

Commentary

The four abstracts selected for this issue are all from an abdominal imaging theme. All four emphasise the performance of newer modalities such as ultrasound and CT in the imaging of pathologies that have long been associated with x-ray based imaging.

The first abstract is from a meta-analysis of original studies evaluating the use of ultrasound, magnetic resonance, scintigraphy and CT in the diagnosis and follow up of Inflammatory Bowel Disease. Imaging of IBD has been associated with barium studies all of which deliver a significant radiation dose. This meta analysis published in *Radiology* analysed results from 34 studies and concluded that there was no significant difference between the performance of ultrasound and MR as compared to CT. It concludes that since the patient with IBD require repeated imaging, selection of studies that do not require ionising radiation is to be preferred. These conclusions are equally valid in our scenario when extrapolated to intestinal tuberculosis.

The second abstract is from an educational exhibit from *Radiographics*. This is an excellent review of bowel abnormalities in children as demonstrated on CT. This is to be recommended for people involved in CT imaging and particularly for those coming up for exams.

The third abstract is from *American Journal of Roentology* in which Gaitini et al report their findings in a group of 420 patients being investigated for acute appendicitis. They compare the results of Colour Doppler Ultrasound and Multidetector CT. Their conclusion is that although the sensitivity and specificity of MDCT is better than US, the performance of Colour Doppler ultrasound is sufficient to recommend this as the initial test for suspected acute appendicitis.

The fourth abstract is from *Radiology* which shows that Time of Flight Magnetic Resonance Angiography has a reputation for over estimating percentage Stenosis. Contrast Enhanced Magnetic Resonance Angiography (CEMRA) performs better but still tends to overcall percentage Stenosis. These statements apply to all segments of the arterial tree but are particularly true for renal arteries. A paper by Soulez et al from Montreal re-enforces this limitation. They report their experience in 293 patients. Compared to DSA, the sensitivity, specificity, and accuracy of CE MR angiography for detection of 51% or greater stenosis or occlusion were 60.1%–84.1%, 89.4%–94.7%, and 80.4%–86.9%, respectively, at segment level. In other words a normal CEMRA is likely to be normal but an abnormal CEMRA needs further evaluation.

Zafar Sajjad

Associate Professor Radiology

Aga Khan university hospital, Karachi.

Radiology 2008;247:64-79

Karin Horsthuis¹, MD, Shandra Bipat, MSc, PhD, Roelof J. Bennink, MD, PhD, and Jaap Stoker, MD, PhD

¹From the Departments of Radiology (K.H., S.B., J.S.) and Nuclear Medicine (R.J.B.), Academic Medical Center, Meibergdreef 9, 1105 AZ Amsterdam, the Netherlands. Received April 3, 2007; revision requested June 1; revision received June 27; accepted July 19; final version accepted September 24. Address correspondence to K.H. (e-mail: k.horsthuis@amc.uva.nl)

Inflammatory Bowel Disease Diagnosed with US, MR, Scintigraphy, and CT: Meta-analysis of Prospective Studies

PURPOSE: To compare, by performing a meta-analysis, the accuracies of ultrasonography (US), magnetic resonance (MR) imaging, scintigraphy, computed tomography (CT), and positron emission tomography (PET) in the diagnosis of inflammatory bowel disease (IBD).

MATERIALS AND METHODS: MEDLINE, EMBASE, CINAHL, and Cochrane databases were searched for

studies on the accuracy of US, MR imaging, scintigraphy, CT, and PET, as compared with a predefined reference standard, in the diagnosis of IBD. Sensitivity and specificity estimates were calculated on per-patient and per-bowel-segment bases by using a bivariate random-effects model.

RESULTS: Thirty-three studies, from a search that yielded 1406 articles, were included in the final analysis.

Mean sensitivity estimates for the diagnosis of IBD on a per-patient basis were high and not significantly different among the imaging modalities (89.7%, 93.0%, 87.8%, and 84.3% for US, MR imaging, scintigraphy, and CT, respectively). Mean per-patient specificity estimates were 95.6% for US, 92.8% for MR imaging, 84.5% for scintigraphy, and 95.1% for CT; the only significant difference in values was that between scintigraphy and US ($P = .009$). Mean per-bowel-segment sensitivity estimates were lower: 73.5% for US, 70.4% for MR imaging, 77.3% for scintigraphy,

and 67.4% for CT. Mean per-bowel-segment specificity estimates were 92.9% for US, 94.0% for MR imaging, 90.3% for scintigraphy, and 90.2% for CT. CT proved to be significantly less sensitive and specific compared with scintigraphy ($P = .006$) and MR imaging ($P = .037$). **CONCLUSION:** No significant differences in diagnostic accuracy among the imaging techniques were observed. Because patients with IBD often need frequent reevaluation of disease status, use of a diagnostic modality that does not involve the use of ionizing radiation is preferable

Radiographics 2008; 28:727-746

Maria d'Almeida¹, MD, Jean Jose, DO, Julieta Oneto, MD, and Ricardo Restrepo, MD

¹ From the Department of Radiology, Miami Children's Hospital, 3100 SW 62nd Ave, Miami, FL 33155. Presented as an education exhibit at the 2005 RSNA Annual Meeting. Received October 9, 2006; revision requested November 9 and received August 20, 2007; accepted November 9. All authors have no financial relationships to disclose. Address correspondence to R.R. (e-mail: Ricardo.Restrepo@mch.com).

Bowel Wall Thickening in Children: CT Findings

A wide variety of bowel diseases, some of which are unique to or more prevalent in pediatric patients, may manifest with intestinal wall thickening at computed tomography (CT). Common causes of bowel wall thickening include edema, hemorrhage, infection, graft-versus-host disease, and inflammatory bowel disease; more unusual causes include immunodeficiencies, lymphoma, hemangioma, pseudotumor, and Langerhans cell histiocytosis. Radiologists must be familiar with the CT signs of bowel disease and should take careful note of the bowel characteristics (eg, extent and distribution of disease involvement, bowel

dilatation, mural stratification, perienteric findings) to generate an adequate differential diagnosis. The study should be tailored and optimized in advance according to the clinical scenario to decrease radiation exposure due to repeated or delayed scanning. With spiral CT scanners, studies can be performed quickly, thereby eliminating the need for sedation, and multiple reconstructed images can be generated. CT is an invaluable diagnostic tool in the evaluation of pediatric diseases involving the bowel, in spite of the use of ionizing radiation.

American Journal of Roentgenology 2008;190:1300-1306

Diana Gaitini^{1,2}, Nira Beck-Razi¹, David Mor-Yosef², Doron Fischer¹, Ofer Ben Itzhak^{2,3}, Michael M. Krausz^{2,4} and Ahuva Engel^{1,2}

¹ Department of Medical Imaging, Rambam Health Care Campus, POB 9602, Haifa 31906, Israel.

² The Ruth and Bruce Rappaport Faculty of Medicine, Technion-Israel Institute of Technology, Haifa, Israel.

³ Department of Pathology, Rambam Health Care Campus, Haifa, Israel.

⁴ Department of Surgery A, Rambam Health Care Campus, Haifa, Israel.

Diagnosing Acute Appendicitis in Adults: Accuracy of Color Doppler Sonography and MDCT Compared with Surgery and Clinical Follow-Up

OBJECTIVE: The objective of our study was to evaluate the accuracy of color Doppler sonography and contrast-enhanced MDCT in the diagnosis of acute appendicitis in adults and their utility as a triage tool in lower

abdominal pain.

MATERIALS AND METHODS: We reviewed the medical records of 420 consecutive adult patients, 271 women and 149 men, 18 years old or older, referred

from the emergency department to sonography examination for clinically suspected acute appendicitis between January 2003 and June 2006. Patients underwent sonography of the right upper abdomen and pelvis followed by graded compression and color Doppler sonography of the right lower quadrant. CT was performed in 132 patients due to inconclusive sonography findings or a discrepancy between the clinical diagnosis and the sonography diagnosis. Sonography and CT reports were compared with surgery or clinical follow-up as the reference standard. Statistical analyses were performed by Pearson's chi-square test and cross-tabulation software.

RESULTS: Sonography and CT correctly diagnosed acute appendicitis in 66 of 75 patients and in 38 of 39

patients, respectively, and correctly denied acute appendicitis in 312 of 326 and in 92 of 92 patients. Sonography was inconclusive in 17 of 418 cases and CT, in one of 132 cases. Sonography and CT allowed alternative diagnoses in 82 and 42 patients, respectively. Sensitivity, specificity, positive predictive value, negative predictive value, and accuracy for sonography were 74.2%, 97%, 88%, 93%, and 92%, respectively, and for CT, 100%, 98.9%, 97.4%, 100%, and 99%.

CONCLUSION: Sonography should be the first imaging technique in adult patients for the diagnosis of acute appendicitis and triage of acute abdominal pain. CT should be used as a complementary study for selected cases.

Radiology 2008; 247:273-285

Gilles Soulez¹, MD, MSc, Mieczyslaw Pasowicz, MD, Giorgio Benea, MD, Luigi Grazioli, MD, Juan Pablo Niedmann, MD, Marek Konopka, MD, Philippe C. Douek, MD, Giovanni Morana, MD, Fritz K. W. Schaefer, MD, Angelo Vanzulli, MD, David A. Bluemke, MD, Jeffrey H. Maki, MD, Martin R. Prince, MD, PhD, Günther Schneider, MD, PhD, Claudio Ballarati, MD, Richard Coulden, MD, Martin N. Wasser, MD, Thomas R. McCauley, MD, Miles A. Kirchin, PhD, and Gianpaolo Pirovano, MD

¹ From the Department of Radiology, Centre Hospitalier de l'Université de Montréal, University of Montreal, 1560 Sherbrooke East, Montreal, QC, Canada H2V 2Z2 (G. Soulez). The complete list of author affiliations and enrolling centers is at the end of this article. From the 2006 RSNA Annual Meeting. Received April 21, 2007; revision requested June 11; revision received July 20; accepted August 17; final version accepted September 26. Supported by Bracco Diagnostics and by research scholarships from the Fonds de la Recherche en Santé du Québec (G. Soulez). Address correspondence to G. Soulez (e-mail: gilles.soulez.chum@ssss.gouv.qc.ca)

Renal Artery Stenosis Evaluation: Diagnostic Performance of Gadobenate Dimeglumine–enhanced MR Angiography—Comparison with DSA

PURPOSE: To prospectively determine diagnostic performance and safety of contrast material–enhanced (CE) magnetic resonance (MR) angiography with 0.1 mmol per kilogram of body weight gadobenate dimeglumine for depiction of significant steno-occlusive disease (51% stenosis) of renal arteries, with digital subtraction angiography (DSA) as reference standard.

MATERIALS AND METHODS: This multicenter study was approved by local institutional review boards; all patients provided written informed consent. Patient enrollment and examination at centers in the United

States complied with HIPAA. Two hundred ninety-three patients (154 men, 139 women; mean age, 61.0 years) with severe hypertension (82.2%), progressive renal failure (11.3%), and suspected renal artery stenosis (6.5%) underwent CE MR angiography with three-dimensional spoiled gradient-echo sequences after administration of 0.1 mmol/kg gadobenate dimeglumine at 2 mL/sec. Anteroposterior and oblique DSA was performed in 268 (91.5%) patients. Three independent blinded reviewers evaluated CE MR angiographic images. Sensitivity, specificity, and accuracy of CE MR

angiography for detection of significant steno-occlusive disease (51% vessel lumen narrowing) were determined at segment (main renal artery) and patient levels. Positive and negative predictive values and positive and negative likelihood ratios were determined. Interobserver agreement was analyzed with generalized statistics. A safety evaluation (clinical examination, electrocardiogram, blood and urine analysis, monitoring for adverse events) was performed.

Results: Of 268 patients, 178 who were evaluated with MR angiography and DSA had significant steno-occlusive disease of renal arteries at DSA. Sensitivity, specificity, and accuracy of CE MR angiography for detection of 51% or greater stenosis or occlusion were

60.1%–84.1%, 89.4%–94.7%, and 80.4%–86.9%, respectively, at segment level. Similar values were obtained for predictive values and for patient-level analyses. Few CE MR angiographic examinations (1.9%–2.8%) were technically inadequate. Interobserver agreement for detection of significant steno-occlusive disease was good (79.9% agreement; $\kappa = 0.69$). No safety concerns were noted.

Conclusion: CE MR angiography performed with 0.1 mmol/kg gadobenate dimeglumine, compared with DSA, is safe and provides good sensitivity, specificity, and accuracy for detection of significant renal artery steno-occlusive disease.