

Correlation Between the Rutgeerts Score and Clinical Recurrence in Crohn's Disease

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Abstract

Crohn's disease frequently recurs after ileocolic resection, with endoscopic lesions often preceding clinical relapse. The Rutgeerts score, widely used to evaluate postoperative recurrence, provides a reliable measure of mucosal healing and disease activity. In this retrospective study including 92 patients operated at Ibn Sina University Hospital between 2019 and 2025, we assessed the correlation between postoperative Rutgeerts scores and clinical outcomes during a three-year follow-up. Endoscopic recurrence (Rutgeerts \geq i2) was observed in 45.6% of patients, while 39.1% developed clinical relapse. Recurrence rates increased progressively with higher scores, ranging from 4.5% in i0 to 100% in i4. Notably, the subclassification of i2 lesions revealed distinct prognostic implications, with clinical relapse occurring in 18.7% of i2a versus 75% of i2b patients. Multivariate analysis identified a Rutgeerts score \geq i2 as the only independent predictor of recurrence (aOR 3.2, 95% CI 2.6–28; $p < 0.001$). These findings confirm the strong association between endoscopic and clinical recurrence, highlight the clinical relevance of the i2a/i2b distinction, and support the role of the Rutgeerts score as a key tool in postoperative risk stratification and therapeutic decision-making.

Keywords: Crohn's Disease; Postoperative Recurrence; Rutgeerts Score; Endoscopy; Risk Stratification

1. Introduction

Crohn's disease (CD) is a chronic inflammatory bowel disease characterized by a relapsing course, transmural lesions, and complications such as strictures or fistulas. Although the terminal ileum is the most frequently affected site, the disease can involve any segment of the gastrointestinal tract. Despite advances in medical therapy, approximately 70% of patients require intestinal resection during their lifetime. However, postoperative recurrence remains common, with endoscopic recurrence occurring in nearly 80% of patients within the first year following surgery, and clinical recurrence in 30% to 50% of cases within the first three years.

The Rutgeerts score, developed in 1990, is a key tool for assessing postoperative endoscopic recurrence. Performed 6 to 12 months after surgery, this score stratifies patients based on the severity of mucosal lesions. Higher scores (\geq i2) are associated with an increased risk of clinical relapse. While widely used, the correlation between the Rutgeerts score and clinical recurrence remains insufficiently studied in North African populations, particularly in Morocco.

2. Materials and Methods

This was a retrospective, descriptive, and analytical study conducted at the Department of Hepato-Gastroenterology and Proctology "Medicine B," Ibn Sina Hospital, Rabat. The study covered a 6-year period, from January 2019 to January 2025.

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Included were patients with a confirmed diagnosis of Crohn's disease who had undergone ileocecal or right ileocolic resection and had a postoperative colonoscopy within one year of surgery, allowing for assessment of the Rutgeerts score. Patients lost to follow-up or lacking postoperative colonoscopy were excluded.

Postoperative endoscopic recurrence was defined as a Rutgeerts score \geq i2. Clinical recurrence was assessed during the three years following surgery.

Statistical analysis was performed using Jamovi software. Both univariate and multivariate analyses were conducted. A p-value < 0.05 was considered statistically significant.

3. Results

A total of 92 patients were included. The mean age was 41.3 years, ranging from 20 to 72 years, with a slight female predominance (female-to-male ratio = 1.19). The median duration between initial diagnosis and surgery was 4.6 years. In terms of medical history, 14 patients (15.2%) were active smokers, and 10 had a family history of inflammatory bowel disease (IBD).

According to the Montreal classification, the disease phenotype was distributed as follows:

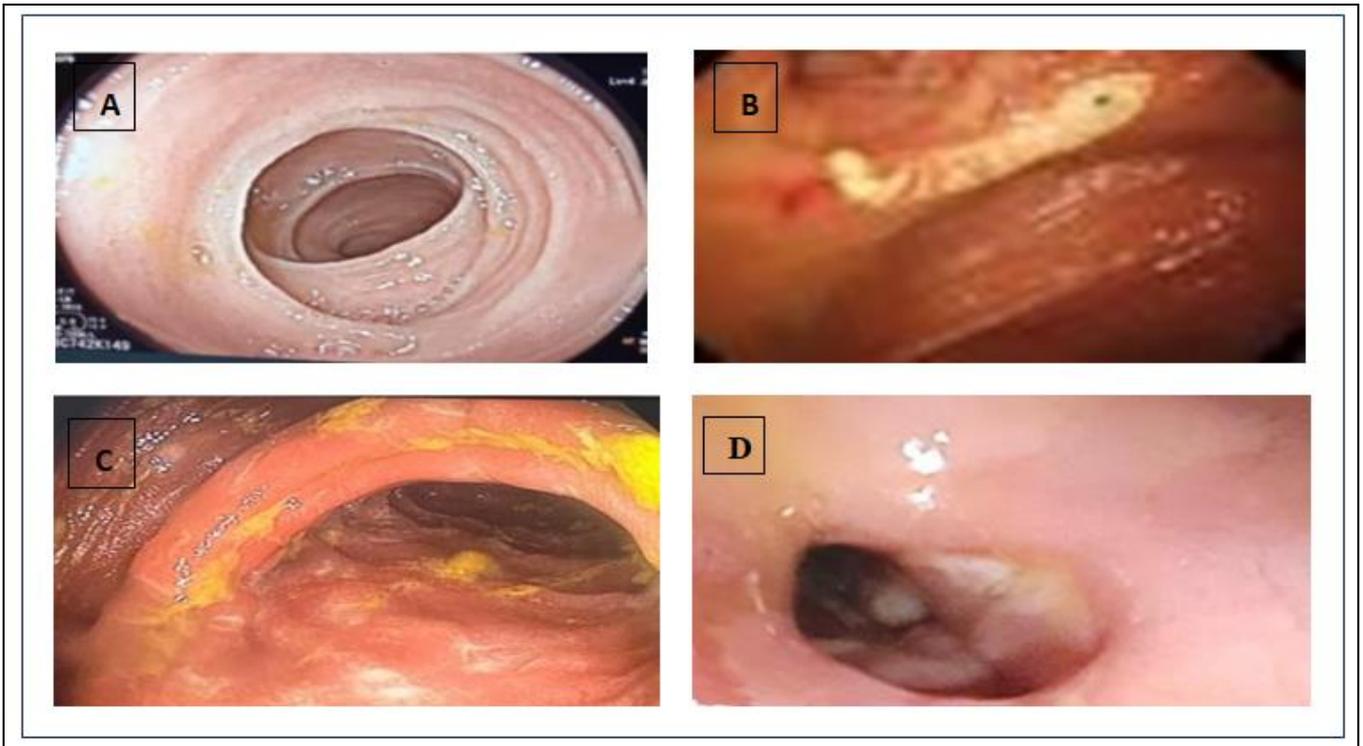
- B1 (Inflammatory): 25 patients (27.2%)
- B2 (Structuring): 39 patients (42.4%)
- B3 (Penetrating): 28 patients (30.4%)

Regarding disease location, 34 patients (37%) had purely ileal disease (L1), 48 (52%) had ileocolic disease (L3), and 10 (11%) had isolated colonic disease (L2).

Perianal involvement was present in 35.8% of patients, with complex fistulas observed in 31.5%. The main surgical indication was stenosis in 73.9% of cases, followed by fistulas in 20.6%.

All patients underwent ileocolonoscopy between 6 and 12 months after surgery, allowing for postoperative endoscopic assessment using the Rutgeerts score. The distribution of scores was as follows:

- i0: 22 patients (24%)
- i1: 28 patients (30%)
- i2a: 16 patients (17%)
- i2b: 4 patients (4%)
- i3: 14 patients (15%)
- i4: 8 patients (9%).



(A) i0: normal mucosa at the anastomotic site; (B) i2b: aphthous ulcers limited to the anastomosis; (C) i3: multiple deep ulcers in the neoterminal ileum; (D) i4: severe inflammatory stricture of the anastomosis with extensive ulceration.

Figure 1 Endoscopic appearance according to Rutgeerts score.

A Rutgeerts score \geq i2, reflecting significant endoscopic recurrence, was observed in 42 patients (45.6%).

During clinical follow-up, 36 patients (39.1%) developed symptomatic recurrence, occurring on average 13.4 months after surgery. Clinical recurrence rates increased proportionally with the severity of the Rutgeerts score, from 4.5% in patients with i0 to 100% in those with i4.

Table 1 Correlation between Rutgeerts score and clinical recurrence rate during follow-up.

| Rutgeerts Score | Clinical Recurrence | Rate |
|-----------------|---------------------|-------|
| i0 | 1/22 | 4.5% |
| i1 | 3/28 | 10.7% |
| i2a | 3/16 | 18.7% |
| i2b | 3/4 | 75% |
| i3 | 13/14 | 92.8% |
| i4 | 8/8 | 100% |

Clinical recurrence rates increased consistently with higher Rutgeerts scores, confirming a strong correlation between endoscopic and symptomatic relapse.

In univariate analysis, both a Rutgeerts score \geq i2 and the presence of perianal lesions were significantly associated with clinical recurrence ($p < 0.001$ and $p = 0.042$, respectively).

However, in multivariate analysis, only the Rutgeerts score \geq i2 remained independently associated with recurrence, with an adjusted odds ratio (aOR) of 3.2 (95% CI: 2.6–28; $p < 0.001$).

No statistically significant association was found with age, smoking, or penetrating phenotype.

Table 2 Univariate and multivariate analysis of factors associated with clinical recurrence.

| Variable | Univariate OR [95% CI] | p-value | Multivariate OR [95% CI] | p-value |
|---------------------------|------------------------|---------|--------------------------|---------|
| Rutgeerts score \geq i2 | 2.1 [1.8 – 20] | <0.001 | 3.2 [2.6 – 28] | <0.001 |
| Perianal lesions (LAP) | 2.0 [0.78 – 9.55] | 0.042 | 5.12 [0.9 – 24] | 0.040 |
| Smoking | 1.011 [0.994 – 1.004] | 0.42 | — | — |
| Penetrating phenotype | 1.0 [0.999 – 1.029] | 0.28 | — | — |
| Age | 1.0 [0.03 – 1.07] | 0.60 | — | — |

4. Discussion

Postoperative recurrence of Crohn's disease is a frequent evolution, affecting up to 80% of patients within one year following ileocolic resection, most often in the form of subclinical endoscopic lesions [1]. Clinical recurrence, on the other hand, occurs later, with an estimated incidence of 30% to 50% at three years [2]. This temporal dissociation justifies systematic and early endoscopic surveillance, as well as the use of reliable prognostic stratification tools to guide postoperative therapeutic decisions.

Among these tools, the Rutgeerts score, developed in 1990, remains the gold standard for assessing postoperative endoscopic recurrence. It classifies lesions from i0 (normal mucosa) to i4 (diffuse ulcerations and stricture), and scores \geq i2 are generally considered indicative of significant disease recurrence, associated with a higher risk of medium-term clinical

relapse [3]. In our retrospective cohort of 92 operated patients, a Rutgeerts score \geq i2 was observed in 45.6% of cases. This score showed a strong association with clinical recurrence, with an adjusted odds ratio of 3.2 (95% CI: 2.6–28; $p < 0.001$), and was the only independent predictive factor identified in multivariate analysis.

These findings are consistent with those in the literature. Yamamoto et al. reported a 4.5-fold increased risk of clinical relapse in patients with a score \geq i2 [4]. Similarly, Park et al. showed a marked difference in clinical recurrence between patients with scores i0–i1 (18%) and those with scores \geq i2 (46%) [5]. Moreover, Pelletier et al. highlighted that scores i3 and i4 were associated with a threefold increased risk of symptomatic recurrence [6].

The recent subdivision of the i2 stage into i2a and i2b, proposed by Buisson et al. [7], offers improved prognostic accuracy. This distinction is based on lesion topography: i2a lesions are limited to the anastomosis, while i2b includes even a small number of aphthous ulcers in the neo-terminal ileum. In our series, although the i2b subgroup was small ($n = 4$), its clinical recurrence rate was markedly higher (75%) than that observed in the i2a group (18.7%). This observation supports the utility of this subclassification for risk stratification, despite the limited statistical power in our cohort.

Our study also revealed a strong correlation between endoscopic and clinical recurrence. Of the 36 patients who experienced symptomatic relapse, 33 (91.6%) had a prior endoscopic recurrence. This reinforces the value of the Rutgeerts score not only as a diagnostic tool but also as a reliable prognostic marker. These findings are in line with ECCO guidelines, which advocate routine ileocolonoscopy 6 to 12 months after surgery to detect early recurrence and guide management [8].

Given the limitations of the Rutgeerts score when used alone, integrated predictive tools have emerged, such as the REMIND score, developed by the GETAID group. This score combines clinical, endoscopic, and therapeutic data and has shown good discriminative performance at 18 months [7]. In addition, the proactive POCER strategy, which includes early endoscopy at 6 months followed by treatment escalation, significantly reduced clinical recurrence from 67% to 49% in the De Cruz et al. trial ($p = 0.03$) [9].

Therapeutically, the Rutgeerts score is instrumental in guiding postoperative treatment. Patients with scores i0–i1 may be managed conservatively without the need for immediate intensive therapy. In contrast, those with scores \geq i2, particularly i2b, often require early initiation of immunosuppressive or biologic therapy [10]. Ferrante et al. demonstrated that early anti-TNF therapy reduced endoscopic recurrence from 62% to 38% [11].

In summary, our study confirms the utility of the Rutgeerts score as a predictor of clinical recurrence following surgery for Crohn's disease. The i2a/i2b subclassification appears particularly helpful in tailoring postoperative strategies. Integrating this score into multidimensional predictive models such as REMIND, or dynamic approaches like POCER, paves the way for more personalized and proactive patient care, with tangible impact on long-term outcomes.

5. Conclusion

Despite surgical intervention, postoperative recurrence in Crohn's disease remains common and calls for rigorous endoscopic monitoring. Our study confirms that a Rutgeerts score \geq i2 is an independent predictor of clinical recurrence, and that distinguishing between i2a and i2b subtypes is particularly relevant for risk stratification. The Rutgeerts score also serves as a key decision-making tool: it helps identify high-risk patients who may benefit from early initiation of immunosuppressive or biologic therapy. When integrated into modern strategies such as REMIND, the Rutgeerts score contributes to an individualized approach to postoperative management, with a meaningful impact on patient prognosis.

Compliance with ethical standards

Disclosure of Conflict of interest

The authors declare that they have no conflict of interest.

Statement of Informed consent

Informed consent was obtained from all individual participants included in the study.

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