imaging Reporting and Data System category 3 in those patients screened with DM compared with DBT. The overall number of patients recommended for short-interval follow-up decreased by a mean of 2.4 women per 1000 after DBT screening. Distribution of recalled finding types significantly changed with DBT, with increased recall examinations for architectural distortions and masses and decreased recall examinations for asymmetries. ■ Page 778

Podcast: Listen to the authors discuss their work.

Three Combined CT Findings Help Predict Strangulation in Adhesive Small Bowel Obstruction

In adhesive small bowel obstruction (SBO), a combination of three independent CT findings (reduced bowel wall enhancement, diffuse mesenteric haziness, and multiple transitional zones reflecting closed-loop obstruction) was accurate in identifying strangulation, with excellent diagnostic performance. In a study of 256 patients with adhesive SBO, Millet et al found the model combining reduced bowel wall enhancement, a closed-loop mechanism, and diffuse mesenteric haziness had an area under the curve of 0.91 and a high negative predictive value. Combinations of these three CT findings should result in appropriate care by either suggesting medical care if two or three of these findings were associated. ■ Page 798

High-Intensity Focused Ultrasound Ablation Is a Well-tolerated Procedure for Graves Disease

US-guided high-intensity focused ultrasound (HIFU) ablation may be an efficacious and safe therapeutic option for patients with persistent or relapsed Graves disease. In a study of 30 patients who underwent ablation of the entire right and left thyroid lobes, Lang et al found disease remission in 22 patients with persistent or relapsed Graves disease over a 12-month period. Patients with lower preablation thyroid-stimulating hormone receptor antibody levels and smaller gland volumes were more likely to experience disease remission after bilateral HIFU ablation. For patients with persistent or relapsed Graves disease despite completion of an 18-month or longer course of antithyroid drugs, HIFU ablation may serve as a reasonable treatment alternative to traditional options like surgery or radioactive iodine therapy. ■ Page 1011

PI-RADS Version 2 Yields Efficient Scoring Criteria to Facilitate Probability of Cancer Detection

The dominant pulse sequence paradigm put forth in Prostate Imaging Reporting and Data System (PI-RADS) version 2 is validated, especially in the peripheral zone (PZ), and dynamic contrast-enhanced (DCE) MR imaging, whose role in PI-RADS version 2 is controversial, adds substantial benefit to PI-RADS category 3 or 4 lesions in the PZ. In a study of 163 patients, Greer et al found the probability of cancer detection for PI-RADS category 2, 3, 4, and 5 lesions was 15.7%, 33.1%, 70.5%, and 90.7%, respectively. Diffusion-weighted (DW) imaging outperformed T2-weighted imaging in the PZ. The addition of DCE imaging to DW imaging scores in the PZ yielded meaningful improvements in probability of cancer detection. ■ Page 859

Three Separate Studies Find That Parkinson Disease Affects the Intracranial Visual System, Functional Connectivity, and Brain Functional Connectome

Arrigo et al found, in newly diagnosed Parkinson disease (PD), multimodal MR imaging results showed alterations in optic radiation connectivity, increased optic radiation mean diffusivity, and a reduction in optic radiation white matter concentration, compared with those in control subjects. Hepp et al showed a PD-related effect on resting-state functional connectivity of posterior and paracentral brain regions, whereas the presence of visual hallucinations was associated with a more global loss of connectivity, related to attention and perception. Suo et al found, by using resting-state functional MR imaging with graph analysis to investigate topologic organization of the brain in PD patients in relation to disease severity, the decrease in nodal centralities with increasing Hoehn and Yahr stage was restricted to the sensorimotor and temporal cortex. ■ Pages 885, 896, 904

See also Herrington et al (p 725).
Retained Gadolinium Is Higher in Rats Receiving Gadodiamide than in Those Receiving Gadoteridol

After repeated intravenous administration in rats, gadoteridol was 10 times less retained than gadodiamide, and all of the detected gadolinium was in the form of intact soluble gadolinium complex; exposure to gadodiamide resulted in retention of both soluble and insoluble gadolinium-containing species, with insoluble materials dominating. In a study of 15 rats, Gianolio et al found, after administration of gadoteridol, 100% of gadolinium recovered in the brain structures corresponded to intact gadoteridol; conversely, for gadodiamide, only 3.6% ± 8.1, 5.6% ± 7.7, and 18.2% ± 10.6 corresponded to intact gadodiamide in the cortex, subcortical brain, and cerebellum, respectively. In animals treated with gadodiamide, the mean amount of gadolinium found in insoluble fractions was 99.6% ± 31.6, 112.0% ± 18.4, and 53.2% ± 10.4 in the cortex, subcortical brain, and cerebellum, respectively. ■ Page 839
See also Lenkinski (p 721).

Artificial Intelligence Demonstrates Potential for Detecting Critical Findings at Head CT

Artificial intelligence tool using deep learning algorithms shows promise in detecting emergent neurologic disease at noncontrast-enhanced head CT, which supports further evaluation of the algorithms within a controlled and prospective clinical setting to determine whether it can independently screen head CT examinations and alert the interpreting radiologist of a potential critical finding. In a study of a training and validation dataset of 246 unenhanced consecutively acquired head CT examinations (2583 representative images), Prevedello et al found final algorithm performance for hemorrhage, mass effect, and hydrocephalus showed 90% sensitivity and 85% specificity, with area under the receiver operating characteristic curve (AUC) of 0.91 with the brain window. For suspected acute infarct, the best performance was achieved with the stroke window showing 62% sensitivity and 96% specificity, with AUC of 0.81. ■ Page 923
See also Kahn (p 719).
Podcast: Listen to the authors discuss their work.

PET/MR Imaging Protocol for Pediatric Cancer Survivors Helps Depict Early Signs of Chemotherapy-induced Tissue Injuries

A PET/MR imaging protocol for pediatric cancer survivors that allows assessment of the brain, heart, and bone for chemotherapy-induced tissue injuries in one session is introduced. In a study of 10 pediatric cancer survivors who completed chemotherapy and underwent PET/MR imaging of the heart, brain, and bone, Theruvath et al found eight of 10 cancer survivors had abnormal findings on brain, heart, and bone images, including six patients with and two patients without clinical symptoms. Clinical problems such as impaired cognitive function, exercise intolerance, and bone pain were correlated with tissue injuries on the basis of integrated PET/MR images in six of eight cancer survivors with abnormal imaging findings. ■ Page 971

Photon-counting Detector Chest CT Improves Diagnostic Image Quality and Reduces Radiation Dose

Initial human experience with dose-reduced photon-counting detector (PCD) chest CT demonstrated lower image noise compared with conventional energy-integrating detector (EID) CT, with better diagnostic quality and lung nodule contrast-to-noise ratio (CNR). Thirty asymptomatic volunteers with 36 incidental lung nodules underwent dose-reduced spiral unenhanced lung EID and PCD CT. Symons et al found PCD diagnostic quality was higher than EID diagnostic quality, with significantly better image quality scores for lung, soft tissue, and bone and with fewer beam-hardening artifacts. Image noise was approximately 16% lower for PCDs compared with conventional detectors at the same radiation dose, while CNR was 21% greater for PCD CT for the detection of lung nodules. ■ Page 980
Podcast: Listen to the authors discuss their work.

Irreversible Electroporation Is Effective to Treat Liver Tumors When Thermal Ablation Is Not an Option

Irreversible electroporation (IRE) is useful to avoid incomplete ablation secondary to heat-sink effects and damage to major blood vessels; however, needle tract seeding is observed and IRE induces sufficient local heating to bile ducts. In a study of 29 patients with 43 primary or secondary malignant liver tumors (located immediately adjacent to major hepatic veins, portal veins, or both) who underwent CT-guided IRE, Distelmaier et al found complete ablation in 40 of 43 target tumors. Local recurrence was observed in only two of 40 target tumors. IRE caused regional recurrence due to needle tract seeding in 11 of 40 target tumors. Five of 21 patients with target tumors adjacent to portal veins developed mild to moderate cholestasis 2–6 weeks after IRE. ■ Page 1023