

Clinical correlations of small bowel CT and contrast radiology findings in Crohn's disease

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Abstract. – *Backgrounds and Objective:* Aim of the present study was to evaluate the clinical correlates of small bowel CT patterns in patients with Crohn's disease (CD), as compared to barium studies and endoscopic findings, as far as parameters of disease activity are concerned.

Material and Methods: Thirty five patients with pathologically proven CD were studied by means of helical single detector CT (13) or multidetector CT (22), after administration of low density contrast by mouth (13) or by nasojejunal tube (22). Eight hours later, all patients were studied with barium administered by mouth (13) or with barium and methylcellulose administered by nasojejunal tube (22). Clinical activity was assessed by CDAI score, ESR, CRP, alpha1 glycoprotein and fibrinogen levels. In twenty one patients, colonoscopy was also performed.

Results: Sensitivity of small bowel CT versus endoscopy was of 88% while sensitivity of barium studies was of 77% versus endoscopic findings, and it reached 100% for the combination of both exams. We found positive correlations between the detection at CT of "target sign" and a CDAI score > 150 or abnormal values of CRP, ESR, α_1 glycoprotein. Abnormal ESR or fibrinogen levels were correlated with the detection of fistulas at CT scans. The diameter of enlarged mesenteric lymph nodes was correlated with α_1 glycoprotein values. No similar correlations were detected for contrast radiology findings.

Discussion: This study underscores the clinical usefulness of performing small bowel CT in adjunct to conventional diagnostic studies in Crohn's disease patients. CT findings (either by oral route or nasojejunal tube) correlate with parameters of disease activity.

Key Words:

Crohn's disease, CT enteroclysis, Small bowel enteroclysis.

Methods

Thirty five consecutive patients (15 males and 20 females, mean age of 39 ± 13 years) with pathologically proven small bowel Crohn's disease were studied by means of helical single detector CT (No = 13) or multidetector CT (No = 22), after administration of low density contrast by mouth (No = 13) or by nasojejunal tube (No = 22).

The following parameters have been evaluated: bowel wall thickening, bowel wall enhancement with contrast, presence of "target sign" (bowel wall stratification), of perienteric stranding, of "comb sign", of fibrofatty proliferation, and of complications (Figure 1).

Eight hours later, all patients were studied with barium administered by mouth (No = 13) or with barium and methylcellulose administered by nasojejunal tube (No = 22). Clinical activity was assessed by CDAI score, and ESR, CRP, haemogram, α_1 glycoprotein and fibrinogen values were also recorded.

In 21 patients, colonoscopy with retrograde ileoscopy and ileal biopsies for histological assessment were also performed.

Statistical analysis has been done by means of Fisher's exact test and Spearman' rank correlation test.

Results

Comparable results were obtained with the use of oral contrast versus nasojejunal tube for CT enteroclysis, as far as bowel distension is concerned. Eighty four % of the patients who

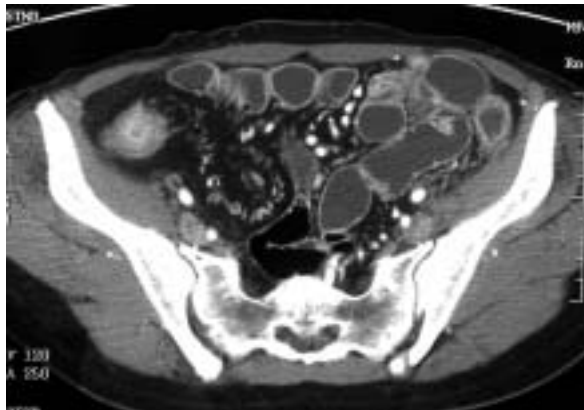


Figure 1. Multidetector CT enteroclysis showing thickening of terminal ileum, “target sign” and “perienteric stranding”.

experienced the insertion of a nasojejunal tube reported variable degrees of discomfort, compared to none in the “oral contrast” group.

Sensitivity of small bowel CT versus endoscopy was of 88% while sensitivity of barium studies was of 77% versus endoscopic findings, and it reached 100% for the combination of both exams.

We found positive correlations between the detection at CT enteroclysis of “target sign” and the occurrence of a CDAI score > 150 or of abnormal values of CRP, ESR, α_1 glycoprotein (Table I). Abnormal ESR or fibrinogen levels were correlated with the detection of fistulas at CT scans. The diameter of enlarged mesenteric lymph nodes was correlated with α_1 glycoprotein values. No correlations were detected with haemogram values and no similar correlations were detected for contrast radiology findings.

Finally, we evaluated that in 30% of patients in this series, the combined use of these

imaging modalities influenced the clinical management.

The conventional diagnostic methods (endoscopy and barium enema) employed in evaluating small bowel Crohn’s disease give information about mucosal surface and axial involvement but not about the intramural and extramural extension of the disease.

Computerised tomography (CT) and magnetic resonance imaging (MRI), on the other hand, also performed with enteroclysis, are able to assess extramural complications (abscesses, fistulas), and parameters of activity like contrast enhancement, bowel wall thickening, blood supply and lymph nodes, even though they are less sensitive than barium studies in detecting early stage Crohn’s lesions¹⁻³.

A correlation with clinical parameters of Crohn’s disease activity is more often found for contrast enhancement, while for other CT findings the correlation is controversial⁴⁻⁸. The use of negative oral contrast solution (PEG, mucofalk) that permit an optimal distension of the bowel loops, without the cost and discomfort of the nasojejunal tube, in association with the technical development (multidetector spiral-CT, 2D and 3D reconstruction) increased the interest for these techniques^{2,9}.

Questions that remain to be solved are if these radiological methods should be targeted only to a particular subgroup of patients, and what is the real clinical value of CT and radiological parameters of activity.

The present study underscores the clinical usefulness of performing CT enteroclysis in adjunct to conventional diagnostic studies in Crohn’s disease patients.

CT enteroclysis findings (either by oral route or nasojejunal tube) correlate with several parameters of disease activity.

Table I. Positive correlations detected for small bowel CT findings.

	CDAI (> 150)*	CRP (> 5 mg/L)*	ESR (> 20 mm)*	Fibrinogen (> 400 mg/dl)*	α_1 glycoprotein (> 120 mg/dl)*
Target sign*	$p < 0.04$	$p < 0.02$	$p < 0.04$		$p < 0.05$
Fistulas*			$p < 0.05$	$p < 0.05$	
Mesenteric lymph nodes (mm)#					$p < 0.02$

*Fisher’s exact test.

#Spearman’ rank correlation test.

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