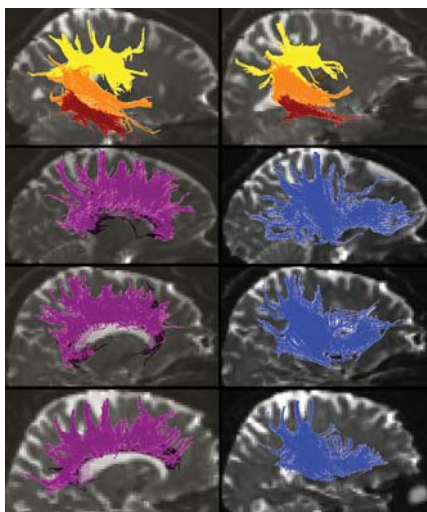


# Radiology

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The cover images are from the article by Stadlbauer et al (pp 179–188).

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### Science to Practice

#### 1 Science to Practice: What Can <sup>31</sup>P MR Spectroscopy Tell Us about Muscle Disease?

Diana Lindquist

<sup>31</sup>P MR spectroscopy is a useful tool for investigating various muscular diseases, such as mitochondrial myopathies, as well as changes in muscular function in systemic diseases, such as heart disease.

### Reviews and Commentary

#### Perspectives 3 Globalization of Health Care

James H. Thrall

The globalization of radiologic professional services has not hurt U.S. radiologists economically and, to the extent that it has helped address onerous on-call work, has probably been a net plus for quality of work life and practice coverage issues.

#### Editorial 8 Imaging Technology and Practice Assessment Studies: Importance of the Baseline or Reference Performance Level

David Gur

This editorial will address but one important issue related to inferences made as a result of pivotal studies that I believe has been largely ignored: namely, the performance level of the reference (often termed *baseline* or *current*) technology or practice.

#### Opinion 12 Comparing Areas under Receiver Operating Characteristic Curves: Potential Impact of the “Last” Experimentally Measured Operating Point

David Gur, Andriy I. Bandos, and Howard E. Rockette

In the case of nonparametric analyses of differences in areas under the receiver operating characteristic curve (AUCs), the last experimentally ascertained operating point can significantly affect AUC estimates in a manner that could result in different study conclusions, as compared with AUC estimates derived when using the parametric approach.

#### State of the Art 16 Whole-Body High-Field-Strength (3.0-T) MR Imaging in Clinical Practice: Part II—Technical Considerations and Clinical Applications

Christiane K. Kuhl, Frank Träber, Jürgen Gieseke, Wolfgang Drahanowsky, Nuschin Morakkabati-Spitz, Winfried Willinek, Marcus von Falkenhausen, Christoph Manka, and Hans H. Schild

At the time of this writing, there has been relatively little published evidence available regarding the added clinical value of high-field-strength systems, and even regarding the seemingly simpler issue of image quality, 3.0-T systems may not always live up to user expectations.

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| <b>Cardiac Imaging</b>         | <b>49</b> | <b>Reperfused Myocardial Infarction: Contrast-enhanced 64-Section CT in Comparison to MR Imaging</b><br>Koen Nieman, Michael D. Shapiro, Maros Ferencik, Cesar H. Nomura, Suhny Abbara, Udo Hoffmann, Herman K. Gold, Ik-Kyung Jang, Thomas J. Brady, and Ricardo C. Cury<br><br>Multidetector CT allows imaging of early and late myocardial hypoenhancement after reperfused myocardial infarction, with good correlation with MR imaging, although imaging of delayed hyperenhancement at multidetector CT has inferior contrast-to-noise ratios.  |
|                                | <b>57</b> | <b>Diagnostic Performance of Myocardial Perfusion MR at 3 T in Patients with Coronary Artery Disease</b><br>Rolf Gebker, Cosima Jahnke, Ingo Paetsch, Sebastian Kelle, Bernhard Schnackenburg, Eckart Fleck, and Eike Nagel<br><br>Myocardial perfusion MR imaging by using saturation-recovery spoiled gradient-echo imaging at 3 T has an accuracy of 84%–86% for depicting hemodynamically relevant coronary stenosis in patients with suspected or known coronary artery disease.   |
| <b>Evidence-based Practice</b> | <b>64</b> | <b>Inflammatory Bowel Disease Diagnosed with US, MR, Scintigraphy, and CT: Meta-analysis of Prospective Studies</b><br>Karin Horsthuis, Shandra Bipat, Roelof J. Bennink, and Jaap Stoker<br><br>Because the accuracy values for US, MR imaging, scintigraphy, and CT were comparable in this meta-analysis, it might be justified to make a well-considered choice for either of these techniques based on their specific advantages and disadvantages.  |
| <b>Experimental Studies</b>    | <b>80</b> | <b>Microwave Ablation with Triaxial Antennas Tuned for Lung: Results in an in Vivo Porcine Model</b><br>Nathan A. Durick, Paul F. Laeseke, Lynn S. Broderick, Fred T. Lee, Jr, Lisa A. Sampson, Tina M. Frey, Thomas F. Warner, Jason P. Fine, Daniel W. van der Weide, and Christopher L. Brace<br><br>Our study results demonstrate the feasibility of tissue-specific microwave ablation for creating large zones of coagulation in normal porcine lung tissue with use of a small-diameter (17-gauge) triaxial antenna.   |
|                                | <b>88</b> | <b>Iodixanol 320 Results in Better Renal Tolerance and Radiodensity than Do Gadolinium-based Contrast Media: Arteriography in Ischemic Porcine Kidneys</b><br>Barbara Elmståhl, Ulf Nyman, Peter Leander, Klaes Golman, Chun-Ming Chai, Derek Grant, Richard Doughty, Rikard Pehrson, Jonas Björk, and Torsten Almén<br><br>Plasma iso-osmotic nonionic iodine-based contrast media at commercially available concentrations seem to have a superior attenuation and nephrotoxic profile compared with equal volumes of plasma hyperosmotic nonionic 0.5–1.0 mol/L gadolinium-based contrast media when performing renal arteriographic procedures.   |

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**98 Monte Carlo and Phantom Study of the Radiation Dose to the Body from Dedicated CT of the Breast**

Ioannis Sechopoulos, Srinivasan Vedantham, Sankararaman Suryanarayanan, Carl J. D'Orsi, and Andrew Karellas

The higher-energy spectra used in dedicated breast CT imaging result in higher doses to the organs and tissues of the body compared with those resulting from planar mammography.

**106 Respiratory Motion and Cardiac Arrhythmia Effects on Diagnostic Accuracy of Myocardial Delayed-enhanced MR Imaging in Canines**

Burkhard Sievers, Wolfgang G. Rehwald, Timothy S. E. Albert, Manesh R. Patel, Michele A. Parker, Raymond J. Kim, and Robert M. Judd

In the setting of a steady heart rate and an ability to hold breath, segmented inversion-recovery pulse sequences are superior to subsecond (single-shot) delayed-enhancement (DE) MR imaging techniques, and in the setting of incorrect cardiac gating and/or an inability to hold breath, subsecond DE MR imaging techniques are preferred.

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Imaging**115 Pancreatic Perfusion: Noninvasive Quantitative Assessment with Dynamic Contrast-enhanced MR Imaging without and with Secretin Stimulation in Healthy Volunteers—Initial Results**

Maria Antonietta Bali, Thierry Metens, Vincent Denolin, Viviane De Maertelaer, Jacques Devière, and Celso Matos

Dynamic contrast-enhanced MR imaging enables quantitative measurements of regional pancreatic perfusion both in resting conditions and during exogenous secretin stimulation.

**122 CT Colonography with Limited Bowel Preparation: Performance Characteristics in an Increased-Risk Population**

Sebastiaan Jensch, Ayso H. de Vries, Jan Peringa, Shandra Bipat, Evelien Dekker, Lubbertus C. Baak, Joep F. Bartelsman, Anneke Heutinck, Alexander D. Montauban van Swijndregt, and Jaap Stoker

CT colonography with limited bowel preparation in a population at increased risk for colorectal cancer had a sensitivity and specificity of 82% (14 of 17) and 97% (146 of 151), respectively, for patients with polyps 10 mm or larger.

**133 CT Colonography and Computer-aided Detection: Effect of False-Positive Results on Reader Specificity and Reading Efficiency in a Low-Prevalence Screening Population**

Stuart A. Taylor, Rebecca Greenhalgh, Rajapandian Ilangovan, Emily Tam, Vikram A. Sahni, David Burling, Jie Zhang, Paul Bassett, Perry J. Pickhardt, and Steve Halligan

We found no evidence that increasing numbers of computer-aided detection false-positive marks adversely influenced either correct reader case classification or diagnostic confidence, but they did prolong reporting times.

Genitourinary  
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David A. McKenna, Fergus V. Coakley, Antonio C. Westphalen, Shoujun Zhao, Ying Lu, Emily M. Webb, Barby Pickett, Mack Roach III, and John Kurhanewicz

The presence and degree of extracapsular extension at MR imaging prior to external-beam radiation therapy are important predictors of posttreatment metastatic recurrence; in particular, patients with extracapsular extension of more than 5 mm may be potential candidates for more aggressive therapy such as radiation dose escalation or extended androgen deprivation.

**147 Physiology of Renal Medullary Tip Hyperattenuation at Unenhanced CT: Urinary Specific Gravity and the NaCl Concentration Gradient**

Christopher T. Hsu, Zhen J. Wang, Alan S. L. Yu, Robert G. Gould, Yanjun Fu, Bonnie N. Joe, Aliya Qayyum, Richard S. Breiman, Fergus V. Coakley, and Benjamin M. Yeh

The presence of renal medullary tip hyperattenuation at unenhanced CT correlates with increased urinary specific gravity and may be related to higher medullary NaCl concentration gradients.

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- Musculoskeletal Imaging 154** **Cartilage T2 Assessment at 3-T MR Imaging: In Vivo Differentiation of Normal Hyaline Cartilage from Reparative Tissue after Two Cartilage Repair Procedures—Initial Experience**  
Goetz H. Welsch, Tallal C. Mamisch, Stephan E. Domayer, Ronald Dorotka, Florian Kutscha-Lissberg, Stefan Marlovits, Lawrence M. White, and Siegfried Trattnig  
With the underlying assumption that reported histologic biopsy specimens obtained at postoperative follow-up arthroscopy in prior studies have shown more fibrocartilage after microfracture therapy and more hyaline-like cartilage after matrix-associated autologous chondrocyte transplantation, our findings may suggest that quantitative T2 mapping can provide information about the structures of different cartilage repair tissues.
- 162** **<sup>31</sup>P MR Spectroscopic Assessment of Muscle in Patients with Myasthenia Gravis before and after Thymectomy: Initial Experience**  
Sheung-Fat Ko, Chung-Cheng Huang, Ming-Jang Hsieh, Shu-Hang Ng, Chen-Chang Lee, Chih-Chia Lee, Tsu-Kung Lin, Min-Chi Chen, and Liangshiu Lee  
The results of this <sup>31</sup>P MR spectroscopic study indicated that patients with moderate to severe myasthenia gravis exhibited muscular oxidative metabolic abnormalities, which occur during exercise with a shift to glycolytic metabolism, and these abnormalities and shift were reversible after thymectomy.
- Neuroradiology 170** **Low-Grade Gliomas: Do Changes in rCBV Measurements at Longitudinal Perfusion-weighted MR Imaging Predict Malignant Transformation?**  
Nasuda Danchaivijitr, Adam D. Waldman, Daniel J. Tozer, Christopher E. Benton, Gisele Brasil Caseiras, Paul S. Tofts, Jeremy H. Rees, and H. Rolf Jäger  
We have demonstrated that increases in relative cerebral blood volume (rCBV) precede the development of contrast enhancement by at least 12 months in transforming low-grade gliomas; rCBV increase is therefore likely to provide an earlier noninvasive indicator of malignant progression.
- 179** **Age-related Degradation in the Central Nervous System: Assessment with Diffusion-Tensor Imaging and Quantitative Fiber Tracking**  
Andreas Stadlbauer, Erich Salomonowitz, Guido Strunk, Thilo Hammen, and Oliver Ganslandt  
We found that quantitative evaluation of fiber-tracking results enabled us to identify differences in age-related changes in diffusivity parameters and fiber characteristics between different fiber structures.
- Nuclear Medicine 189** **Bone Metastases in Patients with Metastatic Breast Cancer: Morphologic and Metabolic Monitoring of Response to Systemic Therapy with Integrated PET/CT**  
Ukhide Tateishi, Cristina Gamez, Shaheenah Dawood, Henry W. D. Yeung, Massimo Cristofanilli, and Homer A. Macapinlac  
Our study results provide evidence that the change in standardized uptake value of bone metastasis after treatment is highly predictive of response duration in patients with metastatic breast cancer.
- Obstetric Imaging 197** **Fetal Body Volume at MR Imaging to Quantify Total Fetal Lung Volume: Normal Ranges**  
Mieke M. Cannie, Jacques C. Jani, Filip Van Kerkhove, Joke Meerschaert, Frederik De Keyzer, Liesbeth Lewi, Jan A. Deprest, and Steven Dymarkowski  
We demonstrated that total fetal lung volume can be predicted from fetal body volume irrespective of fetal growth and gestational age.
- Pediatric Imaging 204** **Hypoxic-Ischemic Encephalopathy: Diagnostic Value of Conventional MR Imaging Pulse Sequences in Term-born Neonates**  
Lishya Liauw, Jeroen van der Grond, Annette A. van den Berg-Huysmans, Inge H. Palm-Meinders, Mark A. van Buchem, and Gerda van Wezel-Meijler  
The combination of T1- and T2-weighted MR imaging and diffusion-weighted imaging is best for the detection of hypoxic-ischemic brain injury in the early neonatal period in term-born infants.

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<b>Special Report</b>	<p><b>213 Impact of the National Institutes of Health on Radiology Research</b> Michael W. Itagaki</p> <p>Large and increasing proportions of U.S. radiology clinical trials and cancer and neurologic disease research are directly funded by the National Institutes of Health and thus may be strongly affected by future National Institutes of Health budget cuts.</p>
<b>Technical Developments</b>	<p><b>220 Coronary Artery Anomalies and Variants: Technical Feasibility of Assessment with Coronary MR Angiography at 3 T</b> Ahmed M. Gharib, Vincent B. Ho, Douglas R. Rosing, Daniel A. Herzka, Matthias Stuber, Andrew E. Arai, and Roderic I. Pettigrew</p> <p>To our knowledge, this is the first study to demonstrate the feasibility of performing free-breathing three-dimensional whole-heart coronary 3-T MR angiography in the clinical assessment of coronary arterial anomalies and variants.</p> <p><b>228 Isotropic High-Spatial-Resolution Contrast-enhanced 3.0-T MR Angiography in Patients Suspected of Having Renal Artery Stenosis</b> Ulrich Kramer, Jakob Wiskirchen, Michael C. Fenchel, Achim Seeger, Gerhard Laub, Gunnar Tepe, J. Paul Finn, Claus D. Claussen, and Stephan Miller</p> <p>Owing to its high sensitivity, contrast-enhanced renal MR angiography performed at 3 T can be used to detect renal artery stenosis and thus has potential as a screening method in the diagnostic work-up of patients with arterial hypertension.</p> <p><b>241 Semiautomated Quantification of the Mass and Distribution of Vascular Calcification with Multidetector CT: Method and Evaluation</b> Raghav Raman, Bhargav Raman, Sandy Napel, and Geoffrey D. Rubin</p> <p>Our algorithm showed promise for use as a tool to facilitate studies of the relationship between the quantity and distribution of systemic arterial calcification in a variety of patient subtypes.</p>
<b>Thoracic Imaging</b>	<p><b>251 Nonspecific Interstitial Pneumonia and Idiopathic Pulmonary Fibrosis: Changes in Pattern and Distribution of Disease over Time</b> C. Isabela S. Silva, Nestor L. Müller, David M. Hansell, Kyung S. Lee, Andrew G. Nicholson, and Athol U. Wells</p> <p>At 3 years or longer follow-up, 28% of patients with initial CT findings suggestive of nonspecific interstitial pneumonia progress to findings suggestive of idiopathic pulmonary fibrosis.</p>
<b>Vascular and Interventional Radiology</b>	<p><b>260 Early-Stage Hepatocellular Carcinoma: Radiofrequency Ablation Combined with Chemoembolization versus Hepatectomy</b> Koichiro Yamakado, Atsuhiko Nakatsuka, Haruyuki Takaki, Hajime Yokoi, Masanobu Usui, Hiroyuki Sakurai, Shuji Isaji, Katsuya Shiraki, Hiroyuki Fuke, Shinji Uemoto, and Kan Takeda</p> <p>Our study results show that radiofrequency ablation combined with chemoembolization provides overall and recurrence-free survival rates comparable to those achieved with hepatectomy in patients with early-stage hepatocellular carcinoma.</p> <p><b>267 De Novo Superficial Femoropopliteal Artery Lesions: Peripheral Cutting Balloon Angioplasty and Restenosis Rates—Randomized Controlled Trial</b> Jasmin Amighi, Martin Schillinger, Petra Dick, Oliver Schlager, Schila Sabeti, Wolfgang Mlekusch, Markus Haumer, Rainer Mathies, Gerald Heinze, Antonius Schuster, Christian Loewe, Renate Koppensteiner, Johannes Lammer, Erich Minar, and Manfred Cejna</p> <p>Cutting balloon angioplasty did not prove to be superior to conventional percutaneous transluminal angioplasty for treatment of short de novo superficial femoropopliteal artery disease, and it even yielded a higher rate of restenosis at 6 months.</p>

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Gilles Soulez, Mieczyslaw Pasowicz, Giorgio Benea, Luigi Grazioli, Juan Pablo Niedmann, Marek Konopka, Philippe C. Douek, Giovanni Morana, Fritz K. W. Schaefer, Angelo Vanzulli, David A. Bluemke, Jeffrey H. Maki, Martin R. Prince, Günther Schneider, Claudio Ballarati, Richard Coulden, Martin N. Wasser, Thomas R. McCauley, Miles A. Kirchin, and Gianpaolo Pirovano

Our study results confirm that gadobenate dimeglumine at a dose of 0.1 mmol/kg is a safe gadolinium-based contrast agent for use in contrast-enhanced MR angiography of the renal arteries and provides an overall accuracy of 80%–87% for the detection of significant steno-occlusive disease.

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**288 Case 132: Lymphangiomas**

Prachi P. Agarwal, Frederick R. K. Matzinger, and Jean M. Seely

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Justin Q. Ly

A fourth tendinous structure will be seen at the medial ankle, located directly posterior to the medial malleolus, when the posterior tibial tendon is longitudinally split with separation of the components, giving the appearance of two separate tendons and a total of four medial ankle tendons.

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