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Alimentary Tract

Magnetic resonance imaging and clinical assessments for perianal Crohn's disease: Gain and limits

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ABSTRACT

Background: Assessment of perianal Crohn's disease remains challenging. European Crohn's and Colitis Organisation (ECCO) recommend magnetic resonance imaging (MRI) as a gold standard, but both accuracy and advantages remain limited compared to systematic clinical assessment. The aim of this study was to define their actual diagnostic value.
Methods: We performed a retrospective analysis of a prospective database of consecutive patients with perianal Crohn's disease assessed by magnetic resonance imaging and clinical examination from 2006 to 2012. At each outpatient visit, perianal activity (Perianal Disease Activity Index) and perianal phenotype (Cardiff-Hughes classification) were noted. MRI was interpreted according to Cardiff-Hughes and Van Assche classifications.
Results: Overall, 122 combined evaluations were assessed in 70 patients. Radiological imaging failed to show superficial ulcerations in 20/21 patients (95%) and severe ulcerations in 13/15 patients (87%). It consistently failed to diagnose anal stenosis ($n = 21$, 100%). For fistulising lesions, the global agreement between the two methods was 71/122 (58%) in assessing complex fistulas. Clinical assessment underestimated 44/68 (65%) of multiple or ramified fistula tracts. Clinical examination failed to diagnose half of the radiological abscesses.
Conclusions: Current ECCO guidelines should be applied with some caution because of the low sensitivity of MRI for the diagnosis of non-fistulising perianal disease. Combining clinical and MRI assessments improves diagnostic accuracy.
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1. Introduction

Perianal lesions were not mentioned as a feature of Crohn's disease (CD) in the initial disease description and were only recognised as such 30 years later [1]. However, perianal CD (PCD) is one of the most unfortunate complications of CD and leads to anal pain, discharge and incontinence, in addition to emotional symptoms and impaired social functioning [2]. Moreover, PCD independently denotes a more aggressive and disabling CD phenotype [3]. Data suggested that findings of rectal inflammation or stenosis had prognostic implications and were relevant in determining the treatment strategy. According to European guidelines, use of the Montreal classification to categorise the CD phenotype is advocated to better define and treat CD [4]. In this classification, PCD is summarised with a "p", whereas prognosis and significance may vary according to the type of perianal lesions. Cardiff-Hughes classification allows more precise description of PCD [5] with ulcerations, fistulas and strictures.

Recent European Crohn's and Colitis Organisation (ECCO) guideline recommendations state: "Magnetic resonance imaging (MRI) is the most accurate diagnostic imaging test for perianal CD with accuracy surpassing examination under anaesthesia, and is recommended during the initial diagnosis unless there is a need for immediate drainage of sepsis" [6].

Interestingly, MRI accuracy in diagnosing fistulising PCD allows almost perfect anatomical classification of fistulising lesions, but

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the predictive value of clinical examination, including the determination of the presence of perianal indurations for the diagnosis of inflammation of such lesions, remains unknown. Conversely, MRI diagnosis of non-fistulising lesions is unknown and underreported, while non-evidence based experience favours clinical examination. Finally, the accuracy of a clinical assessment in an out-patient visit is underreported in the literature as compared to the evaluation under anaesthesia of surgical series. This study aimed, therefore, to define the diagnostic value of both methods.

2. Methods

2.1. Study population

Between January 2006 and April 2012, a tertiary referral centre database recorded prospectively the main events of consecutive patients with an established diagnosis of PCD based on clinical, biological, radiological, endoscopic and/or histological evidence. The following data were prospectively recorded in a secure database: sex, age at diagnosis, height, weight, smoking habits, luminal CD phenotype according to the Montreal classification [4] at diagnosis, treatment (including steroids, 5-aminosalicylates [ASA], immunosuppressants, tumour necrosis factor [TNF] antagonists) and past surgical history. At each visit, CD activity was assessed using the Harvey-Bradshaw Index (HBI) [7], anatomical classification of PCD was described according to the Cardiff-Hughes classification (including a digital examination) [5], and PCD activity was evaluated with the Perianal Disease Activity Index (PDAI) [8]. Rectal inflammation was assessed by endoscopy. According to the HBI, CD was considered in clinical remission with an HBI score below 4, mild to moderately active with an HBI score ranging from 4 to 12 and severely active with an HBI score above 12.

Inclusion criteria were the diagnosis of fistulising PCD assessed by MRI. All patients with fistulising PCD were extracted from the database and compared with the radiology records of all patients assessed by pelvic MRI. The clinical assessment immediately before MRI evaluation within 1 month was taken into account for analyses to obtain a blind assessment.

2.2. MRI data

Pelvic MRI was performed in patients suffering from severe LAP where abscesses or complex fistulas were suspected and/or to assess the effectiveness of surgical drainage. The pelvic MRI was performed using 2 different MRI scanners: one manufactured by Achieva (3.0 tesla; Philips Medical Systems) and one manufactured by Verio (3.0 tesla; Siemens Medical Systems). MRI used surface coil Torso 16 elements on the Achieva instrument and cardiac 32 elements on the Verio instrument. The acquisition protocol used high-resolution T2-weighted fat-saturation fast-spin echo pulse sequences and T1-weighted fat-saturation fast-spin echo or three dimensional gradient echo sequences before and after intra-venous injection of gadolinium (Dotarem®, Guerbet). T2 sequences were acquired in 3 orthogonal planes depending on the anal canal axis. T1 sequences were acquired at least in the anal canal axis. An antispasmodic was administered to all patients before acquisition. All records were reviewed by one experienced radiologist (TR) blinded to the previous interpretation form, the clinical assessment and the history of CD. MRI data were collected according to Van Assche classification [9], using anatomic descriptions of fistulising lesions and the intensity of the T2 signal. The Cardiff-Hughes classification was used to describe the 3 elementary lesions of PCD: fistula, stricture and ulceration.

2.3. Statistical analysis

Quantitative variables were described as the median and interquartile range [IQR 25–75]. Categorical variables were presented as counts and percentage of the cohort. Concordance rates between clinical and MRI assessments were quantified. The sensitivity and the specificity were determined according to a reference standard: clinical for ulcerations and stenosis and MRI for fistulising lesions and inflammation [6]. Likelihood ratios (LR), global concordance and Youden index (J) offered a global assessment of diagnostic performance. These performance tests were calculated using the following equations: (1) Positive LR, [Sensitivity/(1 – Specificity)]; (2) negative LR, [(1 – Sensitivity)/Specificity]; (3) global concordance, [(true positives + true negatives)/N]; (4) Youden index J, [(sensitivity + specificity) – 1]. The LR is the probability that a test result would be expected in a patient with the target disorder compared to the probability that the same result would be expected in a patient without the target disorder. A

Table 1
Baseline characteristics of the study population.

	N (%) or median [IQR 25–75]
Total	*N* = 70
Male gender	26 (37%)
Age (years)	31.5 [24–40.3]
Smoking	56 (80%)
Smoker	17 (30%)
Former smoker	8 (14%)
Non-smoker	31 (55%)
Duration of CD (months)	78 [33–139.5]
Duration of perianal episode at baseline (months)	3 [0–7]
Previous medical treatment	
Steroid	52 (74%)
Thiopurines	53 (73%)
Methotrexate	12 (17%)
Anti-TNF therapy	42 (60%)
Previous surgical treatment	
Drainage of suppuration	52 (74%)
Obturation	10 (14%)
Intestinal resection	15 (21%)
Definitive stoma	1 (1%)
Luminal disease – Montreal classification	
A1/A2/A3	1 (1%)/58 (83%)/11 (16%)
L0/L1/L2/L3	2 (3%)/4 (6%)/27 (39%)/37 (53%)
L4	9 (13%)
B1/B2/B3	53 (76%)/11 (16%)/3 (4%)
p	70 (100%)
Luminal disease – activity	
Harvey Bradshaw	
<4	21 (32%)
4–12	41 (63%)
>12	3 (5%)
Rectal involvement	43 (65%)
Perianal disease – Cardiff-Hughes classification	
Fistula	
F1	15 (21%)
F2	55 (79%)
Ulceration	
U1	17 (24.3%)
U2	13 (18.6%)
Stenosis	
S1	7 (10%)
S2	7 (10%)
Perianal disease – PDAI score	8.5 [5–12.25]

CD, Crohn's disease; PDAI, Perianal Disease Activity Index; IQR InterQuartile Range; TNF, Tumour Necrosis Factor.

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