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Commentary

As technology evolves the inflation adjusted costs of acquiring new established modalities largely static if not moving downwards. This is especially true of mid and low field strength Magnetic Resonance scanners. As the number of scanners for a given population increase the available time on the scanners opens up the modality to novel applications. Bowel has been an area that has not usually been associated with MR imaging. This has been to two main reasons. The length of the examinations meant that bowel movement caused blurring and therefore of detail and the fact that the available scanners were so busy in neuroradiology and musculoskeletal imaging that there was no time available for the gut. This is now changing. The scan times have come down drastically and many sequences can be completed in less than 20 seconds allowing both breath hold imaging and the ability to freeze bowel motion. Krishna et al report the application of MR enterography to intestinal tuberculosis and compare it with the traditional barium based small bowel follow through examination. They report that the diagnostic performance is similar to the barium study but with the added advantage of no radiation exposure. They unfortunately do not report on the differences in cost or the overall economic impact on the treatment of intestinal tuberculosis.

Staying on the theme of evolution of technology Feuerstein et al report their data on localising lower gastrointestinal haemorrhage on multi detector computerised tomography. GI haemorrhage is difficult to treat as the source is often obscure. To compound the difficulty it most often occurs on a background of multiple comorbid conditions. The trend is to manage these patients non surgically with an increasing role of catheter delivered therapies. This requires an accurate localisation of the source of the haemorrhage as non-directed therapies are associated with a high complication rates. MDCT has been utilised in the effort to do this but there has always been the argument that due to the intermittent nature of the haemorrhage tagged red cell studies that have a much larger sample window (several hours) are better than MDCT which has a sampling window of only a few minutes. Feuerstein et al show that both modalities have a similar detection rate but the localisation is significantly more accurate with MDCT. Again there is no evaluation of the economic impact of the different modalities.

Technology may help solve existing issues but by its nature also presents novel ones. The technical report by McVey et al highlights one of these. The hitherto unknown “air bubble artefact” on CT imaging. It is important for radiologists to be able to identify any artefacts on imaging to avoid misdiagnosis. Over diagnosis is as important to avoid as under diagnosis. The artefacts described are important to recognise not only as they do not look like any of the CT artefacts that the radiologists are familiar with but also that they very convincingly simulate disease.

Prof. Zafar Sajjad

Professor of Radiology

Aga Khan University Hospital, Karachi, Pakistan.

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Satheesh Krishna , Naveen Kalra , Paramjeet Singh , Rakesh Kochhar , Rajesh Gupta , Rajinder Singh and Niranjan Khandelwal

Small-Bowel Tuberculosis: A Comparative Study of MR Enterography and Small-Bowel Follow-Through

OBJECTIVE: The purpose of this article is to describe the MR enterographic findings of small-bowel tuberculosis (TB) and to compare the imaging findings of small-bowel follow-through (SBFT) with those of MR enterography.

SUBJECTS AND METHODS: Thirty patients (20 male and 10 female) presenting with suspected intestinal TB were enrolled in this prospective study. MR enterography and SBFT were performed within 2 weeks of each other.

RESULTS: Nineteen of the 30 patients were confirmed to have TB. Of these 19 patients, MR enterography depicted ileocecal involvement in nine patients (47%), mural thickening in any other segment of the small bowel in 11 patients (58%), lymphadenopathy in 17 patients (89%), ascites in five patients (26%), and peritoneal enhancement in six patients (32%). In addition, MRI also depicted a splenic granuloma, spondylodiscitis with prevertebral abscess, and small-bowel perforation with collections in one patient each. There was good correlation between MR enterography and SBFT in the depiction of ileocecal involvement and small-bowel mural thickening. However, MR enterography was able to show a higher number of strictures than was SBFT. The sensitivity, specificity, positive predictive value, and negative predictive value in the diagnosis of TB were 100%, 73%, 86%, and 100%, respectively, for MR enterography and 88%, 70%, 83%, and 78%, respectively, for SBFT. The difference was not statistically significant ($p = 0.24$).

CONCLUSION: MR enterography depicts intestinal as well as extraintestinal manifestations of TB. The intestinal manifestations correlate well with SBFT findings. MR enterography has the potential to become the one-stop radiation-free tool in the evaluation of small-bowel TB.

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Joseph D. Feuerstein, Gyanprakash Ketwaroo, Sumeet K. Tewani, Antonio Cheesman, Juan Trivella, Vassillios Raptopoulos and Daniel A. Leffler

Localizing Acute Lower Gastrointestinal Hemorrhage: CT Angiography Versus Tagged RBC Scintigraphy

OBJECTIVE: Lower gastrointestinal hemorrhage is a common cause of hospitalization and has substantial associated morbidity and financial cost. CT angiography (CTA) is emerging as an alternative to 99mTc-labeled RBC scintigraphy (RBC scintigraphy) for the localization of acute lower gastrointestinal bleeding (LGIB); however, data on comparative efficacy are scant. The aim of this study was to assess the utility of CTA compared with RBC scintigraphy in the overall evaluation and management of acute LGIB.

MATERIALS AND METHODS: We retrospectively reviewed images from all CTA examinations performed for suspected acute LGIB at our tertiary care hospital from January 2010 through November 2011. The comparison group was determined by retrospective review of twice the number of RBC scintigraphic scans consecutively obtained from June 2008 to November 2011 for the same indication. All CTA and RBC scintigraphic scans were reviewed for accurate loca-lization of the site and source of suspected active LGIB.

RESULTS: In total, 45 CTA and 90 RBC scintigraphic examinations were performed during the study period. Seventeen (38%) CTA scans showed active gastrointestinal bleeding compared with 34 (38%) RBC scintigraphic scans (p = 1.000). However, the site of bleeding was accurately localized on 24 (53%) CTA scans. This proportion was significantly greater than the proportion localized on RBC scintigraphic scans (27 [30%]) (p = 0.008). There were no significant differences between the two groups in average hospital length of stay, blood transfusion requirement, incidence of acute kidney injury, or in-hospital mortality.

CONCLUSION: Both CTA and RBC scintigraphy can be used to identify active bleeding in 38% of cases. However, the site of bleeding is localized with CTA in a significantly higher proportion of studies.

Technical Report

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S. McVey, A.K. Kanodia, , S. Dundas, G. Main, S. Pillai, G. Prasad, J. Flinn, I. Zealley, K. Brauer, N. Schembri, S. Docherty, A. Webster, M. Szewczyk-Bieda, T. Sudarshan

"Air bubble artefact": A new type of artefact on CT head examination

Highlights:

Air bubble artefact is a new type of CT artefact on CT heads.
It is produced by gas bubbles in the tube oil cooling system.
It can cause inconsistent, illdefined areas of low attenuation mimicking pathologies.
The usual physics checks and QC may be inadequate to confirm these.
Equipment manufacturers may lack automatic alarms to detect these.