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Ileal crohn's disease: clinical characteristics, complications and outcomes in a moroccan tertiary center: A retrospective study of 105 Patients

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Abstract

Ileal involvement in Crohn's disease represents a distinct form often associated with severe complications such as strictures, fistulas, and abscesses. It remains underexplored in our context. Through this retrospective study conducted in the Department of Hepato-Gastroenterology at Hassan II University Hospital in Fez, we analyzed the clinical, paraclinical, endoscopic, and evolutionary characteristics of patients with ileal Crohn's disease. The clinical presentation was dominated by abdominal pain and bowel disturbances, with perianal and extraintestinal manifestations in several cases. Radiological and endoscopic investigations revealed suggestive ileal lesions, sometimes complicated. Diagnosis was based on a combination of clinical, biological, endoscopic, and histological findings. Management included immunosuppressive and biologic therapies, with surgery required in complicated forms. Disease progression was variable, marked by phases of remission but also by refractory or aggressive forms. This study highlights the severity of this disease phenotype, the frequency of its complications, and the importance of a tailored therapeutic strategy that combines early diagnosis, close monitoring, and multidisciplinary coordination.

Keywords: Crohn's disease; Ileal involvement; Complications; Surgery

1. Introduction

Ileal involvement in Crohn's disease represents a distinct form characterized primarily by segmental and transmural inflammatory involvement of the ileum, with a course marked by remissions interspersed with flare-ups. Ileal involvement tends to lead to complications, notably strictures, fistulas, and abscesses.

On our continent, the characteristics of this entity remain poorly explored, owing to its low incidence in Africa and the challenges associated with diagnosis. Moreover, its etiologies remain elusive. Nevertheless, consensus among several studies suggests a multifactorial origin involving dysfunctions in the gut flora resulting from environmental and genetic factors.

This work aims to describe the epidemiological profile, analyze the sociodemographic, clinical, and paraclinical characteristics of ileal involvement, outline its therapeutic management, investigate prognostic factors and the disease's progression profile, all aimed at preventing progression towards intestinal destruction and perforating or stenosing complications.

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2. Materials and Methods

This was a retrospective descriptive study including 105 patients with ileal Crohn's disease, with or without associated colonic involvement, followed at the Department of Hepato-Gastroenterology of Hassan II University Hospital in Fez.

We included patients aged over 16 years with complete and exploitable medical records, in whom the diagnosis of ileal Crohn's disease was established based on clinical, biological, endoscopic, radiological, histological, and follow-up criteria.

Sociodemographic, clinical, paraclinical, and outcome data were collected using the "Hosix" electronic medical record system. The study was conducted in accordance with international ethical standards, ensuring strict respect for patient confidentiality and data protection.

3. Results

3.1. Epidemiological Characteristics

In our series of 105 patients with Crohn's disease, the mean age was 37.76 ± 12.2 years, ranging from 18 to 69 years. The average age at diagnosis was 31.5 years. Crohn's disease remains rare after the age of 60, with only three patients affected, representing 2.8% of our population. The most represented age group was 30-39 years, with 34 patients, accounting for 34% of cases.

We observed a female predominance in our series, with 70 women (66.7%) compared to 35 men (33%), resulting in a female-to-male ratio of 2. The majority of patients came from an urban environment, representing 76.3% of cases (n = 71).

Regarding health coverage, 69 patients (66%) were beneficiaries of AMO-TADAMON, a system that provides them with limited access to biotherapies.

Table 1 Epidemiological characteristics of the study population

Category	**Category**	**Number**	**%**
Average Age	Average Age	37.76 ± 12.2 (18-69 years)	
Symptom Onset to Diagnosis	Symptom Onset to Diagnosis	16.7 months	
sex	Female	70	66.7%
sex	Male	35	33.3%
Health coverage	AMO-TADAMON	69	66
Health coverage	CNSS	18	17%
Health coverage	CNOPS	14	13%
Health coverage	Couverture privée	3	3%
Health coverage	Aucune couverture	1	1%
Origin	Urban	71	76.3%
Origin	Rural	22	23.7%
Tuberculosis and the concept of contagion	History of Contact	3	2.86%
Tuberculosis and the concept of contagion	Tuberculosis Disease	8	7,6%
Tuberculosis and the concept of contagion	None	94	89,5 %
History of Autoimmune Disease	Celiac Disease	1	1%
History of Autoimmune Disease	SPA	7	6%

History of Autoimmune Disease	Psoriasis	1	1%
History of Autoimmune Disease	Lupus	1	1%
History of Autoimmune Disease	NONE	95	91%
Surgical History	Never	76	72%
Surgical History	Appendectomy	11	10.7%
Surgical History	Anal Abscess Drainage	6	5.7%
Surgical History	Anal Fistula Surgery	4	3.6%
Surgical History	Digestive Segmental Resection	3	2.8%
Toxic history	Active Smokers	18	14.3%
Toxic history	Cannabis Use	14	

3.2. Clinical Characteristics

Ileal involvement in Crohn's disease presented as a chronic course (abdominal pain, chronic diarrhea) in 81 patients (77%) compared to an acute onset (intestinal obstruction, appendicitis, etc.) in 24 patients (23%).

Digestive symptoms were predominant in the diagnosis of ileal Crohn's disease, particularly abdominal pain and diarrhea. Abdominal pain was present in 93 patients (88.5%). Chronic diarrhea was a major clinical feature, with 28 patients experiencing watery diarrhea, 28 with mucus diarrhea, 21 with muco-bloody diarrhea, 7 with bloody diarrhea, and 8 reporting alternating diarrhea and constipation . dysenteric syndrome was observed in 26 patients (24.76%).

Koenig's syndrome was observed in 52 patients (49.5%). Right iliac fossa pain was reported by 26 patients (24.7%). Pseudo-appendicular syndrome revealed the disease in 5 patients (4.76%), two of whom required emergency surgery. Intestinal obstruction was the reason for consultation in 4 patients (3.8%).

Extra-digestive manifestations were present in 32 patients (30%), predominantly arthralgia in 30 cases. Mucocutaneous symptoms were observed in 3 patients, mainly oral aphthae and erythema. One patient had uveitis, while no neurological signs were associated with the disease onset (figure 1)

Anoperineal manifestation at the time of diagnosis were present in 21 patients (20%) and were distributed as follows (Table 4):

According to the Cardiff classification (see Annex 2), anal fissures and anal fistulas accounted for 6.6% (n=7) and 8.5% (n=9), respectively.

Hemorrhoidal skin tags were found in 5 patients (4.7%)

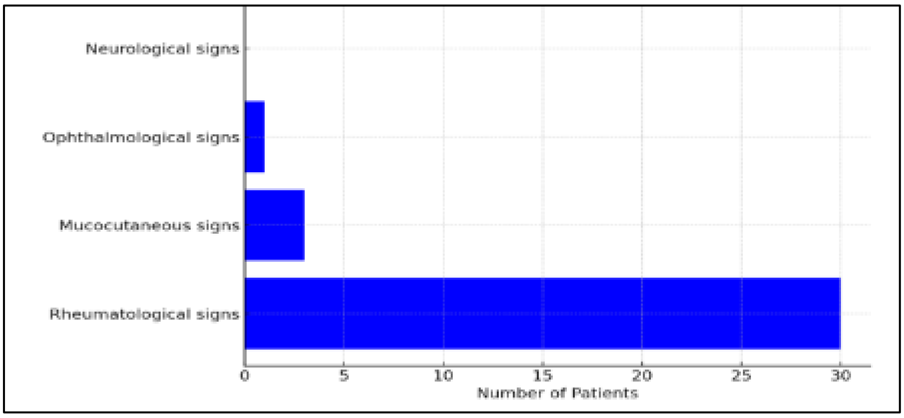

Figure 1 Distribution of observed extra-digestive manifestations.

Anemia was present in 68 patients (64.7%). The biological assessment revealed an average C-reactive protein (CRP) level of 59.23 ± 67.1 mg/L, while the mean serum albumin level was 22.11 ± 7.0 g/L. Additionally, the mean fecal calprotectin level was 653.31 ± 452.5 µg/g, reflecting significant inflammatory activity

3.3. Radiological Characteristics (figure 2 et 3)

In our series, all patients initially underwent a digestive ultrasound, followed by cross-sectional imaging (CT and/or MRI) . CT and/or MRI scans performed on all patients reported thickening of the terminal ileum in 86 patients (82%), fistulas in 27 cases (25%), and abscess formation in 13 cases (12%). Sclerolipomatosis was observed in 6 patients (5.7%), while retractile mesenteritis was identified in 3 cases (2.8%).

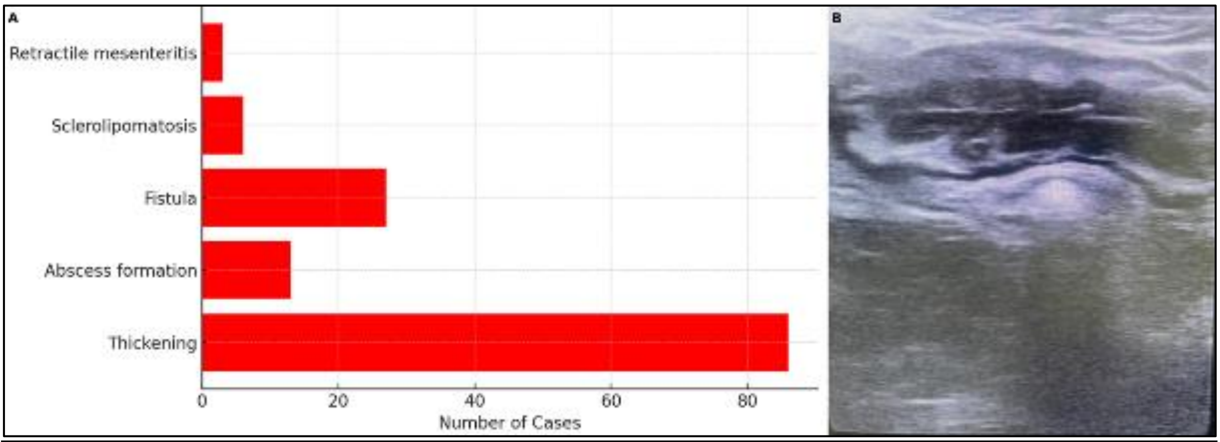

Figure 2 Radiological and ultrasound findings in ileal Crohn's disease. (A) Radiological abnormalities in CT and abdominal MRI. (B) Ultrasound image showing thickening of the terminal ileum

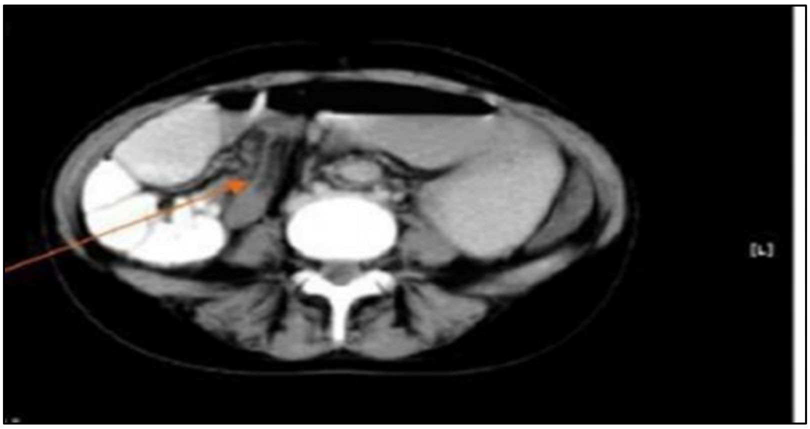

Figure 3 Entero-CT scan showing a stenosis of the terminal ileal loop with upstream ileal distension (Radiology Department, CHU Hassan II, Fez)

3.4. Endoscopic Characteristics

All patients underwent ileocolonoscopy (Figure 4), Terminal ileum stenosis (DAI) was observed in 42 patients (40%), erythema in 28 (26%), aphthoid ulcers in 25 (23%), superficial ulcers in 7 (6.6%), deep ulcers in 3 (2.8%), nodular appearance in 18 (17%), and fistulas in 4 cases (3.8%).

Regarding lesion topography, isolated ileal involvement was observed in 14 patients (13.3%) in our series, whereas ileocecal involvement was present in 35 patients (33.3%). Ileocolic involvement was the most frequent, affecting 56 patients (53.3%) (Figure 4).

According to the Montreal classification (see Annex 1), the ileocolic (L3) localization was found in 91 patients (86.7%), while the pure ileal (L1) localization was observed in 14 patients (13.3%)

An esophagogastroduodenoscopy (EGD) was performed in 44 patients (41.9%). It revealed erythematous antrum-fundic gastritis (GAFE) in 40 patients (38%) and esophageal ulceration in 2 cases (1.9%).

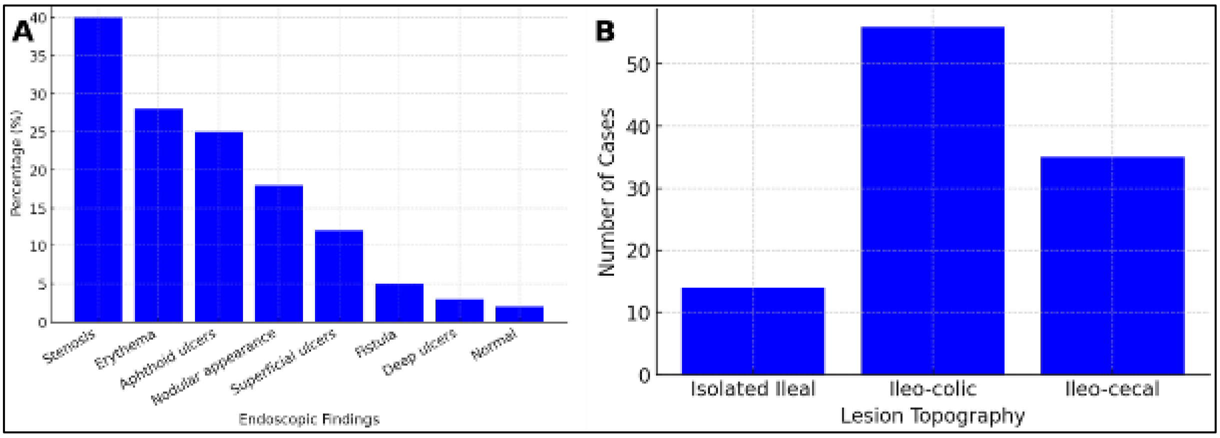

Figure 4 Endoscopic findings and lesion topography in Crohn's disease. (A) Percentage of colonoscopic abnormalities. (B) Distribution of patients according to lesion topography

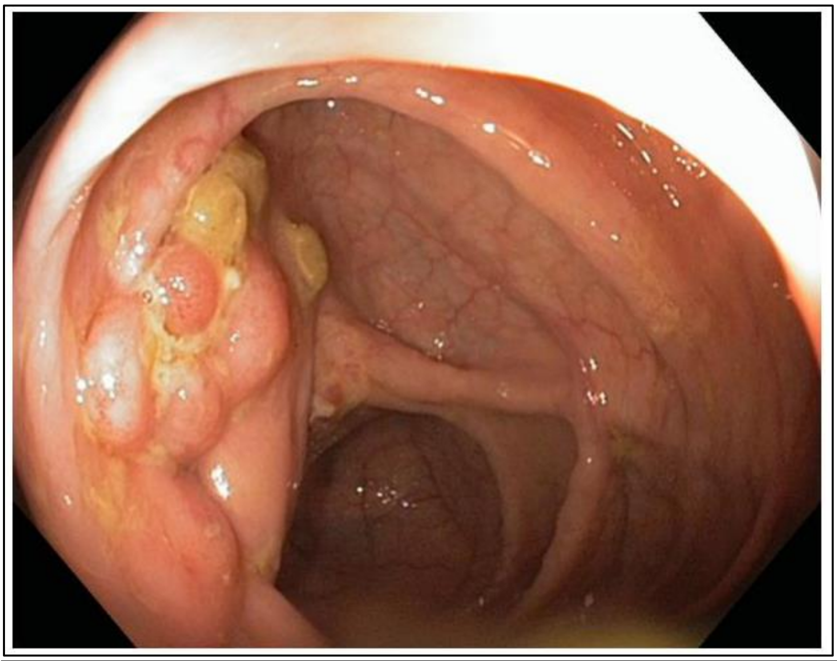

Figure 5 Stenosed, pseudo-polyploid, and ulcerated ileocecal valve (Digestive Endoscopy Unit – Hassan II University Hospital, Fez)

3.5. Histological Characteristics

Histopathological examination of biopsies obtained during endoscopic explorations and/or from surgical resection specimens in operated patients. Findings were consistent with Crohn's disease in 87 patients (83%), while in 18 patients (17%), the results were non specific.

3.6. Treatment

The indication for medical treatment in our setting was based on several factors, including disease phenotype, activity, the presence of complications, patient age, comorbidities, access to therapeutic agents, and healthcare coverage.

In our study, azathioprine was prescribed to 67 patients (64%), while corticosteroid therapy was administered to 20 patients (19%).Regarding biologic therapy, 57 patients (54.3%) received treatment, with infliximab being the most commonly used agent in 45 patients (78.9%), followed by adalimumab in 11 patients (10.5%) and ustekinumab in 1 patient (1.8%) (Figure 7). Additionally, combination therapy was employed in 22 patients (20%).

Surgical treatment was required in 45 patients (43%), whereas 60 patients (57%) did not undergo surgery .The primary surgical indication was fistula formation in 21 cases, followed by stenosis in 19 cases. Surgery was also indicated for abscess formation in 2 cases and peritonitis in 1 case.

Surgical resection was the most frequently performed procedure, carried out in 42 patients (40%). Additionally, surgical drainage of an abscess was performed in 2 cases (1.9%), and fistulectomy was conducted in 1 patient (0.95%).

Figure 6 Ileocecal surgical resection specimen (Department of Visceral Surgery – CHU Hassan II, Fez)

3.7. Evolution

Among the 105 patients with ileal involvement of Crohn's disease included in our study, 72 cases (68.5%) were hospitalized at least once during the follow-up period, while 33 patients (31.5%) never required hospitalization.

Regarding disease progression, 31 patients (29.5%) did not develop any notable complications. However, 7 patients (6.7%) developed abscesses, 51 patients (48.6%) presented with stenosis, and 44 patients (41.9%) experienced fistulas. These results highlight the high prevalence of complications in patients with ileal Crohn's disease.

In our series, clinical remission was observed in 78 patients (74.3%), while 63 patients (60%) achieved biological remission. However, endoscopic remission was observed in only 20 patients (19%), and histological remission was noted in 3 patients (2.9%) . Conversely, 38 patients (26**%)** did not achieve any form of remission.

Based on the different therapeutic strategies implemented, remission was achieved under biologic therapy in 22 patients (21%), Azathioprine in 18 patients (17%), and combination therapy in 10 patients (9.5%). Additionally, 18 patients (17%) achieved remission following surgery.

Finally, 11 deaths (10.5%) were recorded during follow-up, the time from diagnosis to death ranged from 9 months to 14 years, with an average of 4 ± 4.0 years. The main causes of death were sepsis, malnutrition, and postoperative complications

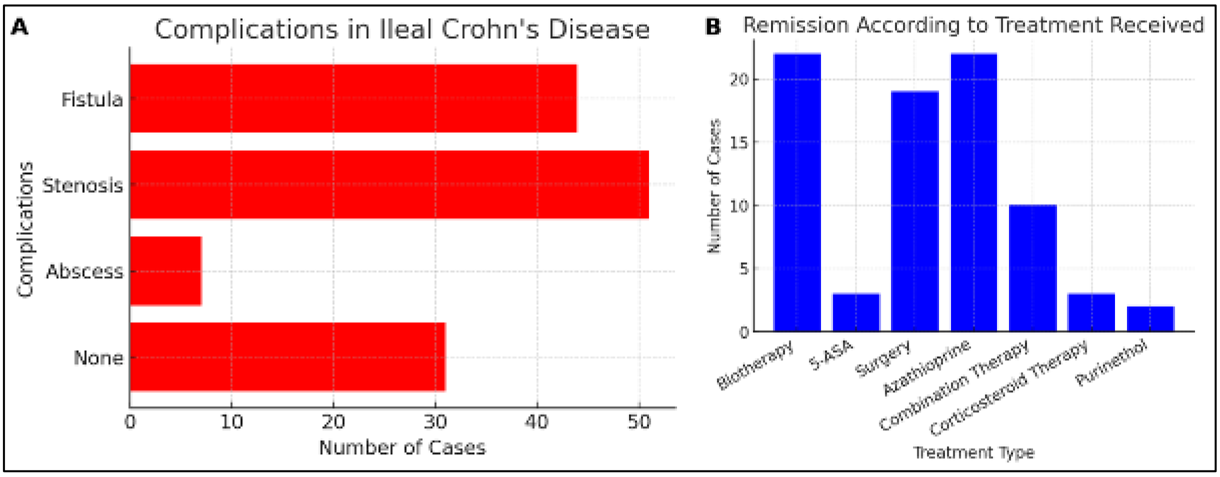

Figure 7 Complications and treatment outcomes in ileal Crohn's disease. (A) Complications occurring during follow-up. (B) Remission according to treatment received

4. Discussion

4.1. Epidemiology

Crohn's disease is a chronic inflammatory bowel disease (IBD) with a variable global distribution. The incidence of Crohn's disease (CD), expressed as the number of new cases per 100,000 individuals per year, ranges from 1 to 6.13. As for prevalence, which represents the total number of recorded cases in a population at a given time, it varies between 27 and 106 per 100,000 inhabitants [1]

Table 2 Incidence of Crohn's disease in different regions of the world

Region	Country	Study Period	Incidence per 10,000 inhabitants
Galicia	Spain	1976-1982	0.8
		1973-1975	2.6
Aberdeen	United Kingdom	1973-1975	2.7
Copenhagen	Denmark	1962-1978	4.1
Baltimore	United States	1979-1987	3.1
Bergen	Norway	1977-1979	
Leiden	Netherlands	1979-1980	3.5
Stockholm	Sweden	1983-1986	3.8
Milan	Italy	1979-1983	5.9
Malmö	Sweden		
		1970-1991	
		1958-1973	4.8
Nord-Pas-de-Calais	France		
Blackpool	United Kingdom	1988-1990	4.8
Derby	United Kingdom	1988-1990	4.9
Kyle	United Kingdom	1976-1980	6.1
		1981-1985	6.7

		1955-1987	5.4
		1985-1987	9.8

In our study, the average age at diagnosis was 31.5 years, consistent with previous data on ileal involvement in Crohn's disease. Studies, such as those by Cooke et al. and the Birmingham series, have shown a predominance of ileal involvement in young patients, with average ages below 20 years and 26.4 years, respectively[2,3,4,5]

Table 3 Age at diagnosis of patients with ileal involvement in Crohn's disease across different studies

Author	**Number of patients**	**Age at diagnosis**
Cooke	18	13/18 < 20 years
Goldstein	13	12/13 < 30 years
Tan	34	26.4 years (average)
Our series	105	31.5 years (average)

Urbanization and socioeconomic status influence the onset and progression of Crohn's disease, particularly ileal involvement. French and Canadian studies have shown a higher incidence among unemployed individuals and those living below the poverty line [5,6].

Other studies suggest a different trend. In Slovakia, patients from a higher socioeconomic background were the most affected. In Greece and China, the majority of cases came from urban areas (87% and 73.8%, respectively), highlighting the impact of industrialization and urbanization. In our study, 76.3% of cases were from urban areas, and 66% of patients were covered by the AMO-TADAMON social security system, designed for economically vulnerable populations (1, 2, 3, and 4)

A Chinese study by Chen et al. [7] compared 617 patients with Crohn's disease (CD) to 617 controls to assess the association between prior appendectomy and CD. The results showed a higher rate of appendectomy in CD patients, identifying this procedure as an independent risk factor (OR: 1.878).

4.2. Clinical Presentation

In our study, we analyzed the characteristics of chronic diarrhea and abdominal pain, comparing them with the results of a Chinese study [8] that followed 44 patients with ileal involvement in Crohn's disease over a period ranging from 5 to 43 months (average of 20.1 ± 10.7 months). Among the most common symptoms, 34 patients (77.3%) experienced abdominal pain, 4 (9.1%) had diarrhea, 3 (6.8%) had rectal bleeding, 2 (4.5%) presented with abdominal distension, and 1 (2.3%) experienced weight loss.

Crohn's disease is known to also present with extraintestinal manifestations. The attached figure provides a brief overview of the different extraintestinal manifestations.

Table 4 Percentage of Extraintestinal Manifestations in Crohn's Disease across Various Studies [9,10,11,3,12]

Author	**Regions**	**Years**	**Percentage of EIMs**
Burisch J., et al	Central Europe	2014	15.5%
Gower-Rousseau C., et al	France (EPIMADE)	2013	13%
Touze I., et al	France	1999	19.1%
Li Y., et al	China	2015	33.2%
Park J., et al	South Korea	2023	8.55%
Engoange et al	Morocco	2014	25.6%
Our series	Morocco	2023	30%

Anoperineal lesions are closely related to the intestinal location of Crohn's disease. The lower the disease involvement, the higher the risk of developing anoperineal lesions (APL) [13,14].

4.3. Paraclinical characteristics

The study by Bezzio et al. highlights ileal involvement with predominantly inflammatory lesions (erosions in 51% of cases, ulcers in 17.6%, aphthous lesions in 19.6%, nodules in 5.9%, and erythema in 5.9%), whereas our study identifies a higher rate of structural complications such as stenoses and fistulas. These differences could be related to the characteristics of the studied population and the duration of disease progression [21].

Computed tomography (CT) is considered the standard diagnostic examination of choice for patients with Crohn's disease, with an almost eightfold increase in its use between 2003 and 2007, according to the report by Jaffe et al. Entero-CT offers several advantages over other imaging modalities, such as rapid acquisition time, availability, extensive experience among radiologists, and the ability to detect both intra- and extra-luminal manifestations of the disease [15]

4.4. Treatment

The treatment of ileal Crohn's disease is based on medical management aimed at reducing inflammation and preventing complications. Aminosalicylates are not indicated for the management of ileal forms. Corticosteroids, particularly budesonide, are recommended for mild to moderate forms, while severe cases require systemic corticosteroids such as prednisone [16]

Azathioprine and 6-mercaptopurine are used for their immunosuppressive effects to maintain remission in corticosteroid-dependent patients [16]. Methotrexate is an alternative for patients intolerant to thiopurines. Biologic therapies, including anti-TNF agents (infliximab, adalimumab), are indicated in cases of treatment failure with conventional therapies or in severe cases from the outset [17].

Vedolizumab and ustekinumab are second-line therapies for patients who fail or are intolerant to anti-TNF agents[18].

Surgery is indicated in cases of complications such as symptomatic stenosis, perforation, intra-abdominal abscess, or fistula[19]. Ileocaecal resection is the most common procedure, and laparoscopic surgery is preferred due to its benefits in terms of postoperative recovery[19].

Stricturoplasties are an alternative to iterative resections to preserve intestinal length and prevent short bowel syndrome [20].

According to the literature, the surgical approach is preferable for patients with short, non-inflammatory strictures [20].

5. Conclusion:

Ileal Crohn's disease in our population is associated with a high rate of structural complications, surgical interventions, and significant morbidity. Early diagnosis and optimized therapeutic strategies are essential to improve long-term outcomes.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflict of interest.

Statement of ethical approval

This retrospective study was conducted in accordance with the principles of the Declaration of Helsinki. Patient data were anonymized and confidentiality was strictly maintained.

Statement of informed consent

"Given the retrospective design of the study and the use of anonymized patient data, the requirement for informed consent was waived".

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