The issue of communication of reports is a solvable operational project if radiology groups only acknowledged that communication of results is as vital as interpretive insight.

One of the bedeviling problems in the communication of results of imaging tests, especially in large hospitals, is the seeming complexity of possibilities in the attempts to reach referring physicians. This has been considered an inherent consequence of the multiplicity of referrers, their apparent anonymity, and mobility. It is a source of frustration for image interpreters, but it is not an inevitability or a necessary byproduct of the elements of current care. Rather, it reflects management failure, a lack of will to develop profiles and access modes for referrers. In much the same way that businesses that sell products learn and utilize readily available information to establish and maintain usable files of every customer, so too should radiology groups gain a similar ability to reach and converse with their physician contacts. The issue is a solvable operational project if radiology groups only acknowledged that communication of results is as vital as interpretive insight.

(Reviewer-).
The relative percentage wash-in ratio may aid in differentiating adrenal adenomas from metastases.

**Objective:** To determine if the relative percentage wash-in ratio at early biphasic CT can distinguish adenomas from metastases.

**Design:** Retrospective analysis.

**Methods:** This study was comprised of 86 patients with 107 adrenal lesions. The final diagnosis was made by either percutaneous biopsy, surgery, or at least 1 year of imaging follow-up. If a histologic diagnosis was not obtained, the following criteria were used for diagnosis: unenhanced CT attenuation value of <11 HU and no change in size were diagnosed as a lipid-rich adenoma; unenhanced CT attenuation value of >10 HU and no change in size were diagnosed as a lipid-poor adenoma; and unenhanced CT attenuation value of >10 HU and increased size or development of a new lesion were diagnosed as a metastasis. Examinations were performed with a 64-MDCT scanner. Unenhanced as well as 35-second arterial and 80-second portal venous phases were obtained. The largest diameter of the lesions was recorded. ROIs were drawn on unenhanced, arterial, and portal venous phase images. The relative percentage wash-in ratio of the lesion from the unenhanced to the portal venous phase was calculated as 100 x (PA – NA)/NA, where PA is lesional attenuation in HU measured on the portal venous phase scan and NA is the lesional attenuation on the unenhanced scan. The relative percentage wash-in ratio from the arterial phase to the portal venous phase was calculated as 100 x (PA – AA)/AA, where PA is lesional attenuation in HU measured on the portal venous phase scan and AA is the lesional attenuation on the arterial phase scan. A 2-step algorithm was used. In the first step, all 107 lesions were separated into nonenhancing (with a negative relative percentage wash-in ratio <0%) or enhancing (with a positive relative percentage wash-in ratio >0%). The second step entailed separating the enhancing lesions into those having a relative percentage wash-in ratio >100% or <100%.

**Results:** The mean diameter of benign lesions was significantly smaller than that of metastatic lesions. There was also a significant difference in the mean attenuation at unenhanced CT between adenomas and metastases. There was no significant difference in the relative percentage wash-in ratio between the lesions from the unenhanced to the portal venous phase. However, there was a significant difference between adenomas and metastases in the relative percentage wash-in ratio from the arterial phase to the portal venous phase. The combination of a negative relative percentage wash-in ratio and early wash-out from the arterial to the portal venous phase had 100% sensitivity for a benign lesion. A positive relative percentage wash-in ratio with a >100% threshold for rapid enhancement had a sensitivity for a benign lesion as well.

**Reviewer's Comments:** The results of this study illustrate that, in addition to the established absolute and relative percentage wash-out calculations, the relative percentage wash-in ratio may be an additional parameter that can increase one's diagnostic confidence in the characterization of an adrenal lesion. One of the limitations noted in this study was that only the benign and malignant lesions evaluated were adenomas and metastatic lesions, respectively. (Reviewer-John C. Sabatino, MD).

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Keywords: Adrenal Lesions, Wash-In Ratio

Print Tag: Refer to original journal article
The apparent diffusion coefficient value of hepatic fibrosis is significantly greater than that of regenerative nodules.

**Objective:** To determine if the apparent diffusion coefficient (ADC) value of hepatic fibrosis varies from that of regenerative nodules.

**Design:** Prospective analysis.

**Methods:** This study was comprised of ex vivo and in vivo components. The ex vivo component was comprised of 63 human liver specimens obtained from 23 explanted cirrhotic livers. Specimens were imaged using a 1.5-T scanner. T1- and T2-weighted sequences were acquired. Diffusion-weighted spin-echo sequences were acquired with b-values of 0 and 770 s/mm². The images were reviewed in conjunction with the digitized histology images. The readers placed ROI pairs on the b=0 s/mm² images, which included one within a fibrotic bridge and another in an adjacent regenerative nodule. ADC values were subsequently calculated. The in vivo component was comprised of 12 men and 5 women with cirrhosis and at least one focal area of confluent fibrosis measuring ≥1 cm on imaging. Subjects were imaged during routine surveillance of hepatocellular carcinoma. The etiologies of cirrhosis were hepatitis C virus in 9 subjects, nonalcoholic fatty liver disease in 3, primary biliary cirrhosis in 2, primary sclerosing cholangitis in 1, alcoholic liver disease in 1, and cryptogenic cirrhosis in 1 patient. Patients were imaged using a 3.0-T scanner. Sequences included T1-weighted SGE dual echo, T2-weighted single-shot fast-spin echo, and 3D SGE before and during dynamic contrast administration at 20 seconds, 80 seconds, 3 minutes, and 6 minutes after injection. The 2D spin-echo single-shot echo planar diffusion-weighted images were acquired with b-values of 0 and 500 s/mm². The readers placed ROI pairs on the b=0 s/mm² images and b=500 s/mm² images, which included one within an area of confluent fibrosis and another in adjacent parenchyma presumed to be a composite of regenerative nodules and fibrosis. ADC values were subsequently calculated.

**Results:** In the ex vivo component, the mean ADC value of fibrotic bridges was significantly greater than that of regenerative nodules. This also held true in the in vivo component, whereby the mean ADC value of confluent fibrosis was significantly greater than that of adjacent cirrhotic parenchyma. Consequently, regenerative nodules have a lower ADC value than hepatic fibrosis.

**Reviewer’s Comments:** The results of this study are useful in demonstrating that the cause of decreased ADC values in cirrhotic livers does not appear to be due to fibrosis but rather the presence of regenerative nodules. One of the limitations reported in this study was that the ADC values of fibrotic bridges and regenerative nodules were not compared with those of normal liver parenchyma. (Reviewer-John C. Sabatino, MD).

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Keywords: Liver, Fibrosis

Print Tag: Refer to original journal article
Partial vs Complete Leiomyoma Infarction After UAE

Uterine Artery Embolization for Leiomyomas: Percentage of Infarction Predicts Clinical Outcome.
Kroencke TJ, Scheurig C, et al:
Radiology 2010; 255 (June): 834-841

Patients with leiomyoma infarction >90% have fewer symptoms and, therefore, require fewer re-interventions.

**Objective:** To determine if partial or complete infarction of leiomyomas after uterine artery embolization (UAE) is required to control symptoms and obviate the need for re-intervention.

**Design:** Prospective analysis.

**Participants/Methods:** This study was comprised of 115 patients scheduled for UAE as an alternative to surgery for symptomatic uterine fibroids. MRI was performed before and within 24 to 72 hours after UAE to assess the percentage of leiomyoma infarction, uterine volume, and dominant leiomyoma volume. MRI was performed with a 1.5-T scanner. T2-weighted fast-spin echo and HASTE sequences, as well as 2D T1-weighted SGE images before and after IV contrast administration were obtained. All leiomyomas measuring at least 10 mm were evaluated. The number and location of the fibroids were recorded, and the uterine and dominant fibroid volumes were calculated. Absence of enhancement of a leiomyoma on follow-up constituted infarction. The percentage of infarction was divided into 3 groups: 100% or complete infarction of all leiomyomas; 90% to 99% or almost complete infarction; and <90% or partial infarction.

**Results:** There were 60 patients with complete infarction of all leiomyomas, 32 with almost complete infarction, and 23 with partial infarction. At 24 months after UAE, 80% of patients with almost complete infarction and 50% of patients with partial infarction did not undergo re-intervention for symptoms. None of the patients with complete infarction required a second intervention. Regarding menorrhagia, 90% of the complete infarction group, 84% of the almost-complete infarction group, and 72% of the partial infarction group remained symptom free at 24 months. There was a 16-fold higher risk for re-intervention in the almost-complete infarction group and a 73-fold higher risk for re-intervention in the partial infarction group. No significant correlation was found between patient age, uterine and dominant leiomyoma volume, or fibroid location and clinical failure.

**Conclusions:** Women with leiomyoma infarction >90% on MRI after UAE “show significantly better symptom control and fewer re-interventions than do patients with a lower infarction rate.”

**Reviewer’s Comments:** The results of this study are useful in demonstrating that the extent of leiomyoma infarction at MRI after UAE may predict the likelihood of a patient experiencing symptoms requiring re-intervention. One of the limitations reported in the study was that the estimation of the extent of leiomyoma infarction at follow-up MRI was performed subjectively. (Reviewer-John C. Sabatino, MD).

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Keywords: Uterine Artery Embolization, Leiomyomas

Print Tag: Refer to original journal article
Pleural Plaque Develops Earlier Than Previously Thought

Workers With Libby Amphibole Exposure: Retrospective Identification and Progression of Radiographic Changes.

Larson TC, Meyer CA, et al:
Radiology 2010; 255 (June): 924-933

In a subset of workers exposed to asbestos in a mining site in Montana, the median latency of development of pleural plaque was 8.6 years, and the median latency of development of pleural calcification was 17.5 years. This is less than previously reported.

**Background:** Libby, Montana, had a vermiculite mining facility. Asbestos-related morbidity and mortality have been documented among former workers at this site. Previous studies have demonstrated that asbestos-related pleural plaque is visible on chest x-ray (CXR) 20 years after initial exposure, and pleural calcification is seen 30 years after initial exposure.

**Objective:** To evaluate pleural and pulmonary changes on CXR of asbestos exposure.

**Design:** Retrospective review.

**Participants:** Vermiculite workers who had a series of CXRs dating from 1955 to 2004 were included. Only patients who had at least 2 posteroanterior CXRs were included.

**Methods:** 3 thoracic radiologists with National Institute of Occupational Safety and Health B reader certification evaluated the CXRs first independently and then in consensus. Abnormalities seen on CXR were subsequently tracked retrospectively on older CXRs of the patient to see when they first became radiographically visible. The 1980 International Labor Office Classification of Radiographs of Pneumoconiosis was used to classify any abnormalities seen on CXR. This takes into account pleural plaques or diffuse pleural thickening width, in-profile extent, and en face extent, as well as pleural calcification and pulmonary parenchymal abnormalities. Every patient's cumulative fiber exposure, which is an estimate of lifetime fiber exposure, was obtained from employment records. Duration of employment, age when working, and smoking history were also obtained.

**Results:** 84 patients with pleural and/or pulmonary parenchymal abnormalities on their most recent CXR were studied. In these patients, a total of 1272 CXRs were evaluated (average of 15.1 ± 7.8 per patient). The average follow-up was 21.6 ± 8.2 years. The median latency (time between date of hire and date of earliest CXR detection) of circumscribed pleural plaque was 8.6 years. Pleural calcification occurred in 44% of the study patients, and the median latency of pleural calcification was 17.5 years. Diffuse pleural thickening occurred in 14%, and the median latency of diffuse pleural thickening was 27.0 years. Among patients with pleural abnormalities, 76% of patients had pleural disease progression; among patients with pulmonary parenchymal abnormalities, 54% had pulmonary parenchymal disease progression. No significant difference was found between measures of exposure to asbestos of individual patients and whether disease progression was found.

**Conclusions:** The median latency of development of pleural plaque was 8.6 years, and the median latency of development of pleural calcification was 17.5 years. This is earlier than what had been reported in earlier studies of subjects with asbestos exposure.

**Reviewer's Comments:** The authors note that the retrospective method used in this study to determine when pleural abnormalities first became visible on CXR significantly lowered the threshold for seeing the abnormalities. Without the benefit of hindsight, these subtle abnormalities would have been unlikely to be recognized as consistent with asbestos-related pleural disease if these CXRs were interpreted on a prospective basis. (Reviewer-Vineet R. Jain, MD).

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Keywords: Asbestos-Related Pleural Disease, Radiographic Change

Print Tag: Refer to original journal article
Scan Direction Doesn't Matter in 64-MDCT Pulmonary Angiography

Comparison of Respiratory Motion Artifact From Craniocaudal Versus Caudocranial Scanning With 64-MDCT Pulmonary Angiography.

Wu C, Sodickson A, et al:

AJR Am J Roentgenol 2010; 195 (July): 155-159

On 64-MDCT scanners, the scan direction (craniocaudal vs caudocranial) does not significantly affect the amount of respiratory motion artifact seen on CT pulmonary angiography.

Objective: To compare the degree of motion artifact on craniocaudal imaging versus caudocranial imaging on 64-MDCT pulmonary angiography.

Design: Retrospective study.

Participants: Patients clinically suspected of having pulmonary embolism in the emergency department were evaluated. The first 100 patients underwent CT pulmonary angiography using caudocranial imaging and the second 100 patients underwent CT pulmonary angiography using craniocaudal imaging.

Methods: The same 64-MDCT scanner was used in both sets of patients. In both groups the chest was imaged in a single breath-hold using 75 mL of iopromide at 5 mL/s followed by a 40-mL saline flush and the study was timed for opacification of the pulmonary arteries using bolus tracking. Scanning was started in both groups after a 5-second delay following triggering because of the need to incorporate table motion and end-inspiratory breath-hold instructions. In the first group of caudal-cranial scanned patients, the pitch was 0.75 and mean scan duration was 9 seconds. In the second group of cranial-caudal scanned patients, the pitch was 1.0 and mean scan duration was 7.1 seconds. The coronal reformatted images of the axial plane were evaluated for motion artifact in the upper, mid, and lower lung zones using a 3 point scale where 0 = no artifact and 3 = severe artifact. Motion artifact due to respiration appeared as not distinct or doubled bronchovascular structures, mildly increased pulmonary parenchymal opacity, and diaphragm position misregistration. Artifact due to cardiac motion that appeared as obscuration of anatomy adjacent to the heart in the lingula and left lower lobe was discounted for the purposes of this study.

Results: There was no statistically significant difference in the degree of motion artifact between the 2 groups in any lung zone or based upon the most severe artifact score seen in each patient. Most of the lung zones did not contain respiratory motion artifact. In lung zones that did have respiratory motion artifact, there was more motion in the middle and lower lung zones than in the upper lung zones in both groups. Approximately 20% of all CT pulmonary angiograms were considered limited due to moderate or severe respiratory motion artifact.

Conclusions: On 64-MDCT scanners, the scan direction does not significantly affect respiratory motion artifact.

Reviewer's Comments: What is very interesting in this article is the discussion where the authors note that prior studies have found that there is significant diaphragmatic motion occurring immediately after a breath-hold initiation that lasts for 4 to 7 seconds. For this reason, imaging in a caudal-cranial direction may actually be inferior to cranial-caudal imaging for the purposes of evaluating for pulmonary embolism as long as the overall scan duration is relatively short. (Reviewer-Vineet R. Jain, MD).

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Keywords: CT Pulmonary Angiography, Degree of Motion Artifact

Print Tag: Refer to original journal article
Coronary CT angiography provides prognostic information for diabetic and nondiabetic patients, as diabetes and obstructive coronary artery disease are independent predictors of outcome and absence of plaque is associated with an excellent prognosis in both groups.

**Objective:** To evaluate coronary CT angiography (CTA) in diabetic patients compared with nondiabetic patients.

**Design:** This was a prospective observational study conducted as a part of a larger group in 2 centers -- 1 in Parma, Italy, and 1 in Leiden, the Netherlands.

**Participants:** 616 patients, 313 of whom had diabetes and 303 who did not, underwent coronary CTA. All patients were suspected of having coronary artery disease (CAD). CAD was defined as having a history of myocardial infarction (MI) or coronary revascularization or the presence of 1 angiographically demonstrated coronary stenosis >50%.

**Methods:** All CTs were performed on a 64-detector row CT. An Agatston coronary artery calcium score was obtained on all patients in addition to the coronary CTA. Plaque was classified as obstructive (>50% stenosis) or non-obstructive (<50% stenosis). All patients were followed up for at least 6 months. Study end points were cardiac death, nonfatal MI, unstable angina, and requirement for elective revascularization.

**Results:** Average age of diabetic patients was 62 ± 11 years, and that of nondiabetic patients was 63 ± 11 years. The number of men and women were also similar in both groups. In total, 19% of diabetics had no CAD and 26% of nondiabetics had no CAD (P =0.04). The average number of diseased segments (5.6 vs 4.4; P =0.001) and the prevalence of obstructive disease (51% vs 37%; P <0.001) was higher in the diabetics. The total Agatston coronary calcium score was higher in diabetics (440 vs 195; P <0.001). The average follow-up period was 20 ± 5.4 months in which 88 cardiac events occurred in the diabetics versus 45 events in the nondiabetics (28% vs 15%; P <0.001). Twenty-two diabetic patients had major events including fatal MI, nonfatal MI, and unstable angina requiring hospitalization versus 5 nondiabetic patients (7% vs 2%; P =0.002). Diabetes (P <0.001) and obstructive CAD (P <0.001) were independent predictors of outcome. None of the patients in either group who had normal coronary arteries without plaque had any cardiac events in the follow-up period. The future cardiac event rate was 36% in nondiabetics with obstructive CAD and was highest (47%) in diabetics with obstructive CAD.

**Conclusions:** Coronary CTA provides prognostic information over baseline clinical features of diabetic and nondiabetic patients clinically suspected of having CAD. The absence of atherosclerotic plaque on CTA is associated with an excellent prognosis in both diabetic and nondiabetic patients. Coronary CTA may therefore be helpful in improving risk stratification in both of these groups.

**Reviewer’s Comments:** This is a very nice study that details the prognostic value of CTA even in patients with diabetes who are at high risk for CAD. (Reviewer-Vineet R. Jain, MD).

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Keywords: Diabetes, Coronary CT Angiography, Coronary Artery Disease

Print Tag: Refer to original journal article
Console-based MRI-guided biopsy systems are more efficient and lead to less excisional biopsies than handheld vacuum-assist devices.

**Background:** Breast MRI has become a widely used component of the multi-modality approach to breast imaging. Lesions that are only detectible on breast MRI and that cross the level of suspicion to warrant a biopsy are regularly targeted under MRI guidance. Two main widely used vacuum biopsy systems are available -- those that use compact handheld systems with an attached syringe used to create a vacuum and those that use systems with a console used to create a mechanical vacuum and separate disposable headpiece.

**Objective:** To assess the clinical performance of each type of MRI-guided biopsy system and its clinical implications.

**Design/Methods:** Over a 36-month retrospective period, patients who had undergone MRI-guided breast interventions were identified. Of those who underwent vacuum-assisted biopsy, 2 different systems were used: a handheld system that incorporated a 10-gauge probe and vacuum-assist that was established with a 20-mL syringe as part of the handpiece, and a second system that used a 9-gauge probe and a separate console for creating a vacuum. Only lesions that were visualized on MRI and not on second-look ultrasound or repeat mammography were included. Lesions were localized via a grid or pillar and post system. With the handheld biopsy system, the needle had to be removed after each biopsy pass in order to obtain the core specimen. The console biopsy system did not require removal of the needle with each pass and only required removal at the end of the procedure. Results of vacuum-assisted biopsy were compared with pathology at surgical excision when available. When surgical excision was not performed, the standard of reference was determined with 6- and 12-month follow-up MRI. If follow-up MRI did not show interval change, a benign diagnosis was accepted.

**Results:** 475 lesions were included in the study. Of those, 159 underwent needle localization and 316 lesions underwent one of the techniques of vacuum-assisted biopsy. No statistically significant demographic or clinical differences in respective cohorts were found. The average size of lesions targeted with the handheld system was almost twice as large as those that were able to be targeted with the console system. The procedure with the handheld system took almost twice as long on average and those lesions targeted with the handheld system had a higher rate of subsequent localization and excisional biopsy.

**Conclusions:** Because of the procedural advantages of use of the console-based system, smaller lesions were biopsied in less time and with higher operator confidence. This result translated into a major shift in the care of patients with MRI-only lesions away from lesion localization toward increased use of MRI-guided vacuum-assisted biopsy.

**Reviewer’s Comments:** This single institution's reported experience with 2 different biopsy systems confirms the advantages of a console-based vacuum-assisted biopsy system in both time and accuracy in tissue sampling. (Reviewer-Basil Hubbi, MD).

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**Keywords:** Breast MRI, MRI-Guided Biopsy, Cancer

**Print Tag:** Refer to original journal article
This meta-analysis shows that breast MRI has high specificity, but sensitivity for assessment of pathologic complete response in the setting of preoperative treatment of locally advanced breast cancer is less than desirable.

**Background:** For those patients diagnosed with locally advanced breast cancer, preoperative chemotherapy has been proven to be equivalent to routine adjuvant chemotherapy in terms of overall survival and rate of metastasis. In this context, the administration of preoperative, or neoadjuvant, chemotherapy is widely practiced. Breast MRI has shown promise in assessing the response to chemotherapy and correlating the residual tumor burden with actual pathologic findings.

**Objective:** To extract data across several studies in order to determine the performance of MRI in prediction of pathologic complete remission and response to preoperative chemotherapy in patients with locally advanced breast cancer.

**Design:** Meta-analysis.

**Methods:** A search of the MEDLINE database was initially performed to identify studies eligible for inclusion into this meta-analysis. Variables that comprised the inclusion criteria were the following: publication of a study in English over an 11-year period ending in April 2009; studies that included at least 10 women; studies that used histopathologic findings as the reference standard; and studies that derived a 2 x 2 data table yielding formulas for sensitivity and specificity. After these studies were identified to have met the inclusion criteria, investigators extracted and recorded the data with variables including, but not limited to: patient age, hormone receptor status, chemotherapy regimens, pathologic complete response rate, and histologic subtype. Data analysis was performed with statistical software, notably Stata version 8.2 and Meta-DiSc. After running the data search and applying the inclusion criteria, 25 studies met the criteria for inclusion in this meta-analysis.

**Results:** The meta-analysis revealed strong evidence of between-study heterogeneity. In total, 1212 patients were included. The specificity of MRI was found to be 90.7% and the sensitivity was found to be 63.1% in predicting pathologic complete remission.

**Conclusions:** MRI has high specificity and relatively lower sensitivity in predicting pathologic complete remission after preoperative therapy in patients with breast cancer.

**Reviewer's Comments:** The sensitivity of breast MRI in detecting pathologic complete response is lower than the sensitivity of breast MRI in detection of untreated breast cancer. The biologic mechanisms for this are undocumented although the authors offer a few theories including response to anti-angiogenesis chemotherapy agents as well as generally higher tumor grade in those with pathologic complete response to preoperative regimens. This meta-analysis demonstrates the limits of MRI sensitivity when dealing with treated breast lesions and serves as a caveat when interpreting breast MRI in patients who have completed neoadjuvant chemotherapy. (Reviewer-Basil Hubbi, MD).

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Keywords: Cancer, MRI, Preoperative Chemotherapy, Neoadjuvant Chemotherapy

Print Tag: Refer to original journal article
Can Addition of Normalized ADC Values Increase Accuracy of DCE Breast Imaging? 

Diffusion-Weighted Imaging Improves the Diagnostic Accuracy of Conventional 3.0-T Breast MR Imaging.

Ei Khouli RH, Jacobs MA, et al:

Radiology 2010; 256 (July): 64-73

Normalized apparent diffusion coefficient values add a statistically significant increase in accuracy for the detection of malignant lesions when used as an adjunct to dynamic contrast-enhanced MRI.

**Background:** The diffusion of water through tissues that have an inherent increased cell density with respect to surrounding or adjacent tissue has been shown to be decreased thereby creating a detectable conspicuous lesion on MRI. It has been shown that diffusion through malignant lesions of the breast is decreased with respect to normal breast tissue.

**Objective:** To evaluate diffusion-weighted imaging (DWI) and apparent diffusion coefficient (ADC) mapping of breast tissue as an adjunct to conventional dynamic contrast-enhanced (DCE) breast MRI.

**Methods:** All breast MRI that was performed at a single institution over a 9-month period was identified. Inclusion criteria into this review consisted of: imaging performed on a 3.0-T magnet; performance of DCE MRI as well as DWI; documented correlative histopathology of identified breast lesions; or lesion stability of ≥2 years to document benignity. In all patients, the same imaging protocol was used on the same MRI machine. A single radiologist retrospectively reviewed the images and identified focal masses or suspicious areas with descriptive terms concordant with the BIRADS lexicon. Time-signal intensity curves were generated for enhancing lesions after a region of interest was placed by this single radiologist over the area of concern. The peak percentage enhancement within the first 2 minutes was assessed for each lesion. The same reader then drew several regions of interest on the corresponding lesions on ADC map images to obtain the absolute ADC value for the lesion. The reader also drew regions of interest of the normal appearing glandular breast tissue on ADC map imaging and the absolute ADC values of the lesions of interest were normalized over the ADC value of the glandular breast tissue. ADC values, both absolute and normalized, were then used in conjunction with DCE MRI images for lesion classification into benign or malignant groups. These were compared with the results of lesion classification based on DCE MRI alone.

**Results/Conclusions:** 101 lesions were included in the study. Normalized ADC values were significantly different between benign and malignant lesions and were more accurate than the absolute ADC values. The addition of normalized ADC values to DCE MRI markedly increased diagnostic accuracy of DCE MRI with the area under the receiver operating characteristic curve reaching 0.98. The false-positive rate also decreased from 36% to 24% with only a 2% increase in the false-negative rate.

**Reviewer's Comments:** The study is yet another in a flood of information corroborating the utility of DWI in assessing breast lesions. The algorithms set forth in papers such as this essentially find their way into future CAD software and understanding the data behind it is fundamental to putting it into practice. (Reviewer-Basil Hubbi, MD).

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Keywords: Diffusion-Weighted Imaging, Apparent Diffusion Coefficient Mapping, Breast MRI, Cancer

Print Tag: Refer to original journal article
Recall rate, sensitivity, and overall accuracy of screening mammography all increased from 1996 to 2004.

**Background:** The community-based Breast Cancer Surveillance Consortium (BCSC) is a publicly available database from 7 geographically distinct mammography registries that are linked to tumor and pathology registries. The data have been mined for over a decade to help understand the delivery and quality of breast cancer screening and its outcomes.

**Objective:** To examine data from 6 of these 7 mammography registries within the BCSC to determine the interpretive performance of screening mammography over an 8-year period.

**Methods:** Data from the BCSC from 1996 to 2004 were collected. A survey of participating facilities had already revealed that nearly 90% were nonacademic institutions. Only screening examinations for women aged 40 to 79 years with at least 9 months separating sequential screenings were included. Individual radiologists were given an anonymous identifier, and demographic information about patients was obtained. All mammograms were classified based on the BI-RADS categories, and breast density was also described based on BI-RADS density categories. Mammographic interpretation was correlated with cancer registry data, and those cancers that developed between screening examinations were noted. Radiologist performance measures that were included consisted of recall rate, sensitivity, specificity, and discrimination as defined as the area under the receiver operating characteristic curve.

**Results/Conclusions:** Approximately 2.54 million screening mammograms were included in the study. Mean age overall was 56 years and remained constant for every year. From 1996 to 2004, recall rates increased from 6.7% to 8.6%, with a big increase occurring in 1996-1997. Sensitivity increased from 71.4% to 83.8%, with a corresponding decrease in specificity from 93.6% to 91.7%. The proportion of digital mammograms began at 3% in 1996 and increased to 12.5% in 2004. The rate of discrimination increased over time as well with the area under the receiver operating characteristic curve increasing from 0.869 to 0.891, suggesting improvement in the ability to discern cancers from non-cancers. There was no change in tumor histology or tumor size over time.

**Reviewer’s Comments:** This is a fun review on the trend of the breast imaging community over an 8-year period. Apparently, we’re getting better at detecting cancers with no particularly obvious reason as to why. The authors hypothesize that the more-universal implementation of MQSA regulations may account for this trend, although there are no hard data to corroborate this. Interestingly, interval tumors that develop between screening examinations have not shown as statistically significant change in histology or size. Is it possible we’re just marginally improving our detection of breast cancer while there remains a group of cancers that simply evade detection for a yet-to-be-determined cause? (Reviewer-Basil Hubbi, MD).
High-, Low-Volume Centers Have Similar Endovascular Tx Outcomes

Similar Safety in Centers With Low and High Volumes of Endovascular Treatments for Unruptured Intracranial Aneurysms: Evaluation of the Analysis of Treatment by Endovascular Approach of Nonruptured Aneurysms Study.

Pierot L, Spelle L, et al:

AJNR Am J Neuroradiol 2010; 31 (June-July): 1010-1014

The outcome of endovascular treatment for unruptured aneurysms is similar when comparing low- and high-volume centers.

Objective: To evaluate the relationship between the outcome and cases per hospital for endovascular treatment of unruptured aneurysms.

Participants: 649 patients with aneurysms to be treated endovascularly were prospectively enrolled from 27 Canadian and French neurointerventional centers. Inclusion criteria included ≥1 unruptured treated aneurysm that was <15 mm.

Methods: Centers were stratified into approximately equal groups. Group A included 13 centers that treated ≤20 patients. Group B included 14 centers that treated >20 patients. Groups were similar with respect to patients’ age, sex, and risk factors. Aneurysms were also similar with respect to location, size, and dome-to-neck ratios between groups as well.

Results: The standard coiling technique was used more frequently in group A, and stent placement was used more frequently in group B. In groups A and B, the rate of adverse events was not statistically different. Rates of thromboembolism and intraoperative rupture as well as device-related complications were also not statistically different between groups. The 1-month mortality and morbidity rates were not statistically different. Median duration of hospital stay was also the same in the 2 groups. Postoperative aneurysm occlusion rates were not statistically different in the 2 groups.

Reviewer’s Comments: This study demonstrated the overall low rate of morbidity and mortality in patients who undergo endovascular treatment of aneurysms. Additionally, the study demonstrated a similarly low rate of complications of endovascular treatment of unruptured intracranial aneurysms in centers that treated >20 aneurysms compared with centers treating ≤20 aneurysms in a similar time interval, namely from June 2005 to October 2006. Prior studies have used discharge data for evaluation of outcomes comparing centers’ endovascularly treating aneurysms. This study used results from a prospective, consecutive multicenter study. Endovascular treatment of aneurysms was performed differently between groups, with the standard coiling technique used more frequently in group A and with stent placement more frequently used in group B, despite similar aneurysm characteristics. This difference may be because high-volume centers may use more complex techniques such as stenting. Morbidity and mortality were similar between groups. A prior study demonstrated a higher morbidity in low-volume centers. This discrepancy may be because the prior study was conducted prior to widespread use of endovascular treatment of aneurysms and many advances in device development since the prior study. Limitations: (1) It was not possible to evaluate results according to specific physician volume as >1 may be involved in the treatment of a single patient. (2) No information of individual physician experience was obtainable. (3) The definition of high- and low-volume centers was arbitrary. (Reviewer-Maureen T. Barry, MD).

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Keywords: Aneurysm, Endovascular Treatment

Print Tag: Refer to original journal article
Restricted Diffusion Correlates With Patient Survival


Objective: To compare FDG-PET and MRI, including apparent diffusion coefficient (ADC) and gadolinium-enhanced MRI, in patients with glial neoplasms and to determine whether diffusion-weighted imaging (DWI) offers any additional information over that of routine MRI and whether the information obtained has any prognostic significance.

Design/Methods: Retrospectively review of 21 patients with glial neoplasms who underwent FDG-PET and MRI with ADC and gadolinium-enhanced images. There were 5 glioblastoma multiformes, 5 anaplastic astrocytomas, 2 anaplastic oligodendrogliomas, 6 low-grade astrocytomas, and 3 low-grade oligodendrogliomas. Regions of interest were drawn around 3 areas: (1) those with increased FDG uptake, (2) those with decreased ADC values, and (3) those with gadolinium enhancement. Additionally, FDG-PET and MRI were co-registered, and pixel-by-pixel comparison of ADC to PET values was performed.

Results: 11 patients had increased FDG-PET uptake, and 10 of these had decreased ADC values as well as gadolinium enhancement. In 60% of patients, there was excellent or good correlation between ADC maps and FDG-PET. There was significant overlap between decreased ADC values and increased FDG-PET uptake compared to that between gadolinium enhancement and increased FDG-PET uptake. The ADC overlap was greater with FDG-PET as compared with gadolinium enhancement in 8 of 9 patients. Restricted diffusion on ADC correlated with patient survival.

Reviewer’s Comments: This paper showed that there is greater correlation between ADC values and FDG-PET compared to FDG-PET and gadolinium enhancement, showing that ADC values provide information that may not be available on routine contrast-enhanced MRI. Also ADC maps are helpful in the evaluation of tumor grade as well as prediction of survival. The authors offer 2 possible explanations. First, FDG-PET and ADC values may measure different parameters. FDG-PET measures increased metabolic activity in high-grade tumors. Highly cellular tumors also have decreased ADC, as there is more restriction to the diffusion of water molecules in high cellular areas. This study shows that higher cellular areas may have increased metabolic activity. Second, increased FDG-PET uptake reflects increased glycolysis in focal areas of ischemia, where rapidly growing cells are located. In this scenario, restricted areas of diffusion may reflect focal ischemia and irreversible cell death. Therefore, ADC values may add information on the physiologic state of the tumor that is complementary to FDG-PET and is not seen on routine contrast-enhanced MRI. This study also showed shorter survival times might be associated with low ADC values, a finding that has been seen in other studies. Limitations: (1) Areas of interest (namely contrast-enhanced areas, areas with restricted diffusion, and FDG-PET positive areas) were not analyzed histologically, immunohistochemically, or with molecular and genetic studies. (2) ADC values were compared with FDG-PET at a single point in time, not followed over time as the tumor progressed. (3) The overall number of high-grade malignant tumors was small. (Reviewer-Maureen T. Barry, MD).

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Keywords: Apparent Diffusion Coefficient, MRI, Glioma, FDG-PET

Print Tag: Refer to original journal article
Ultrasound-Guided Transaxillary Access Is Safe in Children

Ultrasound-Guided Transaxillary Access for Diagnostic and Interventional Arteriography in Children.
Roebuck DJ, Vendhan K, et al:

J Vasc Interv Radiol 2010; 21 (June): 842-847

Transaxillary access in children is safe under ultrasound guidance and is associated with very few non-permanent complications.

Background: Conventional angiography in children can be done for diagnostic or therapeutic purposes. Usually, arterial access is via a common femoral artery, but there are circumstances when the transaxillary approach is indicated.

Objective: To evaluate the safety and efficacy of ultrasound-guided transaxillary arteriography in children.

Design/Methods: Retrospective review of arteriography in children aged >10 years at a children’s hospital. Of 1007 angiograms, 2.5% were via the transaxillary approach. In these 19 children, ages varied between 7 days and 15 years, and weight varied between 2.6 kg and 47.0 kg. The smallest sheath necessary was used, and anticoagulation was used only if there was intervention and the child weighed >10 kg. Upon removal of the sheath, at least 5 minutes of digital compression was used for hemostasis. The clinical record was examined for follow-up and complications.

Results: In three fourths of patients, the access was from the left arm. In 40% of patients, there was additional access via 1 or both femorals because of the complexity of the procedure. Sheath sizes used were 3-F to 7-F. Heparin was used in three fourths of patients. There were 5 complications noted, and only 2 were related to the access site. In 1 child weighing 2.8 kg, there was coolness and pallor of the arm after removal of a 4-F sheath. This resolved after 2 days of systemic heparinization. In a 7-year-old boy treated with heparin during the procedure, a pseudoaneurysm developed 3 days after removal of a 4-F sheath. The pseudoaneurysm spontaneously clotted at day 12 without treatment.

Reviewer’s Comments: This is the first review of this technique in children; axillary access in kids was previously documented in reviews grouped with adults. In kids, the indication is inability to use the femoral approach, but the access from above is beneficial for getting into some arteries because of the angle or shunts. Complications of upper limb ischemia, bleeding, arteriovenous fistula formation, and peripheral nerve damage are concerns with the transaxillary access, particularly in children. Both site-specific complications in this series did not have permanent sequelae. The low incidence seen in this series suggests that site-specific complications should occur in <15% of cases. The left approach is more favorable, because only 1 cerebral artery is crossed. Use of ultrasound and a small access needle, as well as using the smallest sheath possible, help to limit complications. Contraindications include hypertension, uncorrected anticoagulation, and obesity. This review is limited because it was retrospective and may have missed some neurologic symptoms that may have developed. Any neurological symptom should prompt immediate consult for surgical exploration.

(Reviewer-Sharon Gonzales, MD).

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Keywords: Pediatric Angiography, Transaxillary Access, Complications, Arterial Puncture

Print Tag: Refer to original journal article
Renal Stenting Significantly Improves Renal Function in Severe Renal Insufficiency

One Year Clinical Outcomes of Renal Artery Stenting: The Results of ODORI Registry.
Sapoval M, Tamari I, et al:

Cardiovasc Intervent Radiol 2010; 33 (June): 475-483

This is a prospective study registry showing improvement in patient hypertension and improvement in renal function as long as the patient is stage 3 or below (glomerular filtration rate >30 mL/min/1.73 m2).

**Background:** Renal stents are placed in renal arteries frequently for renal revascularization to decrease hypertension or to increase renal function in the presence of a significant stenosis. The efficacy and long-term clinical benefits are unclear.

**Objective/Design:** To present the results of the authors' prospective, multicenter study on the Tsunami stent placed for hypertension and/or renal function in patients with atherosclerotic renal artery stenosis.

**Methods:** In 36 institutions, the ODORI registry was used to enroll patients. There were 12 centers. The primary end point was acute technical success of producing a <30% residual stenosis. Secondary end points included complications, restenosis, improvement in blood pressure, and renal function. Follow-up and ultrasound surveillance was performed.

**Results:** There were 251 patients enrolled. In 100% of the patients, there was technical success. Eighty percent were treated for hypertension and 39% for renal salvage. Combined problems were seen in 25% of the patients. A total of 277 stents were used to treat 276 lesions in 221 patients. In 1 patient there was migration of the stent and dissection of the artery in another patient. There was 1 peri-procedural stent thrombosis resolved by giving thrombolytics. There were 6 additional minor complications periprocedurally that all resolved without intervention or permanent sequel. One death occurred, causing a 0.5% mortality rate. At 6-month follow-up, 4 patients died, only 1 from renal failure. There was only 1 patient who had a restenosis and required a repeat procedure. At 12-month follow-up, 7 more patients died, with 2 dying from renal failure. One other patient had repeat procedure because of restenosis. As for control of hypertension, there was a statistically significant drop from a mean blood pressure of 171/89 down to a mean blood pressure of 142/78 at 6 months and a mean of 140/80 at 12 months. The glomerular filtration rate improved only slightly or worsened in patients with values <30 mL/min/1.73 m2; however, it improved significantly in patients who had values >30 (stages 1 to 3).

**Reviewer's Comments:** Catheter-based therapy is standard treatment for atherosclerotic renal hypertension. In the literature, the benefit from this therapy was still questioned. In this study, the patient's blood pressure was controlled, as well as the mean pulse pressure, which is shown to be an important predictor of mortality. The improvement in renal function was not as uniform, and it seems that renal stenting appears to stabilize the renal function and prevent further deterioration and with that, improving outcome as well as decreasing mortality and the potential poor sequelae of renal failure. This study demonstrates that the Tsunami stent functioned well in this multicenter study for up to 12-month follow-up. There was a great success rate with low complications. (Reviewer-Sharon Gonzales, MD).

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Keywords: Renal Artery Stenting, Renal Revascularization, Renal Insufficiency, Renovascular Dz

Print Tag: Refer to original journal article
Gross Oversizing in Small Aorta With Short Radius of Aortic Arch Can Cause Collapse

Background: Thoracic endovascular repair (TEVAR) is an accepted option to treat thoracic aortic aneurysms, traumatic rupture, and type B dissection. Collapse of the endograft is a potentially catastrophic complication that results in decreased flow to the rest of the body.

Objective: These researchers report their experience and the outcomes.

Design/Methods: Retrospective review was performed of the 16 TEVAR cases performed in the authors' institution. Data for the groups with and without subsequent collapse were compared and analyzed for potential risk factors.

Results: 3 patients (approximately 20%) had stent graft collapse, with this occurring between postoperative days 3 and 8. The first patient had asymptomatic distal collapse, and subsequently had embolization of the left subclavian artery (LSA) and thrombosis of the aneurysm sac. The second patient had a traumatic rupture just distal to the LSA. After 1 week, the aortic graft collapsed proximally, and the patient was treated with an additional proximal stent. The third patient also had traumatic rupture of the aorta just distal to the LSA. Upon deployment, the proximal end of the graft slipped proximally treated by a wallstent placed in the origin of the left common carotid. On day 3, the proximal endograft collapsed and was successfully treated with a stent placed in the proximal graft. Patients with collapse tended to be significantly younger, have smaller diameters of the landing zones, have more oversizing of the graft, and have a smaller radius of the aortic arch.

Reviewer's Comments: TEVAR is a good alternative to open thoracic procedures, but complications such as proximal stent graft collapse can be catastrophic. In this review, there was a 20% incidence of stent graft collapse seen in their population, with 2 out of 3 patients having proximal collapse. Most young trauma patients have smaller aortas, and the grafts available usually are large, thus necessitating significant oversizing of the stent graft in these patients. The companies producing the grafts recommend oversizing of the stent grafts <25%. Gross oversizing in a small aorta with a short radius of the aortic arch can cause collapse. The symptoms of proximal collapse usually are persistent hypertension, chest pain, and distal malperfusion causing renal insufficiency and loss of lower extremity pulses. Stent graft collapse has been noted up to 6 months postprocedure. Balloon dilation is not sufficient; support with an additional stent at the proximal end is necessary to keep the endograft from collapsing. Distal collapse seems to be tolerated better, and may be treated conservatively depending on patient symptoms. This study suggests collapse of the proximal end of the TEVAR stent may be more common in young patients with a small aortic arch diameter, so they recommend using a more flexible prosthesis with less oversizing. (Reviewer-Sharon Gonzales, MD).

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Keywords: TEVAR, Thoracic Endograft, Complications, Endograft Collapse, Endovascular Tx

Print Tag: Refer to original journal article
Is Contrast-Enhanced US Appropriate for Surveillance of EVAR?

Contrast-Enhanced Ultrasound Versus Computed Tomographic Angiography for Surveillance of Endovascular Abdominal Aortic Aneurysm Repair.

Ten Bosch JA, Rouwet EV, et al:

J Vasc Interv Radiol 2010; 21 (May): 638-643

Contrast-enhanced US is a suitable replacement for CT angiography in patients with contraindications provided high-quality technicians are available.

Background: CT imaging has been considered the gold standard in follow-up imaging of patients who have had an endovascular aortic aneurysm repair (EVAR). The routine surveillance protocol calls for imaging 3 months and 12 months after the procedure, with yearly scans afterwards.

Objective: To investigate the accuracy of contrast-enhanced US as an alternative to CT angiography in the follow-up of patients after EVAR with regard to detection of endoleaks and changes in abdominal aortic aneurysm (AAA) dimensions.

Design/Methods: This was a prospective study in which patients who underwent endovascular aortic repair were enrolled for dual-modality imaging between May 2006 and December 2008. Patients who were not eligible for CT due to a contrast allergy or renal insufficiency were excluded.

Results: There was good correspondence in anteroposterior and transverse maximal diameters as determined by the 2 imaging modalities. The mean difference in AAA sac diameters as measured by CT angiography and contrast-enhanced US was 3.2 mm for anteroposterior and 4.1 mm for transverse maximal diameters. There was a statistically significant difference in determination of endoleak presence by CT angiography and contrast-enhanced US. Endoleak was detected by CT angiography in 22% (27 of 127) and by contrast-enhanced US in 53% (67 of 127) of successful cases. In 45 cases, an endoleak was visualized by US but not by CT angiography, while in 5 cases, an endoleak was detected by CT angiography but not by US. The majority of the endoleaks were type II, but contrast-enhanced US also detected 2 additional type I endoleaks. No type III or IV endoleaks were detected in this study population.

Conclusions: Yearly lifelong CT angiography of patients who have had endovascular abdominal aortic repair has 2 major risks, which are adverse effects from ionizing radiation and contrast-induced nephrotoxicity. Although US examinations have fewer biological hazards, operator skill is a major variable, and the scans may be more time consuming. In this study, the measurement of sac diameter was similar between the 2 modalities. Contrast-enhanced US was statistically better in detecting endoleaks, with endoleak detected by CT angiography in 22% and by contrast-enhanced US in 53% of patients. Contrast-enhanced US may be better at detecting endoleaks because of the dynamic nature of the examination.

Reviewer’s Comments: This study does provide evidence that in patients with renal failure or a contrast allergy, contrast-enhanced US may serve well in a role as an alternative to CT angiography. Contrast-enhanced US may be better at detecting endoleaks because of the dynamic nature of the examination; however, a weakness of the study was that there was no mention of the clinical significance of the extra 40 endoleak cases detected by US. (Reviewer-Waseem A. Bhatti, MD).

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Keywords: Angiography, Vascular Interventions

Print Tag: Refer to original journal article
Uterine artery embolization has comparable effectiveness when compared with myomectomy in reducing symptoms related to uterine leiomyomas.

**Background:** Traditional therapy for uterine leiomyomas has consisted of hysterectomy or abdominal myomectomy. Recent studies suggest that uterine artery embolization (UAE) is associated with comparable improvements in symptoms versus abdominal myomectomy. However, very few studies have compared long-term outcomes between these patient populations.

**Objective:** To compare the long-term outcomes in patients who received UAE versus myomectomy based on self-reported patient symptoms and the number of repeat interventions following the initial procedure.

**Design/Participants:** Retrospective cohort study of 247 women who received a UAE or abdominal myomectomy between 2000 and 2002 in a single tertiary care hospital.

**Methods:** The authors were able to contact 185 women; of these women, 87 (47.0%) received UAE and 98 (53.0%) received an abdominal myomectomy. Questionnaires were used to evaluate symptom severity before and after the procedure, pregnancy rates, and satisfaction with the procedure. Chart reviews were performed to supplement analyses. The study has a mean follow-up time of >5 years.

**Results:** After treatment, UAE recipients reported fewer symptoms (score, 15.0) than those who received myomectomies (score, 22.6). There were significant improvements in heavy bleeding, passing blood clots, fluctuations in the duration of menstrual periods, fluctuation in the length of monthly cycles, and feelings of fatigue. Symptoms of tightness or pressure in the pelvic area, frequent urination during daytime hours, and frequent nighttime urination were not significantly improved. Patients who underwent abdominal myomectomies were more likely to have other gynecological procedures after their initial surgery, although the results were not statistically significant. UAE recipients were less likely to attempt to get pregnant, but those who did had a 66.7% success rate compared with 58.8% for patients who underwent myomectomy. There was no difference between the groups when it came to satisfaction with the procedure, reported effectiveness of symptom relief, and recommendation of the procedure to others. Patients who underwent UAE had fewer hospital days and underwent fewer transfusions.

**Conclusions:** This study demonstrates that UAE recipients are more likely to report greater improvements in symptoms and have fewer complications. Most important is that improvements in symptoms persisted during long-term follow-up for patients in both treatment groups. Fewer UAE recipients attempted pregnancy. This is in line with guidelines from the Society of Interventional Radiology that suggest UAE is a relative contraindication for women who wish to retain fertility.

**Reviewer's Comments:** Despite study design weaknesses, the valuable information in the report regarding long-term symptomatic relief with UAE is encouraging. Furthermore, fewer days in the hospital combined with a lower rate of complications serve as supporting factors for UAE. (Reviewer-Waseem A. Bhatti, MD).

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Keywords: Uterine Artery Embolization, Abdominal Myomectomy, Outcomes

Print Tag: Refer to original journal article
Flobetapir May Be Successful Imaging Agent From Scientific Point of View

**Background:** The amyloid-beta (Abeta) peptide plays an important role in the development of Alzheimer disease (AD) and is a promising target for novel treatment. A reliable biomarker for this protein would be very useful. A prior imaging agent, known as Pittsburgh compound B, has encouraging features, but is limited by its short-lived 11C radiolabel.

**Objective:** Initial characterization of the safety, metabolism, and imaging features of a new 18F-labeled radiopharmaceutical for imaging of Aβ peptide.

**Design:** Open-label, multicenter trial.

**Participants:** 16 patients aged >50 years with a probable diagnosis of AD and 16 healthy controls of similar age and without evidence of cognitive impairment were included.

**Methods:** Similar methods were obtained at each of 3 sites. Approximately 10 mCi of 18F-labeled Flobetapir was injected intravenously. Dynamic images were obtained over a subsequent 90 minutes; plasma metabolites were also analyzed. In a subset of 4 of the healthy control subjects, whole-body scans for the purpose of calculating preliminary dosimetry were obtained between 20 and 45 minutes and again from 160 to 185 minutes. Image data were registered to Talairach space. Volumes of interest were developed in the high-flow regions of the frontal, temporal, parietal, occipital, anterior cingulate, posterior cingulate, and precuneus cortical gray matter. Absolute standardized uptake values (SUVs) were generated for each time point, and SUV ratios were also calculated using either the cerebellar gray matter or the centrum semiovale white matter as references. In a subset of patients in whom adequate MRI scans were available, kinetic modeling was performed to estimate a distribution volume ratio, using the cerebellum as a reference.

**Results:** 1 AD patient withdrew consent after 5 minutes in the scanner; there were 5 technical failures, 4 of which were due to motion in AD patients. Flobetapir was well tolerated without safety concerns. Flobetapir accumulated in cortical regions of AD patients (especially precuneus, frontal, and temporal cortices), while minimal accumulation was seen in controls. Cortical to cerebellar ratios increased through 30 minutes and then plateaued within 50 minutes. The 50- to 60-minute period was used for further analysis. SUV ratio to cerebellum was 1.67 for AD patients versus 1.25 for controls. The distribution volume ratios were highly correlated with SUV ratios, and differences between groups were statistically significant.

**Conclusions:** Flobetapir appears useful in localizing to areas of probable Abeta plaques in a noninvasive and safe manner. Imaging 50 to 60 minutes following injection appears to be an optimal and tolerable approach.

**Reviewer's Comments:** This paper and other reports suggest that Flobetapir is likely to be a successful imaging agent from a scientific point of view. Whether it will be clinically successful will depend on what niche it will occupy in the diagnosis and treatment of AD. (Reviewer-Lionel S. Zuckier, MD).

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Keywords: Alzheimer Disease, PET Imaging, 18F, Amyloid Plaques

Print Tag: Refer to original journal article
Diabetic myopathy can occur in patients with either type I or type II diabetes mellitus.

**Objective:** To correlate MRI findings of lower extremity diabetic myopathy with the clinical data and laboratory findings of diabetes mellitus.

**Methods:** The authors retrospectively pulled the reports of the MRI studies of the lower extremities performed at their institution over a period of 7 years, selecting patients with findings consistent with diabetic myopathy (myositis, atrophy, findings consistent with muscle ischemia/infarction). Clinical data, including patient history, laboratory findings, and imaging findings, were reviewed.

**Results:** A total of 16 patients were included in this study, and a total of 21 MRI examinations of the lower extremities were performed (11 thighs, 10 calves). All subjects carried a diagnosis of diabetes for ≥7 years. Fourteen patients had type II diabetes, while only 2 had type I. Nephropathy was present in 50% of the patient population. In all 11 thighs, the anterior compartment was involved; in 9 of 10 calves, the posterior compartment was affected. Imaging findings included subcutaneous edema, subfascial fluid, rim enhancement of the affected muscle, and areas of increased T1 signal intensity.

**Conclusions:** Diabetic myopathy appears to occur more frequently in patients with longstanding, poorly controlled type II diabetes. The authors claim that gadolinium contrast should not be used routinely, as it does not alter management, and too many patients have underlying nephropathy.

**Reviewer's Comments:** This article confirms much of what has been noted in previous studies. The small sample size is a limitation, but previous studies were similarly unable to generate a large sample. The authors' results differ in 1 notable aspect from other similar studies. Their population contained a greater number of type II diabetic patients. This may be related to the growing incidence and earlier onset of type II diabetes, to differences in nomenclature and classification among various studies (juvenile onset, insulin-dependent, etc), or to sampling error, as the study was not designed to evaluate the incidence of diabetic myopathy in the respective populations of type I and II diabetics. Suffice it to say, diabetic myopathy is a complication that can occur in both type I and II diabetics. The authors also rightly point out that the imaging findings in diabetic myopathy overlap with other entities, including necrotizing fasciitis. In instances when the clinical scenario is vague, I would be cautious and offer a differential diagnosis. Finally, the article rightly notes that gadolinium should be avoided in this population, due to the risk of nephrogenic systemic sclerosis and low incremental diagnostic yield. (Reviewer-John Hochhold, MD).

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Keywords: Diabetes Mellitus, Diabetic Myopathy, MRI Patterns

Print Tag: Refer to original journal article
Can MRI Reliably Distinguish Subchondral Insufficiency Fracture, Osteonecrosis of Femoral Head?

MRI Evaluation of Collapsed Femoral Heads in Patients 60 Years Old or Older: Differentiation of Subchondral Insufficiency Fracture From Osteonecrosis of the Femoral Head.

Ikemura S, Yamamoto T, et al:
AJR Am J Roentgenol 2010; 195 (July): W63-W68

In older patients with subchondral collapse of the femoral head on x-ray, a concave band of linear, low T1 signal intensity on MRI correlates with osteonecrosis, whereas a convex band is suggestive of a subchondral insufficiency fracture.

**Objective:** To distinguish subchondral insufficiency fracture from osteonecrosis of the femoral head in patients ≥60 years of age with radiographic evidence of subchondral collapse.

**Design/Participants:** Retrospective study of 30 patients aged ≥60 years with radiographic evidence of subchondral collapse of the femoral head.

**Methods:** All patients underwent plain film radiography and MRI examinations prior to undergoing hip arthroplasty and histopathologic analysis of the affected hip. MRI examinations were reviewed by 3 radiologists in a blinded fashion.

**Results:** All 16 patients with osteonecrosis on histopathologic analysis demonstrated a well-demarcated, concave band of low T1 signal intensity in the hip. Of 14 subjects in the subchondral insufficiency fracture group, all were women without a history of alcohol abuse, and only 2 had a history of corticosteroid use. MRI in the 14 patients with a final histopathologic diagnosis of subchondral insufficiency fracture revealed a convex, serpiginous band of low T1 signal intensity.

**Conclusions:** The morphology of the linear band of low T1 signal intensity in patients with radiographic evidence of subchondral collapse is a useful tool in distinguishing between osteonecrosis and subchondral insufficiency fracture. Clinical factors associated with subchondral insufficiency fracture include female gender, age ≥60 years, and the absence of alcohol abuse or corticosteroid use.

**Reviewer's Comments:** The clinical data associated with subchondral insufficiency fractures in this study are consistent with previously reported findings. The pattern the authors describe of low T1 signal intensity on MRI is also useful, but must be applied in the appropriate clinical setting. The authors rightly point out 2 limitations to this study, namely that the sample size consisted of only 30 subjects and that a very specific population was selected (ie, patients aged ≥60 years with radiographic evidence of subchondral collapse). Something the authors did not address was whether distinguishing between a subchondral insufficiency fracture and osteonecrosis in the setting of subchondral collapse makes a difference in terms of management. It should be noted that osteonecrosis is a progressive disorder, whereas subchondral insufficiency fractures may respond to conservative measures without progressing to complete collapse of the femoral head. In their study, all patients underwent hip arthroplasty, so the management end point was the same. I would also keep in my mind that avascular necrosis of the hip is many times more common than subchondral insufficiency fracture.

(Reviewer-John Hochhold, MD).

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**Keywords:** Osteonecrosis, Subchondral Insufficiency Fracture, MRI, Femoral Head

**Print Tag:** Refer to original journal article