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Validation of the Capsule Endoscopy Crohn's Disease Activity Index (CECDAI or Niv score): a multicenter prospective study.

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Introduction

The concept of deep remission in Crohn's disease (CD) is being increasingly recognized as a cornerstone predictor of clinical behaviour and prognosis.1,2 Indeed, mucosal healing has been shown to be associated with increased rates of clinical remission, fewer hospitalizations, and fewer abdominal surgeries.1 Therefore, video capsule endoscopy (VCE) has become an attractive noninvasive tool to assess small bowel mucosal damage in patients with CD.3 However, none of the available VCE scoring indices, used to diagnose and measure small bowel involvement in CD, had been prospectively validated.

Key findings

In this multicenter, multi-country (four centers in Israel, one in Greece, and one in Ireland), double-blind, prospective, controlled study,4 the authors enrolled 62 consecutive patients with isolated small-bowel CD, 50 of which were able to finish the study protocol. The aim was to prospectively validate the use of the Capsule Endoscopy Crohn's Disease Activity Index (CECDAI or Niv score)5 in the assessment of small bowel mucosal disease activity using VCE. The CECDAI was designed to evaluate three main parameters of CD: inflammation (A), extent of disease (B), and stricture (C), all graded on a numeric scale in both the proximal and distal segments of the small bowel. These two segments were defined by equally dividing the small bowel transit time. The final score is calculated by adding the two segmental scores: CECDAI = proximal ([A1×B1] +C1) + distal ([A2×B2] +C2) – Table 1. In this index, villous appearance and ulcers are considered to be opposite extremes of a wide range of inflammation rather than as independent variables, as was the case in the Lewis Score.6-8 Also, the number of lesions is not important for calculating the CECDAI, because when different inflammatory lesions are identified in the same bowel segment, only the more severe lesion is considered.

The primary end point of the study was to validate the CECDAI score. The secondary end points were to evaluate the correlation between CECDAI and both Crohn's Disease Activity Index (CDAI) and Inflammatory Bowel Disease Quality of Life Questionnaire (IBDQ).

The mean age of the study population was 39.44 ± 16.14 years and 28 (56 %) were women. Twenty-three patients (46 %) were in clinical relapse (CDAI >150).

Looking at the results, the interpretation of the CECDAI showed a good correlation between endoscopists from the different study centers, reaching statistical significance, with r=0.767 (range 0.717-0.985; Kappa 0.66; P<0.001). Overall, the distal scores were higher than the proximal scores: 6.70 ± 5.04 vs. 2.76 ± 3.49 (difference 3.94, 95% confidence interval [CI] 2.59–5.29; P <0.0001), and 6.50 ± 5.24 vs. 3.32 ± 4.17 (difference 3.18, 95% CI 1.67–4.69; P <0.0001), according to the site investigators and principal investigator, respectively. Proximal small bowel was involved in up to 62% of patients. No correlation was found between CDAI or IBDQ or any of their components with the CECDAI.

Conclusion

The authors validated a new easy and user-friendly score for VCE, the CECDAI, and recommend its use in controlled trials and/or regular follow-up of patients with small bowel CD. Although a relatively small number of patients have been enrolled in the study, it had the statistical power to validate the score in everyday clinical practice.

In this study, VCE diagnosed proximal small bowel involvement in the majority (up to 62%) of patients, revealing significant lesions out of the reach of the standard colonoscope. As endoscopic remission has been associated with better outcomes and prognosis in CD,1,2 the CECDAI may thus become particularly valuable for use in a longitudinal way, to assess response of patients to a given medical therapy, comparable to the Crohn's Disease Endoscopy Index Score (CDEIS) used in drug trials for ileocolonic disease.9 However, as the authors underline, the CECDAI has the drawback that it can only be applied to patients with isolated small bowel CD with no colonic involvement.

Similarly to several previous trials, this study could not demonstrate a positive correlation between the endoscopic score and clinical indices. This may be due to the fact that symptoms such as diarrhea, fatigue or abdominal pain are usually multifactorial and not necessarily associated with the presence of significant endoscopic lesions.

Finally, it must be underlined that, similarly to other endoscopic activity scores, the CECDAI cannot by itself diagnose CD, as it measures mucosal changes and the degree of mucosal inflammation regardless of its etiology. It has no discriminatory ability in differentiating CD from other diseases such as nonsteroidal anti-inflammatory drug enteropathy, radiation enteritis, celiac disease, lymphoma, vasculitis and/or ischemia, and it seems unlikely that a threshold for differential diagnosis might be determined. Moreover, up to 10% of healthy individuals may present small bowel mucosal lesions of unknown clinical meaning, 10 and thus it is crucial to interpret the endoscopic score in the light of each individual clinical context.

To summarize, this new objective and reproducible endoscopic score standardizes the assessment of small bowel inflammatory activity and may become a useful tool in the future research of small bowel CD.

A. Inflammation score
0 = None
1 = Mild to moderate edema / hyperemia / denudation
2 = Severe edema / hyperemia / denudation
3 = Bleeding, exudate, aphthae, erosion, small ulcer (<0,5cm)
4 = Moderate ulcer (0,5 - 2cm), pseudopolyp
5 = Large ulcer (>2cm)
B. Extent of disease score
0 = No disease
1 = Focal disease (single segment)
2 = Patchy disease (2-3 segments)
3 = Diffuse disease (more than 3 segments)
C. Stricture score
0 = None
1 = Single-passed
2 = Multiple-passed
3 = Obstruction (non-passage)

Table 1: Capsule Endoscopy Crohn's Disease Activity Index (adapted from Niv Y et al, 2012 4)

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