Contrast enhanced magnetic resonance imaging of the gastrointestinal tract in children with Crohn's disease.

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BACKGROUND AND AIMS: Magnetic resonance imaging (MRI) has been introduced in the diagnosis of patients with Crohn's disease (CD). However, it is still rarely reported in paediatric population. We studied the diagnostic value of gadolinium enhanced MRI with oral opacification in revealing inflammation of the bowel in children with Crohn's disease. MRI was performed using a 5% of mannitol solution as oral contrast agent to distend the small bowel (CE-Mannitol-MRI).

SUBJECTS AND METHODS: Sixty-two consecutive children (median age 13.9 years, range 7-18) with known or suspected CD underwent ileocolonoscopy with biopsy, ultrasonography and CE-Mannitol-MRI. CD activity was measured by the paediatric Crohn's disease activity index (PCDAI). Images quality, wall thickness, contrast enhancement and complications identified on CE-Mannitol-MRI were evaluated by 2 blinded radiologists. CE-mannitol-MRI, PCDAI, ultrasonography, endoscopy and histology results were correlated by statistical analysis (sensitivity, specificity, Kappa test, Pearson test and t student; p=0.05).

RESULTS: Active CD was diagnosed in 40 cases, active ulcerative colitis (UC) in 10, and indeterminate ileocolitis in 2; 10 children served as controls. Of the 40 children with CD, 31 had PCDAI inferior to 30. Otherwise, CD with distal ileitis was identified in 24 cases. Quality images of CE-Mannitol-MRI was good to excellent in 70 %. The sensitivity and specificity of CE-Mannitol-MRI for the diagnosis of CD, as documented by pathology, were 83% and 100%, respectively. Parietal contrast enhancement was higher in group of abnormal small bowel loops (Figure 1) versus control group (p=0,001). Concordance between CE-Mannitol-MRI and pathology was good (κ=0,74) for the detection of abnormal small bowel loop. In children with known CD, positive correlation was identified between wall thickness and PCDAI (p=0,003). However, no significative correlation was demonstrated between parietal contrast enhancement and PCDAI (p=0,497). Complications were identified in 18 cases on CE-Mannitol-MRI versus 8 cases on ultrasonography with 9 fistulaes, 8 stenosis and 1 intussusception (Figure 2). Inter-observer agreement was excellent (κ=0,95) for the detection of small bowel loop abnormality.

CONCLUSIONS: In children with CD, CE-Mannitol-MRI identified extent, severity and intestinal complications with adequate diagnostic accuracy. This technique could also be useful for the firstline diagnostic approach in children with suspected CD. The high concordance observed between MRI, endoscopy, and US findings suggests that MRI is at least comparable for diagnostic capability with these techniques offering, thanks to multiplanar projections, an improved visualisation of the bowel without ionising radiation and makes this test as a tool for monitoring the effect of therapy.

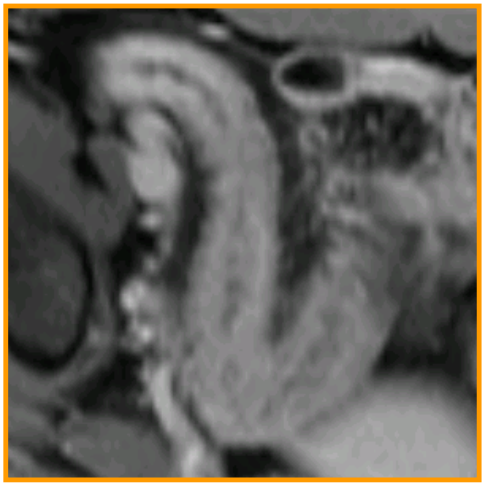

Figure 1: Contrast-enhancement of distal ileitis in patient with crohn disease.

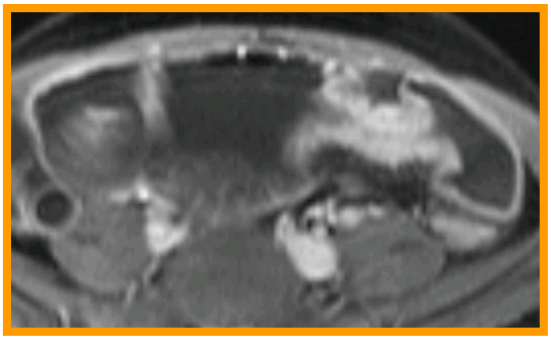

Figure 2: Identification of symptomatic large bowel stenosis in patient with suspected CD