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Research Article

Undernutrition in Crohn's Disease Prevalence and Predictive Factors

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Abstract:

Introduction: *Crohn's disease (CD) is a major cause of undernutrition. The evaluation of the nutritional status as well as its improvement is one of the major objectives of disease management. The aim of our work is to evaluate the nutritional status in patients with CD and to highlight its predictive factors.*

Methods: *This is a prospective descriptive and analytical study, from September 2021 to August 2024, including 138 patients with CD and undernutrition (BMI <18.5).*

Results: *The mean age of our patients was 36.4 years [17-72], with a female/male sex ratio of 1.6. Undernutrition (BMI <18.5) was: moderate 61.5%, severe 14.95%, and profound 4.3%. We reported the following in our patients: anemia (49.5%), lipid disorders (42%), phosphocalcic disorder (16.81%), hypoalbuminemia (56.6%), and a decrease in vitamin B12 (26%). Active disease was more frequent in undernourished subjects compared to non-undernourished subjects (56% vs. 18%, p = 0.002). In multivariate analysis, disease activity (p = 0.005; OR = 2.19; CI [1.15-10.16]), surgical resection (p <0.001; OR = 1.003; CI [1.01-2.05]), and ileocolic localization (p = 0.003; OR = 1.07; CI [1.03-9.07]) were associated with undernutrition.*

Conclusion: *The predictive factors in our series are disease activity, surgical resection, and ileocolic localization. Nutritional support associated with disease treatment allows for the best outcomes.*

Keywords: Undernutrition – Prevalence – BMI – Crohn's Disease.

Introduction

Inflammatory bowel diseases (IBD), including ulcerative colitis (UC) and CD, are a group of chronic diseases affecting the digestive tract. One of the most prominent complications of these diseases is malnutrition, which can occur in both diseases. However, it is more frequent in CD due to its extent (from the mouth to the anal area). In fact, among all digestive diseases, CD is one of the conditions in which the link between the gastrointestinal tract and nutrition is most obvious, but also most intriguing. Nutrition has been related to CD in different ways: First, reduced oral food intake could be a determinant of undernutrition, as patients often experience loss of appetite due to nausea, vomiting, and abdominal pain. [1] Malabsorption is, among other

factors, strongly related to mucosal alterations, such as impaired epithelial transport and loss of epithelial integrity. Undernutrition has been linked to adverse clinical outcomes [2] in CD, and it has the potential to affect the quality of life (QoL). That's why the evaluation of nutritional status, as well as the identification of its predictive factors and improvement, is one of the major goals in managing the disease. The aim of our work is to evaluate the clinical and biological aspects of undernutrition in patients with CD and to highlight its predictive factors.

Methods

Study Population:

138 patients with CD, including outpatients and hospitalized patients in the Department of Gastro-Enterology and Proctology "Médecine B" - Ibn Sina University Hospital, were studied between September 2021 and August 2024. The diagnosis of CD was made on the basis of clinical manifestations (chronic diarrhea, abdominal pain, and intestinal obstructive symptoms), endoscopic features (skip lesions, asymmetrical involvement, deep ulcers, aphthous ulcers, involvement of the ileocecal valve and terminal ileum), and histological evidence (inflammation extending beyond the muscularis mucosae, lymphoid follicles, and non-caseating granulomas). Disease activity was assessed using the Crohn's Disease Activity Index (CDAI). The location and behavior of the disease were classified using the modified Montreal classification.

Nutritional Assessment:

Anthropometric measurements included height, weight, triceps skin fold (TSF), and mid-upper arm circumference (MUAC). Height was measured using a standardized scale to the nearest 0.1 cm with a wall-mounted stadiometer. Body weight was measured with minimal clothing, using an electronic scale with a digital readout accurate to 0.01 kg. Body mass index (BMI) was calculated from height and weight (kg/m^2). All measurements were taken on the non-dominant arm. From the MUAC and TSF, Mid Upper Arm Muscle Circumference (MAMC) was calculated using the following formula: MAMC = MUAC – (π x TSF).

Except for BMI, the observed values of weight, TSF, and MAMC were compared with the standard values from the reference population and expressed as a percentage of ideal standards. The ideal body weight (IBW) was calculated using the Broca index: [IBW for men = height in cm – 100, IBW for women = height in cm – 105].

Patients were classified as undernourished if three or more of the previous values were abnormal.

Biochemical Parameters:

After an overnight fast, a venous blood sample was obtained from the patients and analyzed for total protein, serum albumin, calcium, hemoglobin, vitamin B12, and lipids.

Management of Undernutrition:

We provided management in line with ESPEN guidelines, with the active input of a dietician. All patients received dietary advice based on their specific personal situations. Good evolution was defined in our study as a gain of at least one kilogram per week.

Inclusion and Exclusion Criteria:

We included patients of both sexes over 16 years old, either inpatient or outpatient, with CD attending our department and excluded patients with incomplete data or unconfirmed Crohn's Disease diagnoses.

Statistical Analysis:

SPSS software 20.0 was used for all statistical analyses. The clinical, demographic, and epidemiologic features were analyzed using a descriptive statistical method: mean ± standard deviation for quantitative normally distributed data; median [range] for quantitative non-normally distributed data; and frequency (percentage) for qualitative data.

Normality was tested using the Kolmogorov-Smirnov test. Between-group comparisons of non-normally distributed data were performed using the Mann-Whitney test. Finally, to evaluate the predictive factors of undernutrition, we performed a multivariate analysis using logistic regression. The level of statistical significance chosen was $p < 0.005$.

Results

We had an effective sample of 138 patients. The mean age was 36.4 years, with a female predominance (sex ratio F/M: 1.6). Among our patients, 75 (45%) were inpatients, and 96 (69%) had active disease. CD had

progressed for a median of 10 years [2-15]. The ileocolic location and penetrating behavior were predominantly found in 68 (49%) and 63 (45%) patients, respectively. Perianal disease was found in 33.3% of patients. 145 of the patients were on steroids, and 14.9% of patients had undergone surgical resection (Table 1).

The overall prevalence of undernutrition in our study was 17.13%, found in 25 patients. We found a significantly higher prevalence of undernutrition in patients with active disease (Figure 1). Regarding anthropometric outcomes: 51.13% of patients were underweight (BMI <18.5), 44.77% were of normal weight (18.5 < BMI < 24.9), and 4.1% were overweight (BMI >24.9); no obese patients were found in the study. 16 (21%) of patients had an abnormal MAMC (Figure 2). 76% of patients in our study decided to avoid eating some food groups. Biological disorders were dominated by hypoalbuminemia (77 patients, 56%), followed by anemia (70 patients, 51%), disturbed lipid balance (57 patients, 42%), and low vitamin B12 (35 patients, 26%) (Figure 3).

Oral nutrition supplements were started in 33.2% of patients; when oral feeding was insufficient, enteral nutrition was started in 46.6% of patients. As a last resort, parenteral nutrition was started in 36.12% of patients. The evolution was good in 88.23%.

In multivariate analysis, disease activity (p = 0.005; OR = 2.19; CI [1.15-10.16]), surgical resection (p < 0.001; OR = 1.003; CI [1.01-2.05]), and ileocolic localization (p = 0.003; OR = 1.07; CI [1.03-9.07]) were associated with undernutrition. The history of smoking, treatment with steroids in the last year, and self-imposed restrictive food had no impact on the risk of malnutrition (Table 2)

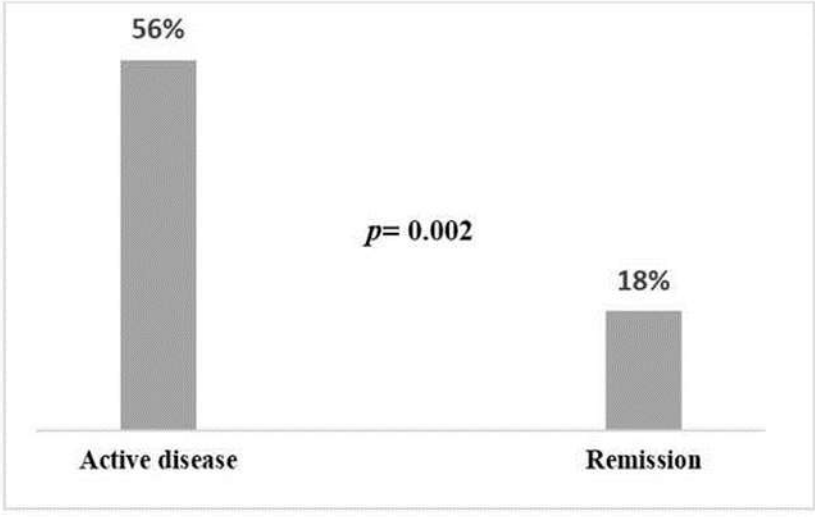

Figure 1: Prevalence of undernutrition according to activity of the disease

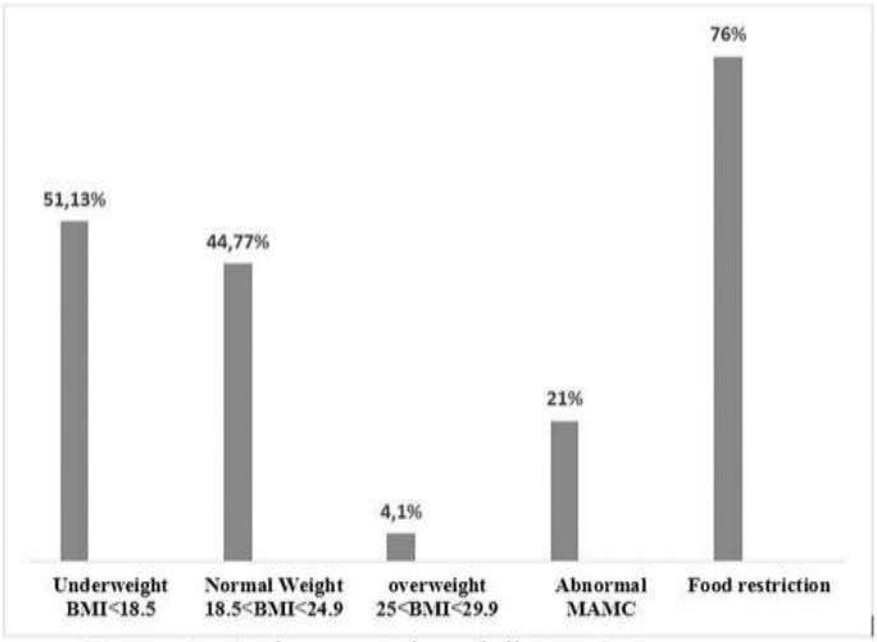

Figure 2: Anthropometric and dietary Outcomes

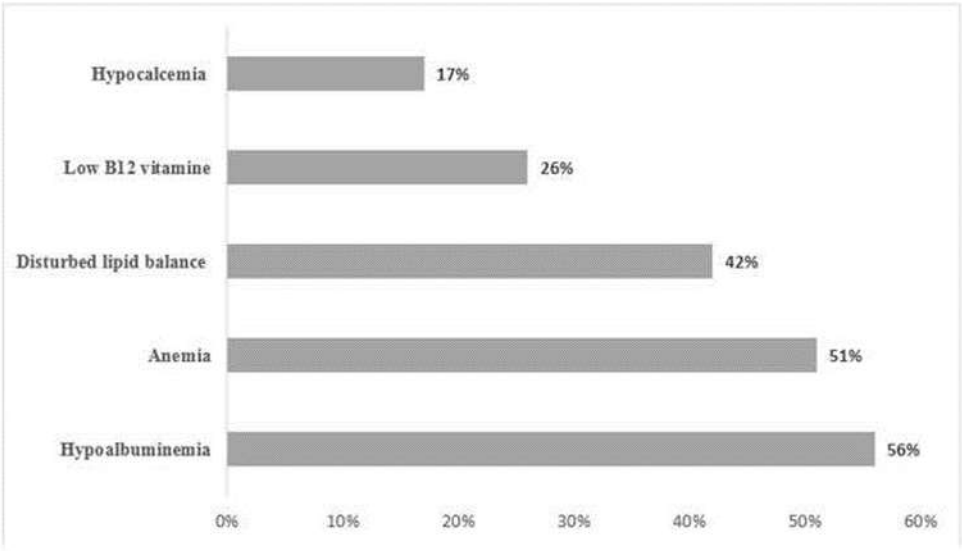

Figure 3: Biological disorders

Table 1 : Demographic data and disease´ s features

OUTCOMES	N =138(%)
Age, years [range]	36.4 [17-72]
Sex Ratio F/H	1.6
Inpatients n(%)	75 (54)
Mean duration of CD ,years [range]	10 [2-15]
Patient in remission (CDAI < 150)	42 (30.43)
Clinical activity n (%)	
Mild *150 <CDAI < 120*	59 (62.3)
Moderate *120 <CDAI < 450*	22 (22.85)
Severe *CDAI> 450*	15 (14.85)
Montreal location n (%)	
L1 (ileal)	12 (15)
L2(Colonic)	49 (35)
L3(Ileo colonic)	68 (49)
Montreal Behaviour n (%)	
• B1(Inflammatory)	25 (18)
• B2 (Stricturing)	45 (32)
• B3 (Penetrating)	63 (45)
Perianal disease n (%)	46 (33.3)
Treatment of CD n (%)	
• 5ASA	73 (52.3)
• IMMS	120 (87.3)
• Biologics	13 (8.5)
• Combo therapy	16 (11)
• Steroids	20 (14)
Surgical resection n (%)	21 (14.9)

Table 2 : Predictive factors of undernutirition

	Univariate Analysis			Multivariate analysis		
	OR	**CI**	***p*-value**	**OR**	**CI**	***p*-value**
Age	0.02	[0.01-11,04]	0,87			
Sex	0,16	[0.01-5.18]	0,6			
History of smoking	1.61	[1.5-13.08]	0.03	0,13	[1.12-7,9]	0,7
Surgical resection	6,07	[1,01-6,1]	0,02	1,003	[1,01-2,05]	<0,001
ileocolic location	1,6	[1.01-6.1]	0.001	1,07	[1,03-9,07]	0.003
Disease activity	2.1	[1.03-5.9]	0.002	2.19	[1,15-10,16]	0.005
Treatment with steroids in the last year	1.4	[0.73.2.68]	0.3			

Self-imposed restrictive food	0,19	[0.1-8.9]	0.005	0.56	[0.11- 5.1]	0.5

Discussion

The nutritional status (IBD) patients is frequently compromised, even when the disease is in remission[3.4]. Impairment in body composition in IBD patients seem to be common, but have not been well studied.

Several studies suggested that IBD are a results of an unbalanced relationship between environment, genes, and the immune system [5]. Nutriments are a relevant part of the environmental factors and, in epidemiological reports , the Western dietary pattern is associated with an increased risk of developing IBD [6]. Current evidence is, however, insufficient to draw firm conclusions about the role of dietary components and the risk of developing IBD. Although there is a lack of evidence to support any recommendation of a specific diet for IBD patients, many of them believe that certain food can induce or worsen disease symptoms. For this reason an important propotion of patient in our study (76 %) decide to avoid some food groups , it is concistant with other reports . In the study of Casanova and al 68 % have a restrictive food behaviour [7]. Restrictive food behavior may be a cause of undernutrition in patients with Crohn´s Disease ; that is why a personalized dietery advice provided by a qualified dietician is needed . According to a study of Zallot and al a relevant proportion of CD patients considered that it would be useful to receive nutritional advice from qualified personnel, in agreement with other studies [8].

We found a significantly higher prevalence of undernutrition in patient with active disease . It was consistent with other findings ; as shown in the study of Benjamin and al [9] in wich all anthropometric parameters of patients with active disease were significantly lower than those in remission , Jahnsen et al [10] had reported similar findings. Those finding may be due to malabsoption and the inedequat intake to fulfill the increased energy metabolism during actrive phases .

Our lower rate of undernutrition in comparison with other studies : Benjamin and al [10] (52%) and Quien Ciao (55.6%) [11] can be explained by patients inclusion criteria ; taking into account that most studies uncluded only hospitalized patients , and the majority of them had hight activity disease index.

It also could be explained by the fact that some studies have used additional parameters for the assessment of undernutrition as : the use of body composition monitor , dual energy X-ray absorptiometry , or the measurement of handgrip strenght . In fact , the definition of undernutrition and tools used to asses remains very controversial and it is continuously evolving.

Within this context Valentini and al. [12] assessed the nutritional status in 144 IBD patients in clinical remission, and concluded that alterations in body composition studied with theduel energy X-ray absorptiometry , are frequent, even in remission, and cannot be detected by standard clinical screening tools.

According to our findings, clinical activity is associated with malnutrition. it is so in other finding [13,14,15]. Nevertheless, malnutrition was found in patients with mild activity and even in remission : a previous study evaluated the nutritional status shortly after IBD diagnosis and concluded that it was already affected negatively at time of diagnosis[16]. Our results also found that history of abdominal surgery was associated with undernutrition , it was also a predictive factor of undernution in a nationwide study performed in IBD patients [17]. The food restrictive behaviour and extensive ileal involvement were widely reported as associated with a higher risk of undernutrition in many reports [7] , this was surprisingly not the case for our study an interessing result that we are not able to explain with the current data .

To conclude, in consistent with previous studies we found an impaired nutritional status especially in patients with active disease . The disease activity is in fact one of the most common described associated factors of undernutrition, followwed by a history of surgical resection . These results highlight the importance of wise management of nutrition mainly during the active phases of the disease. Screaning of undernutrition should be inclouded in clinical routines and individualized dietery advice should be provided to all patients.

Declarations of interest: none

References

1- Balestrieri P, Ribolsi M, Guarino MPL, Emerenziani S, Altomare A, Cicala M. Nutritional Aspects in Inflammatory Bowel Diseases. Nutrients. 31 janv 2020;12(2):372.

2- Stephan C. Bischoff , Johanna Escher , Xavier H_ebuterne , Stanisław Kłe, Zeljko Krznaric , St_ephane Schneider and al . ESPEN practical guideline: Clinical Nutrition in inflammatory bowel Disease. Clin Nutr 2020 Jan 13 .

3- Valentini L, Schaper L, Buning C, et al. Malnutrition and impaired muscle strength in patients with crohn's disease and ulcerative colitis in remission. Nutrition 2008;24:694-702.

4- Tinsley A, Ehrlich OG, Hwang C, et al. Knowledge, attitudes, and beliefs regarding the role of nutrition in ibd among patients and providers. Inflamm Bowel Dis 2016;22:2474-81.

5- D'Haens G, Feagan B, Colombel JF, et al. Challenges to the design, execution, and analysis of randomized controlled trials for inflammatory bowel disease. Gastroenterology 2012;143:1461-9.

6- Limdi JK, Aggarwal D, McLaughlin JT. Dietary practices and beliefs in patients with inflammatory bowel disease. Inflamm Bowel Dis 2016;22:164-70.

7- MJ. Casanova1, M. Chaparro1, B. Molina1*, O. Merino2, R. Batanero2*, C. Dueñas-Sadornil3 and al. PREVALENCE OF MALNUTRITION AND NUTRITIONAL CHARACTERISTICS OF PATIENTS WITH INFLAMMATORY BOWEL DISEASE.JCC .Doi: 10.1093/ecco-jcc/jjx102

8- Zallot C, Quilliot D, Chevaux JB, et al. Dietary beliefs and behavior among inflammatory bowel disease patients. Inflamm Bowel Dis 2013;19:66-72.

9- Benjamin J ,1 Govind K Makharia,1 Kalaivani M,2 Yogendra K Joshi. Nutritional status of patients with Crohn's disease. Indian Journal of Gastroenterology 2008 Vol 27 Number 5

10- Jahnsen J, Falch JA, Mowinckel P, Aadland E. Body composition in patients with inflammatory bowel disease: a population based study. Am J Gastroenterol 2003;98:1556–62.

11- Qin Cao, Yu-Hong Huang, Min Jiang & Cong Dai. The prevalence and risk factors of psychological disorders, malnutrition and quality of life in IBD patients Scand J Gastroenterol 2019 Dec

12- Bryant RV, Trott MJ, Bartholomeusz FD, Andrews JM. Systematic review: Body composition in adults with inflammatory bowel disease. Aliment Pharmacol Ther 2013;38:213-25.

13- Cabre E, Gassull MA. Nutrition in inflammatory bowel disease: Impact on disease and therapy. Curr Opin Gastroenterol 2001;17:342-9.

14- Layden T, Rosenberg F, Nemchausky G, Elson C, Rosenberg I. Reversal of growth arrest in adolescents with crohn's disease after parenteral alimentation. Gastroenterology 1976;70:1017-21.

15- Lanfranchi GA, Brignola C, Campieri M, et al. Assessment of nutritional status in crohn's disease in remission or low activity. Hepatogastroenterology 1984;31:129-32.

16- Geerling BJ, Badart-Smook A, Stockbrugger RW, Brummer RJ. Comprehensive nutritional status in recently diagnosed patients with inflammatory bowel disease compared with population controls. Eur J Clin Nutr 2000;54:514-21.

17- Nguyen GC, Munsell M, Harris ML. Nationwide prevalence and prognostic significance of clinically diagnosable protein-calorie malnutrition in hospitalized inflammatory bowel disease patients. Inflamm

Bowel Dis 2008;14:1105-11.ç.