

Neuroradiology Articles From Around the World



Highlights from ARRS Global Partner Society journals



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Highlights of and open access to original articles published in ARRS Global Partner Society (GPS) journals since June 2013 are available to ARRS International Outreach Program web page visitors as part of a GPS publications exchange program. The participating organizations publish the *American Journal of Roentgenology (AJR)*, the *Japanese Journal of Radiology*, the *Korean Journal of Radiology*, *Radiología (Spain)*, the *South African Journal of Radiology*, the *Revista Colombiana de Radiología*, the *Journal of Radiological Sciences (Taiwan)*, the *Journal of Medical Imaging and Radiation Oncology (Australia/New Zealand)*, the *Revista Argentina de Radiología*, and the *Radiología Brasileira*. Thomas H. Berquist, Nagara Tamaki, Yeon Hyeon Choe, José Maria García Santos, Razaan Davis, Sonia Bermudez, Rheun-Chuan Lee, David Ball, Claudia Cejas, and Edson Marchiori, respectively, serve as editors of these journals. Each month, the articles selected to be part of this exchange focus on the subspecialty section featured in the *AJR*. In January 2014, for example, ARRS made “Subarachnoid Hemorrhage: Beyond Aneurysms” [1] freely available on the websites of the participating global partners, including the Japan Radiological Society, Korean Society of Radiology, Spanish Society of Medical Radiology, Radiological Society of South Africa, Colombian Association of Radiology, Radiological Society of the Republic of China, Royal Australian and New Zealand College of Radiologists, Chinese Society of Radiology, Argentinian Society of Radiology, and Brazilian College of Radiology. In addition, the members of the Singapore Radiological Society and the Chinese Society of Radiology receive complimentary access to an *AJR* article from the subspecialty focus section every month.

For this year’s review, the following international articles addressing neuroradiology are highlighted:

Korean Journal of Radiology— Korean Society of Radiology

Jeon JY, Choi JW, Roh HG, Moon WJ. Effect of imaging time in the magnetic resonance detection of intracerebral metastasis using single dose gadobutrol. *Korean J Radiol* 2014; 15:145–150

The authors compared the effect of imaging time delay on the MR detection of 100 intracerebral metastases (size = 1–30 mm; median: 7 mm) in 21 patients: 12 men and 9 women, who were 28 to 85 years old (mean age: 60.5 years) after a single dose of gadobutrol (0.1 mmol/kg). All examinations were performed at 3 T using an eight-channel head coil. Scanning with contrast-enhanced 3D fast spoiled gradient-echo was started at 1, 5, and 10 minutes after contrast injection. Assessment of lesion conspicuity was performed using a qualitative scale. Quantitative signal intensity (SI) analysis of enhancing metastases and normal parenchyma was measured, including the contrast rate (CR) and enhancement rate (ER). Statistical comparisons between the different time delays showed that lesion conspicuity did not differ significantly among them. Although the SI, CR, and ER of lesions did not reveal significant differences at 1 and 5 minutes’ delay, both the 1- and 5-minutes-delayed images showed significantly higher CRs of lesions compared with the 10-minutes-delayed images. Results suggest that a less time-consuming protocol may be adopted using short-time-delay (1 minute) contrast-enhanced imaging.

Japanese Journal of Radiology— Japan Radiological Society

Hayashida E, Sasao A, Hirai T, et al. Can sufficient preoperative information of intracranial aneurysms be obtained by using 320-row detector CT angiography alone? *Jpn J Radiol* 2013; 31:600–607

The authors prospectively enrolled 40 consecutive patients: 20 men and 20 women who were 35 to 73 years old (mean age: 57.6 years) with unruptured intracranial aneurysms. Two blinded readers evaluated CT angiography (CTA), including unenhanced and contrast-enhanced images obtained with a 320-row detector unit as the only preoperative imaging study. To analyze the aneurysms, data were subjected to bone subtraction, multiplanar reconstruction, and 3D volume rendering. To provide high-quality preoperative views of arterial and venous structures, data were converted to color-coded 3D reconstructions using the volume-rendering technique. Interobserver agreement and the agree-

ment between CTA and surgical findings were determined by calculating kappa coefficient. Agreement between CTA and surgical findings was excellent for aneurysm location ($\kappa = 1.0$) and there was also good agreement for the shape, neck, and the relationship of the aneurysm with adjacent arterial branches ($\kappa = 0.71$ – 0.74). In 93% of the patients, CTA data were highly useful for surgical treatment, although small perforators deriving from aneurysms were not fully visualized in two patients.

Radiología—Spanish Society of Medical Radiology

Ramos Amador A, Alcaraz Mexía M, González Preciado JL, Fernández Zapardiel S, Salgado R, Páez A. Natural history of lumbar disc hernias: does gadolinium enhancement have any prognostic value? *Radiologia* 2013; 55:398–407

The authors evaluated the percentage of disc herniations that had disappeared at 1-year follow-up and the time to disappearance to determine whether gadolinium enhancement is a useful predictor for herniation shrinkage. Seventy-two patients with 80 disc herniations (detected on initial CT) who presented with lower back pain or sciatica of more than 3 months entered the study. Gadolinium-enhanced MRI with a delay of 30 seconds was performed at enrollment, then every 6 months for 1 year or until the herniation disappeared. Type of hernia, location, type of contrast enhancement, and degree of herniation shrinkage were measured. Fifty-nine percent of disc herniations disappeared within the 1-year follow-up period; disappearance was noted in 83% of all extruded discs. Lack of enhancement was significantly associated with persistence of herniations in the univariate analysis. The authors concluded that enhancement pattern was not useful in predicting whether herniations disappear.

South African Journal of Radiology—Radiological Society of South Africa

Sikwila CT, Amod K, Cupido BD, Sabri A. Multi-detector computed tomography radiation doses in the follow-up of paediatric neurosurgery patients in KwaZulu-Natal: a dosimetric audit. *S Afr J Rad* 2014; 18:588–591

The aim of this study was to determine the radiation dose exposure in pediatric patients subjected to MDCT following neurosurgery and to compare these values with references in the literature. Radiation dose was calculated in relation to clinical scenarios. Median dosimetric values were calculated in 169 patients from neonate to 12 years old who had a baseline scan in 2010 and were followed for 6 months or less. The children were grouped into three age ranges (younger than 3 years old, 3 to 7 years old, and 8 to 12 years old). Dose-length product (DLP) and current-time product were collected from PACS. Effective doses (ED) were calculated from corresponding DLP using age-adjusted conversion tables. Indications for follow-up included shunts (65%), intracranial abscesses (18%), subdural hematomas (8%), trauma (5%), and tumors (4%). The highest median radiation doses were noted in patients being followed for intracranial abscesses in the group of 8- to 12-year-olds. The lowest radiation doses were noted in patients receiving follow-up for intracranial shunts. Mean radiation doses were comparable to values in the litera-

ture; wider dose distributions of all parameters (DLP, ED, and current-time product [mAs]) were attributed to inappropriate use of scan length and reference effective mAs. Further dose reductions could be achieved by omission of unenhanced scans in the follow-up of intracranial abscesses.

Revista Colombiana de Radiología—Colombian Association of Radiology

Duque JE, Herrera DA, Sergio Vargas S, Ochoa JF. Custom template construction to implement voxel-based morphometry. *Rev Colomb Radiol* 2013; 24:3684–3691

The purpose of this study was to implement the construction of voxel-based morphometric templates to characterize variable brain morphology automatically, without use of regions of interest. Gray and white matter, and CSF templates, were built from a population of 50 volunteers—32 women and 18 men whose mean age was 41.6 years—using the following inclusion criteria: normal MRI studies per assessment by two neuroradiologists, and no history of head trauma, cognitive disorders, structural anomalies, striking anatomic variants, or technical artifacts. Results were compared with those obtained using templates of the Montreal Neurological Institute and validated in the literature. The authors found that Diffeomorphic Anatomical Registration Through Exponentiated Lie Algebra (DARTEL) algorithms used in voxel-based morphometry increase the sensitivity of the technique. The construction of voxel-based morphometric templates provides better representation of local variability, allowing for a personalized approach by improving segmentation and other processing tasks.

Journal of Radiological Science—Radiological Society of the Republic of China (RSROC) (The Chinese Taipei Society of Radiology)

Fu CJ, Chen HW, Wu CT, et al. Extraplural malignancies found incidentally on lumbar spine MRI: prevalence and etiologies. *J Radiol Sci* 2013; 38:85–91

MRI of the lumbosacral spine is frequently performed in the imaging workup of patients with low back pain, sciatica, or both; incidental extrapural malignancies that may be more relevant than the spinal findings can be found in these routine MRI studies. The study population included 26 patients: 17 men and nine women, 33 to 84 years old (mean age: 55.7 years), who underwent routine non-enhanced MRI of the lumbosacral spine between January 2010 and December 2011, and who also had CT scans within 1 year. Twenty-eight extrapural malignancies were found, including nine lymphadenopathies, seven renal tumors, five iliac bone lesions, four adrenal tumors, two liver tumors, and one colon tumor. The prevalence of newly diagnosed extrapural malignancies was 0.5%. Coexisting spinal metastases were found in 53.8% of patients. Coronal STIR images provided the best information. The most common extrapural malignancies without coexisting spinal metastases were renal tumors and iliac bone lesions. The authors hypothesize that this may be due to similar clinical presentations of low back pain, sciatica, or both. Knowledge of and familiarity with these extrapural findings are crucial for timely treatment and outcome.

Journal Highlights continues on p. 16

Journal of Medical Imaging and Radiation Oncology—Royal Australian and New Zealand College of Radiologists

Yu J, Cooley T, Truong MT, Mercier G, Subramaniam RM. Head and neck squamous cell cancer (stages III and IV) induction chemotherapy assessment: value of FDG volumetric imaging parameters. *J Med Imag Radiat On* 2014; 58:18–24

The purpose of the study was to assess whether changes in metabolic tumor volume (MTV) or total lesion glycolysis (TLG) of primary tumors on PET/CT before and after induction chemotherapy predicted outcome in 28 patients: 20 men and eight women who were 29 to 82 years old (mean age: 59 years), with advanced head and neck squamous cell cancer. MTV and TLG were measured using gradient and fixed-percentage threshold segmentations; the outcome endpoint was disease progression or death. Using receiver operating characteristic analysis, a 42% reduction in gradient MTV or 55% reduction in gradient TLG before and after induction chemotherapy were determined to be optimal for predicting short-term, event-free survival in patients with advanced head and neck squamous cell cancer.

Revista Argentina de Radiología—Argentina Society of Radiology

Surur AM, Buccolini TV, Londero HF, Marangoni MA, Allende NJ. Noninvasive assessment of carotid stenosis in relation to atherosclerosis: correlation between color Doppler ultrasound and magnetic resonance angiography with gadolinium. *Rev Argent Radiol* 2013; 77:267–274

Noninvasive imaging methods for evaluation of carotid stenosis, including contrast-enhanced magnetic resonance angiography (MRA) and color Doppler ultrasound have gained popularity as compared to carotid catheter angiography. The study aimed to assess the correlation between MRA and color Doppler ultrasound in evaluating the degree of carotid stenoses. One hundred carotid bifurcations were studied between January 2009 and August 2011 via MRA and color Doppler ultrasound. Patients with a history of prior carotid stenting or endarterectomy were excluded, as were those with nonatherosclerotic carotid stenosis. Excellent correlation was obtained between MRA and color Doppler ultrasound; MRA was more successful at detecting irregular carotid plaque surface, ulcerated plaques, or both.

Radiologia Brasileira—Brazilian College of Radiology and Diagnostic Imaging

Filho OC, Filho OV, Ragazzo PC, Barbosa da Fonseca LM. A new method for intraoperative localization of epilepsy focus by means of a gamma probe. *Radiol Bras* 2014; 47:23–27

The study evaluated the ability to detect epileptogenic areas with a gamma probe as compared with intraoperative electrocorticography (ECoG). Gamma-probe-assisted surgery was first introduced to guide brain tumor resection. Considering that ictal brain SPECT can detect epileptogenic foci and that the radio-tracer remains in the abnormal cortical areas for many hours, the authors hypothesized that the gamma probe might allow for

intraoperative identification of epileptogenic focus. Two patients were enrolled in this pilot study. SPECT scans of the brain were performed at the basal state (interictal phase) and during epileptic seizure (ictal phase) before surgery. After craniotomy, radioactivity count was performed with the gamma probe. ECoG was subsequently performed with subdural grids and depth electrodes implanted in the head of the hippocampus and amygdala under spontaneous activity and following activation with alfen-tanyl. ECoG findings and radioactivity counts were congruent in both patients. The advantages of gamma-probe-assisted surgery include low cost and the capacity to show decreased radiotracer activity immediately after lesion resection. ■

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Reference:

1. Marder CP, Narla V, Fink JR, Fink KRT. Subarachnoid hemorrhage: beyond aneurysms. *AJR* 2014; 202:25–37

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- Natural history of lumbar disc hernias: does gadolinium enhancement have any prognostic value?—*Radiologia*
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- Noninvasive assessment of carotid stenosis in relation to atherosclerosis: correlation between color Doppler ultrasound and magnetic resonance angiography with gadolinium. *Rev Argent Radiol* 2013; 77:267–274—*Revista Argentina de Radiologia*
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