Clinical features and Histopathologic distribution of Granuloma in Colonoscopy Biopsy

A Research project submitted to department of Surgery, School of Medicine, CHS, Addis Ababa University, for the partial fulfillment of general surgery Specialty Certificate program

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APPROVAL SHEET

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I, the undersigned general surgery resident, declare that I have submitted my original work on a title CLINICAL FEATURES AND HISTOPATHOLOGIC DISTRIBUTION OF GRANULOMA IN COLONOSCOPY BIOPSY for the examination.

Submitted by:

Natnael Gebeyehu _____ _____ 3/11/2025

Signature Date

This thesis work has been submitted for examination with my approval as an advisor.

Approved by:

Dr. Abel Shiferaw

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Signature Date

Statement of the Author

I hereby declare that this thesis is my original work and has not been presented for a degree in any other university and all sources of material used for this thesis have been duly acknowledged.

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Abstract

Introduction

Histopathologic examination of colonoscopy biopsies is vital for diagnosing gastrointestinal diseases. Granulomas, focal aggregates of immune cells associated with chronic inflammation, are a key area of study. They can be categorized into foreign body granulomas, which isolate non-reactive substances without a T cell response, and immune granulomas, which involve continuous T cell-mediated reactions. Granulomas exhibit various patterns, such as foreign body, epithelioid, xanthogranulomatous, suppurative, and necrotizing types, each indicating different causes. They can result from infections such as TB, non-infectious conditions like Crohn's disease, drug reactions, inherited disorders, malignancies, or idiopathic conditions. Accurate classification is crucial for effective management, ranging from antimicrobial therapy to immunosuppressive treatment. Despite challenges in granuloma distribution and morphology, histopathology remains essential for diagnosing intestinal granulomatous disease and differentiating between IBD subtypes and other conditions.

Objectives

The objective of this study is to understand patient's clinical features and histopathologic distribution of granulomas found in colonoscopy biopsies that guides in early categorization and management selection of patients.

Methods

This is a cross sectional descriptive study which will be conducted to describe patients presenting clinical features, distribution pattern on colonoscopy biopsy and histopathologic characteristics of granulomas in those attending the GI outpatient clinic at Tikur Anbessa Specialized hospital (TASH).

Result and discussion

This study provides a comprehensive analysis of patients diagnosed with Crohn's Disease (CD) and Tuberculosis (TB) at a gastrointestinal clinic over a six-month period. The findings reveal that a significant proportion of the study population was female (64%), with a mean age of 33.5 years. The average age of symptom onset was 30.8 years, indicating that symptoms typically manifest in the late twenties to early thirties. A notable proportion of patients had a history of prior surgery (33.7%) and TB (15.7%).

The majority of patients (76.4%) were diagnosed with CD, while 16.9% were diagnosed with TB. Diagnostic methods included colonoscopy (37%) and histopathology (34.5%). Abdominal pain was the most common presenting symptom (68.8%), followed by chronic diarrhea without blood (12.9%) and anorectal pain (10.8%).

During follow-up, 21% of cases experienced a change in diagnosis, with 18% reclassified as CD and 2% as TB. Over half of the patients (56%) were hospitalized for their condition. Initial treatment patterns revealed that 47% of patients were started on steroids, 32% on immunomodulators, and 15% on anti-TB treatment. A significant proportion (41.6%) underwent surgery during follow-up.

Histologic findings highlighted the presence of increased inflammatory cells and granulomas. Imaging findings, particularly bowel wall thickening and unremarkable ultrasound results, were significant in differentiating CD from non-CD conditions.

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1. Introduction

The histopathologic examination of colonoscopic biopsies plays a crucial role in diagnosing and understanding various gastrointestinal diseases(1,2). One intriguing area of study is the distribution and characteristics of granulomas within colonic tissue. Granulomas are focal aggregates of immune cells, often associated with chronic inflammation. Investigating their prevalence, location, and histological features can provide valuable insights into disease processes, differential diagnoses, and potential therapeutic approaches(1).

Granulomatous reactions are categorized into two primary types. The first is the foreign body type, which occurs when the body tries to engulf and isolate non-reactive substances, such as surgical sutures, without triggering a T cell-mediated immune response. The second type, immune granulomata, arises from a continuous T cell-mediated immune reaction, leading to the engagement of both the body's innate and adaptive immune defenses(3).

Granulomas display various patterns that often indicate their cause. Common forms include the foreign body type with multi-nucleated cells and irregular nuclei arrangement; the epithelioid type with clusters of histiocytes that have a lot of eosinophilic cytoplasm and nuclei resembling footprints; the xanthogranulomatous type with lipid-filled macrophages; the suppurative type centered around neutrophils; and the necrotising type, which may preserve the structure of the dead tissue, except in tuberculosis where it becomes unstructured. Additionally, sarcoidal granulomas, typically free from other inflammatory cells and containing calcified inclusions, and microgranulomas, which are smaller with fewer histiocytes, are notable subtypes(3).

Granulomas can indeed be classified based on the inciting agents for effective management. Infectious granulomas are typically caused by systemic infections like tuberculosis or localized GI

infections such as those caused by Helicobacter species. Parasitic infections and venereal diseases can also lead to granuloma formation. Non-infectious granulomas may arise from conditions like Crohn's disease, reactions to drugs or foreign materials, and inherited disorders like chronic granulomatous disease. Additionally, granulomas can be associated with malignancies or idiopathic conditions where the cause remains unknown. It's important to accurately classify granulomas since the underlying cause dictates the management approach, ranging from antimicrobial therapy for infectious causes to immunosuppressive treatment for autoimmune conditions(3–5).

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Histopathology remains a gold standard and crucial for diagnosing intestinal granulomatous disease. However, variations in granuloma distribution and morphology can pose challenges. Investigating these variations can enhance our ability to differentiate between IBD subtypes and other granulomatous conditions(1,3).

2. Statement of the Problem

Despite existing literature on granulomas in IBD in high income countries, there is limited research regarding other overlapping granulomatous diseases in LMIC and no published literature is found specifically focusing on clinical features and histopathologic granuloma distribution pattern within the colon in Ethiopia where TB and other infectious diseases are relatively common and bring challenges in managing patients timely. Addressing this gap will improve our understanding of disease pathogenesis and guide clinical decision-making and open path for other researches directed to this disease classes.

3. Significance of the Study

3.1 Clinical Implications

- Accurate identification of granulomas can aid in distinguishing Crohn's disease from other colitis's.
- This research aims to produce and test a disease predicting model and score that assist Predicting disease behavior based on granuloma distribution may guide treatment strategies.

3.2 Research Contributions

- This study will provide novel insights into the spatial distribution of granulomas in colonic biopsies and associated clinical features.
- Findings may lead to refined diagnostic criteria and improved patient management.

4. Literature review

Granulomas, which are structured clusters of activated histiocytes, commonly emerge as a result of continuous antigen exposure within the gastrointestinal system. These granulomas arise due to ongoing antigenic stimulation and can be categorized into infectious, non-infectious, or idiopathic immune responses. In the context of Crohn's disease, granulomas appear in about 15-60% of instances, with an average occurrence rate of 45%. At initial diagnosis, they are detected in 25-40% of tissue samples. The incidence of granulomatous conditions affecting the gastrointestinal tract may vary and is influenced by factors such as geographical location and the specific population being considered. These conditions can stem from bacterial, fungal, or parasitic

infections. A less common condition is granulomatous gastritis, which is found in roughly 0.35% of stomach tissue biopsies(3,5,6).

Granulomas are distinctive histopathological entities that may be encountered during colonoscopy biopsies. They are significant in the differential diagnosis of various intestinal diseases, particularly Crohn's disease and intestinal tuberculosis. The clinical features accompanying these granulomas can vary widely, making accurate diagnosis a challenge for clinicians(7,7–10).

Studies have shown that clinical features alone are insufficient to distinguish between the two conditions. Endoscopic mucosal biopsies, colonoscopic findings, and histological examination play pivotal roles in the differential diagnosis (8,11–14). The presence of granulomas on biopsy, combined with culture results, enhances the diagnostic accuracy (10,12). However, even with these methods, the differentiation remains complex due to the granulomatous nature of both diseases (15–17).

Tuberculosis (TB) and Crohn's Disease (CD) are two distinct conditions that can affect the gastrointestinal tract, presenting with similar clinical, endoscopic, and histological features. This overlap in presentation poses a diagnostic challenge, particularly in regions where TB is endemic(10).

Even though Crohn's disease has been extensively studied in high-income countries, its epidemiology and care in LLMICs are not well established due to a lack of disease registries and diagnostic capacity. A scoping review conducted by Rajbhandari et al. on Crohn's disease in low and lower-middle income countries (LLMICs) aimed to describe the published burden, diagnostic/treatment capacity, service utilization, challenges/barriers faced by individuals with Crohn's and their providers in 79 LLMICs found mean number of Crohn's patients 57.84, with a

wide range from 1 - 980 largest number of studies from India, followed by Tunisia and Egypt. The conclusion was there is a signal of Crohn's disease in these settings around the world(18).

Another study conducted by Hodges and Kelly on Inflammatory Bowel Disease (IBD) in Africa showed, despite lacking comprehensive epidemiological data are lacking, the incidence of IBD in Africa is rising. It also mentioned that Intestinal tuberculosis (TB) represents a significant confounding factor in the diagnosis of IBD in Africa (19).

In Ethiopia , with lacking published data regarding IBD , one unpublished research in AAU data base done to describe SOCIODEMOGRAPHIC FEATURES, CLINICAL CHARACTERISTICS AND TREATMENT PATTERNS OF INFLAMMATORY BOWELDISEASE IN PATIENTS SEEN AT TIKUR ANBESSA SPECIALIZED HOSPITAL concluded that with predominance of females in both IBD subtypes histopathological CD was more common than UC other with the research didn't try to evaluate and compare other granulomatous colonic disease in the hospital(20).

According to WHO global TB burden report of 2022, despite lacking break down report of specific type of TB like intestinal TB , the Global Incidence is estimated to be 10 million new TB cases worldwide and Mortality of Approximately 1.4 million people , including 208,000 deaths among individuals with HIV with High-Burden disease occur in India, followed by countries in Africa and Southeast Asia(21).

Despite Ethiopia being found in high burden region according to WHO there is no specific published data showing the specific burden, clinical features and histopathologic pattern of intestinal TB.

Even though the differentiation between intestinal TB and CD is crucial for appropriate management, as the treatment strategies for these diseases differ significantly There is a constant challenge of differentiating Crohn's disease (CD) from intestinal tuberculosis, especially with the increasing burden of inflammatory bowel disease in tuberculosis-endemic areas causing delay in the diagnosis and management(22).

This research aims to elucidate and to develop a comprehensive understanding of the clinical features and histopathologic distribution of granulomas found in colonoscopy biopsies by providing a knowledge and filling the gap of research which will be pivotal in enhancing diagnostic accuracy and improving patient outcomes.

5. Objectives

5.1. General Objective

The general objective of this study is to understand patient's clinical features and histopathologic distribution of granulomas found in colonoscopy biopsies that guides in early categorization and management selection of patients.

5.2. Specific Objectives

- To determine association between clinical features, distribution and histopathologic pattern of granulomas from colonoscopic biopsy.
- To identify disease specific characteristic histopathologic pattern and distribution of granulomas from colonoscopic biopsy.

6. METHODOLOGY

6.1. Study setting

6.1.1. Study area

The research took place in the gastroenterology referral clinic at Tikur Anbessa Specialized Hospital, the foremost tertiary care institution in Ethiopia, situated in the capital city, Addis Ababa. This hospital offers specialized, extensive healthcare services not only to the local population but also to patients referred from other regions for expert consultations and procedures. Additionally, it serves as an academic hospital affiliated with Addis Ababa University's College of Medicine and Health Sciences, contributing to the education of medical students at various levels, including undergraduate, graduate, and fellowship programs across diverse medical specialties.

6.1.2. Study period

The study was conducted on patients having follow-up in the clinic from June 1/2024 to November 30/2024

6.2. Study Design

A cross sectional descriptive study was conducted to describe patients presenting clinical features, distribution pattern on colonoscopic biopsy and histopathologic characteristics of granulomas in those attending the GI outpatient clinic at Tikur Anbessa Specialized hospital (TASH).

6.3. Source and Study population

All patients seen at the GI outpatient clinic of TASH during the specified study period with clinical features deemed requiring colonoscopy and biopsy result showing granulomatous lesion.

6.4. Sample frame

Registry was prepared for those who fulfills inclusion criteria.

6.5. Sample size and Sampling technique

Systemic random sampling method was used. Samples taken from sample frame.

Since the predicted number of patients attending GI referral clinic during the study period is less than 10,000 correction formula for sample size calculation was used.

$$n = \frac{\frac{Z^2 p(1-p)}{d^2}}{1 + \frac{1}{N}\left(\frac{Z^2 p(1-p)}{d^2}\right)}$$

Were,

P is the is the (estimated) proportion of the population, 50%, given lack of previous studies

N is population size a total of 150 patients seen over 6 months period

Z2* p(1-p)/d2 (Cochran's formula) =0.9604

n=108

A sample size of 108 patients was calculated assuming CI of 95% and degree of freedom of 0.05.

6.6. Inclusion and exclusion criteria for patients

6.6.1 Inclusion criteria

- ✓ Any patient with diagnosis of Crohn's Disease and TB.

6.6.2 exclusion criteria

- ✓ Patients with other diagnosis than CD and intestinal TB

6.7. Study Variables

Dependent variables

- ✓ Histopathologic diagnosis
- ✓ Patient clinical response after treatment initiation

Independent variables

- ✓ Patient socio demographic data
- ✓ Patients' clinical features (Chief compliant, present and past medical history, physical examination)
- ✓ Patient's Laboratory and radiologic features
- ✓ Colonoscopic features and characteristic findings
- ✓ Histologic descriptive findings

6.8. Data collection procedures

Data was collected from structured questionnaires filled out from chart review.

6.9. Data analysis and presentation

Collected data were verified, cleaned and checked for quality before the analysis. IBM SPSS Statistics software package version 26 was used for entry of statistical data and analysis.

Descriptive statistics was used as a statistical data analysis method and expressed as

frequencies and numbers (percentages %). The results are summarized by using tables, and

figures. A P-value < 0.05 was considered to indicate statistical significance. All independent study variables are compared against dependent variable for existence of statistical significant relationship.

6.10. Ethical consideration

The ethical approval of the present investigation was obtained from the department of Surgery, College of health science.

6.11. Dissemination of the results

The results of the study was presented to the department of surgery, college of health sciences. The manuscript will also be sent to international journals for publication.

Result

General findings

In this study a total of 89 patients those visited the GI clinic from June 1/2024 to November 30/2024 and diagnosed either to have Crohn's disease or TB were enrolled.

There were 57 (64%) females and 32(36%) male patients, the mean age of the population was 33.5 years with standard deviation of 11.5.

The average age when symptoms first started was 30.8yrs with median of 28yrs and SD of 12yrs. Fig 1.

Regarding previous medical or surgical illness,33.7% patients claim having history of prior surgery before their current diagnosis and 18% patients are found to have perianal disease and 15.7% of patients were having history of diagnosis with tuberculosis. Table 1: summarizes distribution and type of history of prior medical and surgical illness.

Table 1: demographic distribution of patients seen at GI OPD from June 1/2024 to November 30/2024

Sex

		Frequency	Percent
	Female	57	64.0
	Male	32	36.0
	Total	89	100.0

categorical age

		Frequency	Percent
	0-20	7	7.9
	21--30	33	37.1
	31-40	29	32.6
	41-50	15	16.9
	>=51	5	5.6
	Total	89	100.0

Family Hx of IBD (Crohn's, UC)

		Frequency	Percent
		8	9.0
	No	80	89.9
	yes	1	1.1
	Total	89	100.0

Initial diagnosis

		Frequency	Percent
	TB	15	16.9
	CD	68	76.4
	nonspecific colitis	3	3.4
	others	3	3.4
	Total	89	100.0

History of surgery

		Frequency	Percent
	No	59	66.3
	Yes	30	33.7
	Total	89	100.0

History of TB treatment

		Frequency	Percent
	No	75	84.3
	Yes	14	15.7
	Total	89	100.0

Any history of hospitalization for the above-compliant

	No	39	43.8
	Yes	50	56.2
	Total	89	100.0

Any known medical illness

	Frequency	Percent
	82	92.1
cardiac illness	1	1.1
other	4	4.5
RVI	2	2.2
Total	89	100.0

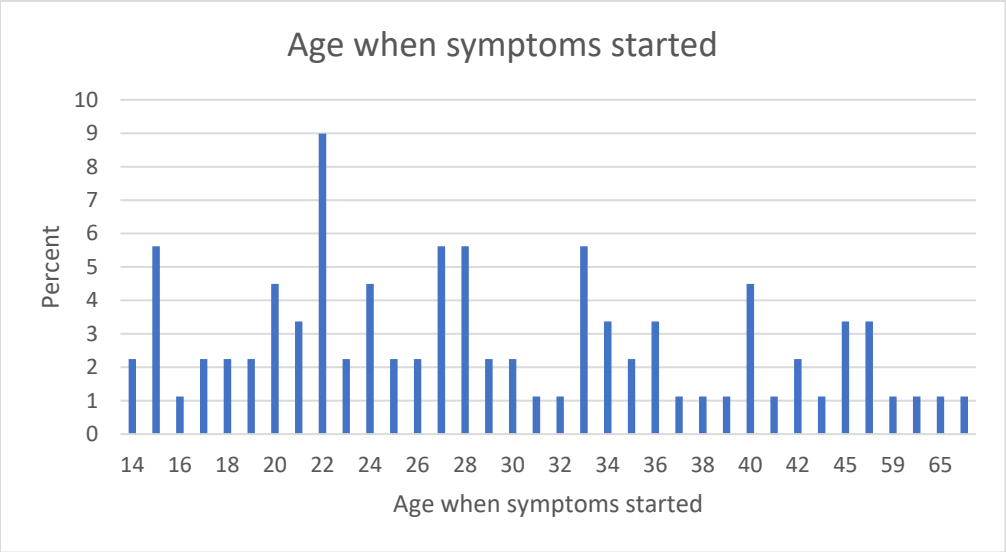

Fig. 1 distribution of age when first symptom is started

Diseases specific results

The most common presenting symptoms among patients were abdominal pain, chronic non bloody diarrhea and anorectal pain which accounts for 69%,13% and 11% respectively. Table 2.

Table 2: Chief compliant Frequencies

		Responses	
		N	Percent
Initial presenting compliant	Abdominal pain	64	68.80%
	Chronic diarrhea without blood	12	12.90%
	Bloody diarrhea	4	4.30%
	Rectal bleeding	2	2.20%
	Anorectal pain	10	10.80%
	Abdominal mass/swelling	1	1.10%
Total		93	100.00%

Associated presenting symptoms include weight loss accounting for 23%, anorexia 16% constipation 15.5% and others in combination or separately, table 3 summarizes the findings.

Regarding duration of symptoms the mean duration was 17 months with standard deviation of 30 and minimum and maximum duration ranging from 0 month to 192 months.

Based on the duration we made a classification of acute and chronic symptomatic patients with time boundaries of less than 6 month and more than 6 month respectively, approximately 50 % patients belong to acute and chronic symptomatic patients. Table 4.

The latency period defined as mean time delay between initial diagnosis and initiation of treatment was 4.5 months with standard deviation of 16.6 months. Based on this we classified patients in

two 3 categories, short latency, moderate and long latency which started treatment with in less than 6 month of diagnosis,6-12months and more than 12 months. Table 5.

In our study based on the finding of initial diagnosis 76.4% of them were Crohn's disease,17% were intestinal TB and 3.4 % of them were nonspecific colitis and other type of colitis each.

37% the diagnoses were made using colonoscopy ,34.5% were using histopathologic report,12.7% using CT/MRI imaging ,10% were using clinical findings and 6.1% using ultrasound findings. Table 7

The colonoscopy reports found on diagnosis were erythema,friability,and ulceration accounting for 28% ,patchy area of inflammation 13% and ICV deformity, stricture accounting for 12 and 11% respectively , classic appearance of cobble stoning only accounts for 5% of the finding, Table 8 summarizes the colonoscopy findings at diagnosis.

Common CT/MRI findings and Abdominal ultrasound findings are summarized on Table 9

Looking at histologic findings and reports majority of the reports with conclusion of non specific acute or chronic inflammation are characterized by Increased intraepithelial lymphocytes (22%), increased inflammatory cells in the lamina propria(27%), Presence of acute inflammatory cells(12.5%), granulomas only account for 3% of the reported histopathology's. Table 10

During follow up of patients there were changes in diagnosis made for 21% of cases. 18% of cases were changed to Crohn's disease from the initial diagnosis and 2% were changed to intestinal TB and the rest were changed to IBS and radiation enteritis. The mean duration for changing diagnosis was 10 months. Table 11

56% patients are found to be hospitalized for their compliant and related complications, 18% were hospitalized before initial diagnosis is made and 38% were hospitalized while on treatment. Table 12

Table 3: Associated symptoms of presentation Frequencies

		Responses	
		N	Percent
Associated symptoms	Abdominal pain	17	7.10%
	Chronic diarrhea without blood	22	9.20%
	Bloody diarrhea	10	4.20%
	Mucoid diarrhea	5	2.10%
	Rectal bleeding	3	1.30%
	Anorectal pain	3	1.30%
	Fissure	1	0.40%
	Constipation	37	15.50%
	Fever	18	7.50%
	Anorexia	40	16.70%
	Weight loss	55	23.00%
	Abdominal mass/swelling	2	0.80%
	Others (Vomiting, fatigue, fecal incontinence, melena, alternating diarrhea and constipation)	26	10.90%
Total		239	100.00%

Table 4: Total duration of symptoms (in months)

		Frequency	Percent
	Acute	44	49.4382
	Chronic	45	50.5618
	Total	89	100

Table 5: Gap b/n diagnosis and treatment

		Frequency	Percent
	Short Latency	80	89.88764
	Long Latency	8	8.988764
	Total	88	98.8764
Missing	System	1	1.123596
Total		89	100

Table 6: distribution of initial diagnosis

		Frequency	Percent
	TB	15	16.85393
	CD	68	76.40449
	Nonspecific Colitis	3	3.370787
	Others	3	3.370787
	Total	89	100

Table 7: Shows how initial diagnosis is made

		Responses	
		N	Percent
Diagnosis was made using	1. Colonoscopy finding	61	37.00%
	2. CT/MRI imaging	21	12.70%
	3. Ultrasound imaging	10	6.10%
	4. Histopathologic finding	57	34.50%
	Only clinical finding	16	9.70%
Total		165	100.00%

Table 8: patients colonoscopy findings during initial diagnosis

		Responses	
		N	Percent
colonoscopy findings	Normal Colon	1	0.70%
	Hyperplastic Polyps	6	4.00%
	Adenomatous Polyps	1	0.70%
	Continuous areas of inflammation	10	6.70%
	erythema, friability, and ulceration,	42	28.00%
	Patchy areas of inflammation,	20	13.30%
	cobblestone appearance	8	5.30%
	deep ulcers	2	1.30%
	strictures	16	10.70%

	Hemorrhoids:	2	1.30%
	masses	5	3.30%
	ICV deformity	18	12.00%
	Aptos ulcer	5	3.30%
	not available	14	9.30%
Total		150	100.00%

Table 9: patients CTMRI findings during initial diagnosis

		Responses	
		N	Percent
Ct or MRI finding	Diffuse colonic wall thickening	4	3.30%
	Mucosal hyperenhancement/Submucosal edema.	6	5.00%
	Segmental bowel wall thickening	22	18.20%
	Mesenteric fat stranding	7	5.80%
	Comb sign (engorged vasa recta).	1	0.80%
	Presence of fistulas	7	5.80%
	abscesses/collection	5	4.10%
	strictures	6	5.00%
	mesenteric lymph nodes	8	6.60%
	mass	5	4.10%

	unremarkable	7	5.80%
	not available	43	35.50%
Total		121	100.00%

Table 10: patients Histology findings during initial diagnosis

		Responses	
		N	Percent
Histology findings	Normal Colonic Mucosa	3	1.70%
	Continuous mucosal inflammation	4	2.30%
	Patchy mucosal inflammation	8	4.50%
	Transmural inflammation	3	1.70%
	Granulomas	5	2.80%
	Fissuring ulcers	4	2.30%
	Presence of acute inflammatory cells	22	12.50%
	Crypt abscesses,	1	0.60%
	Atrophy of the crypts/loss of architecture	16	9.10%
	Increased intraepithelial lymphocytes	39	22.20%
	Increased inflammatory cells in the lamina propria.	47	26.70%
	Thickened subepithelial collagen layer.	4	2.30%
	Hyperplastic Polyps	1	0.60%

	Adenomatous Polyps: Tubular, villous, or tubulovillous	1	0.60%
	Not available	18	10.20%
Total		176	100.00%

Table 11: Change in diagnosis during follow-up

		Frequency	Percent
	No	70	78.7
	Yes	19	21.3
	Total	89	100

Table 12: History of hospitalization during or before initiation of treatment

		Frequency	Percent
	No	39	43.8
	Yes	50	56.2
	Total	89	100

Table 13: When was hospitalization

		Frequency	Percent
		39	43.8
	before initial diagnosis	16	18
	during treatment	34	38.2
	Total	89	100

Treatment pattern specific results

47% patients were on steroid 32% were on immunomodulators and 15% were on anti TB as initiation of treatment, around 3% of the patient's undergone surgery as their initial treatment, table 14.

Table 14: pattern of initiation of treatment

		Responses	
		N	Percent
Initial management	1. Steroids	57	47.10%
	3. Immunomodulators- MTX/AZA	39	32.20%
	4. Biologics- Infliximab	3	2.50%
	5. Surgery	4	3.30%
	6. Anti TB	18	14.90%
Total		121	100.00%

Regarding their current management 80% the patients are taking immunomodulators as a maintenance medical treatment. Table 15

Table 15: Current maintenance management

		Responses	
		N	Percent
Current management	2 Current maintenance medication 1. Steroids	9	9.40%
	2. 5-ASA	2	2.10%

	3. Immunomodulators- MTX/AZA	78	81.30%
	4. Biologics- Infliximab	4	4.20%
	5. Anti TB	3	3.10%
Total		96	100.00%

Regarding surgical management 41.6% patients undergone surgical procedure during their follow-up, while on medical management main reasons include, resistance for medical management and complications. Table 16

Table 16: patient undergone surgery during treatment and follow up

		Frequency	Percent
	no	52	58.4
	yes	37	41.6
	Total	89	100

The overall response of patients after receiving initial management ,32% have improved in all symptoms or can be labeled as on clinical remission,41% are with some degree of improvement, 14.6% had no change and 11% were worsened. Table 17

Table 17: Response for initial treatment

		Frequency	Percent
	1. Improved with all symptoms	29	32.6
	2. Some improvement with symptoms	37	41.6

3. No change	13	14.6
4. Worsened with symptoms	10	11.2
Total	89	100

Result of association

The majority of non-Crohn's disease (non-CD) patients (76.20%) did not require surgery during follow-up, while 23.80% did. The p-value of 0.026 indicates a statistically significant relationship between the initial diagnosis of non-CD and the risk of requiring surgery. The Confidence Interval (C.I.) for EXP(B) ranges from 1.25 to 11.6, with an odds ratio (OR) of 3.81, suggesting that non-CD patients have higher odds of not requiring surgery compared to Crohn's disease (CD) patients. In contrast, about half of the CD patients (48.50%) did not require surgery during follow-up, whereas slightly more than half (51.50%) did, indicating that CD patients have a higher likelihood of requiring surgery compared to non-CD patients. Table 18

Table 18: patient initial diagnosis and risk of treatment of surgery during follow up

			any treatment for surgery?		X2	Sig.	95% Confidence Interval		OR
			no	yes			Lower	Upper	
category of initial dx	non-CD	Count	16(76.20%)	5(23.80%)	0.026	0.01	1.25	11.6	3.81
	CD	Count	33(48.50%)	35(51.50%)					

The relationship between the history of surgery before initial diagnosis and treatment and the response to initial management reveals that 75.90% of patients with no history of surgery improved

with all symptoms, compared to 24.10% with a history of surgery, with a statistically significant p-value of 0.02. For some improvement with symptoms, 48.60% of patients with no history of surgery showed improvement, while 51.40% with a history of surgery did, also statistically significant with a p-value of 0.041 and an odds ratio of 0.105. In the category of no change, 76.90% of patients with no history of surgery showed no change, compared to 23.10% with a history of surgery, though this was not statistically significant (p-value 0.424). For worsened symptoms, 90.00% of patients with no history of surgery worsened, while 10.00% with a history of surgery did, indicating that a history of surgery does not significantly impact worsening symptoms. This data suggests that having a history of surgery before initial diagnosis is a significant factor in the response to initial management, particularly for improvement and some improvement in symptoms. table 19

Table 19: patient history of surgery before initial diagnosis and treatment and response for initial management

							95% C.I.for EXP(B)			
			History of surgery		Total		sig	Lower	Upper	ODD
			No	Yes		P val				
Response for initial treatment	1. Improved with all symptoms	Count	22(75.90%)	7(24.10%)	29	0.02	0.356			
	2. Some improvement with symptoms	Count	18(48.60%)	19(51.40%)	37		0.041	0.012	0.917	0.105
	3. No change	Count	10(76.90%)	3(23.10%)	13		0.424			
	4. Worsened with symptoms	Count	9(90.00%)	1(10.00%)	10					

The majority of patients (97.40%) experienced a short gap between diagnosis and treatment, suggesting that most hospitalizations occurred quickly after diagnosis. A significant number of

patients (75.00%) with short latency were hospitalized before their initial diagnosis, while only 25.00% of these hospitalizations occurred with a longer latency. The significance value of 0.033 indicates a statistically significant relationship between the timing of hospitalization and the gap between diagnosis and treatment for this group. Additionally, most hospitalizations (91.20%) occurred during treatment among patients with short latency, indicating timely interventions, whereas hospitalizations during treatment were less common (8.80%) for those with long latency**.** Patients with a shorter gap between diagnosis and treatment are more likely to be hospitalized both before their initial diagnosis and during treatment, reflecting the urgency and quick response required in their cases. Table 20

Table 20 association between gap of diagnosis and treatment and time of hospitalization

			gap b/n diagnosis and treatment		Total	X^2
			Short Latency	Long Latency		
When was hospitalization		Count	37(97.40%)	1(2.60%)	38	
	1. before initial diagnosis	Count	12(75.00%)	4(25.00%)	16	0.033
	2. during treatment	Count	31(91.20%)	3(8.80%)	34	

Overall, 87.20% of patients did not require surgery during follow-up, while 12.80% did. Among those hospitalized before the initial diagnosis, 43.80% did not require surgery during follow-up, whereas 56.30% did, with a p-value of 0.00 indicating that hospitalization before the initial

diagnosis is a significant risk factor for requiring surgery, as reflected in the Confidence Interval (C.I.) for EXP(B) ranging from 0.052 to 0.16. For patients hospitalized during treatment, 17.60% did not require surgery, while 82.40% did, further supported by an odds ratio (OR) of 0.017, emphasizing that hospitalization during treatment is associated with a higher risk of requiring surgery during follow-up. table 21

Table 21: risk of history of hospitalization prior to initial diagnosis and treatment to surgery during follow up

								95% C.I.for EXP(B)	
			any treatment for surgery?		Total	P value	OR	Lower	Upper
			no	yes				0.017	0.16
When was hospitalization		Count	34(87.20%)	5(12.80%)	39				
	1. before initial diagnosis	Count	7(43.80%)	9(56.30%)	16	0.00	0.052		
	2. during treatment	Count	6(17.60%)	28(82.40%)	34				

A higher proportion of patients who worsened experienced a change in diagnosis (70.00%) .while A significantly lower proportion of patients experienced a change in diagnosis (10.80%) if there was some improvement in symptoms. The odds ratio of 0.052 indicates that patients with some improvement are much less likely to have a change in diagnosis, which is statistically significant (Sig. 0.001).on the other hand ,A slight majority of patients who had no change in symptoms also had a change in diagnosis (61.50%), but this relationship is not statistically significant (Sig. 0.673).No patients who improved with all symptoms experienced a change in diagnosis (0.00%).table 22

Table 22: Association of change in diagnosis during treatment and response to initial diagnosis and management										
								95% C.I.for EXP(B)		
			Was there change in diagnosis		Total	X^2	Sig.	Lower	Upper	OR
			No	Yes						
responseinitialrx	4. Worsened with symptoms	Count	3(30.00%)	7(70.00%)	10	0.000				
	2. Some improvement with symptoms	Count	33(89.20%)	4(10.80%)	37		0.001	0.009	0.286	0.052
	3. No change	Count	5(38.50%)	8(61.50%)	13		0.673			
	1. Improved with all symptoms	Count	29(100.00%)	0(0.00%)	29		0.998			

Patients with a short gap between their first and second diagnosis are more likely to require treatment for surgery, with 100% of patients with a short gap requiring surgery. Conversely, patients with a long gap between diagnoses are less likely to need surgery, with 60% not needing surgery and 40% requiring it. The Likelihood Ratio of 0.029 indicates a statistically significant relationship between the time gap and the likelihood of requiring treatment for surgery. Table 23

Table 23 time gap between first and 2nd diagnosis and association treatment for surgery during followup						
			any treatment for surgery?		Total	
			no	yes		
time gap between first and 2nd diagnosis	short gap	Count	0(0.00%)	3(100.00%)	3	**Likelihood Ratio 0.029**
	long gap	Count	9(60.00%)	6(40.00%)	15	

Patients with Crohn's disease (CD) are most likely to show improvement with symptoms (93.10% for "Improved with all symptoms" and 89.20% for "Some improvement with symptoms").on the hand TB patients are more likely to have no change (53.80%) or worsen (40.00%) with symptoms and Non-specific colitis patients seem to have a mixed response with no clear trend. Other diagnoses show varied responses, though the numbers are small. Table 24

Table 24: relationship of initial diagnosis with treatment responses for all initial diagnosis								
			initialdx				Total	X2
			TB	CD	non specific colitis	others		
responseinitialrx	4. Worsened with symptoms	Count	4(40.00%)	5(50.00%)	0(0.00%)	1(10.00%)	10	0.00
	2. Some improvement with symptoms	Count	3(8.10%)	33(89.20%)	0(0.00%)	1(2.70%)	37	
	3. No change	Count	7(53.80%)	3(23.10%)	3(23.10%)	0(0.00%)	13	
	1. Improved with all symptoms	Count	1(3.40%)	27(93.10%)	0(0.00%)	1(3.40%)	29	

Patients with Crohn's disease (CD) are more likely to show improvement in symptoms (93.10% for "Improved with all symptoms" and 89.20% for "Some improvement with symptoms") compared to non-Crohn's disease (non-CD) patients.

Non-Crohn's disease patients are more likely to experience no change (76.90%) or worsening of symptoms (50.00%). Table 25

Table 25: relationship of initial diagnosis with treatment responses for categorized initial diagnosis to non Crohn's disease and Crohn's disease										
								95% C.I.for EXP(B)		
			category of initial dx		Total	X^2	Sig.	Lower	Upper	OR
			non CD	CD						
responseinitialrx	4. Worsened with symptoms	Count	5(50.00%)	5(50.00%)	10	0.00				1
	2. Some improvement with symptoms	Count	4(10.80%)	33(89.20%)	37		.011	0.024070	0.610409	0.121
	3. No change	Count	10(76.90%)	3(23.10%)	13		0.18	0.556983	19.948759	3.334
	1. Improved with all symptoms	Count	2(6.90%)	27(93.10%)	29		0.007	0.011110	0.493895	0.74

Table 26: association of histologic finding and change in diagnosis									
							95% C.I.for EXP(B)		
			Change dx		Total	Sig.	Lower	Upper	OR
			No	Yes					
Initial histologic findingb	Normal Colonic Mucosa	Count	1(33.30%)	2(66.70%)	3	0.381	0.186	81.396	3.895
	Continuous mucosal inflammation	Count	4(100.00%)	0(0.00%)	4	0.999	0	.	0
	Patchy mucosal inflammation	Count	6(75.00%)	2(25.00%)	8	0.589	0.246	11.81	1.705
	Transmural inflammation	Count	3(100.00%)	0(0.00%)	3	0.999	0	.	0
	Granulomas	Count	2(40.00%)	3(60.00%)	5	0.029	1.395	438.877	24.745
	Fissuring ulcers	Count	3(75.00%)	1(25.00%)	4	0.427	0.005	9.083	0.222
	Presence of acute inflammatory cells	Count	17(77.30%)	5(22.70%)	22	0.962	0.219	4.253	0.965
	Crypt abscesses,	Count	1(100.00%)	0(0.00%)	1	1	0	.	0
	Atrophy of the crypts/loss of architecture	Count	13(81.30%)	3(18.80%)	16	0.133	0.015	1.748	0.16
	Increased intraepithelial lymphocytes	Count	30(76.90%)	9(23.10%)	39	0.45	0.102	2.756	0.53
	Increased inflammatory cells in the lamina propria.	Count	36(76.60%)	11(23.40%)	47	0.741	0.224	8.215	1.355
	Thickened subepithelial collagen layer.	Count	4(100.00%)	0(0.00%)	4	0.999	0	.	0
	Hyperplastic Polyps	Count	1(100.00%)	0(0.00%)	1	1	0	.	0
	Adenomatous Polyps:Tubular, villous, or tubulovillous	Count	0(0.00%)	1(100.00%)	1	1	0	.	3469943537
	Not available	Count	16(88.90%)	2(11.10%)	18	0.319	0.02	3.575	0.268

The presence of granulomas is significantly associated with an increased likelihood of the change in diagnosis, with (p = 0.029) and an odds ratio of 24.745. Other variables do not show significant associations, likely due to large standard errors and non-significant p-values. Table 26

Table 27: association of change in diagnosis and initial diagnosis

							95% C.I.for EXP(B		
			Was there change in diagnosis		Total	Sig.	Lower	Upper	OR
			No	Yes					
initialdx	TB	Count	3(20.00%)	12(80.00%)	15	0.032			4
	CD	Count	65(95.60%)	3(4.40%)	68	0.00	0.002	0.064	0.012
	non specific colitis	Count	1(33.30%)	2(66.70%)	3	0.617	0.033	7.541	0.5
	others	Count	1(33.30%)	2(66.70%)	3	0.617	0.033	7.541	0.5

This suggests that being diagnosed with CD significantly (p = .000) reduces the odds (0.012)of change in diagnosis compared to TB.

No statistically significant association was found regarding CT/MRI finding and diagnosis. Table 27

Table 26. Association Of Histologic Finding And Distribution In Patients Initial Diagnosis

			Normal Colonic Mucosa	Continuous Mucosal Inflammation	Patchy Mucosal Inflammation	Transmural Inflammation	Granulomas	Fissuring Ulcers	Presence Of Acute Inflammatory Cells	Crypt Abscesses,	Atrophy Of The Crypts/Loss Of Architecture	Increased Intraepithelial Lymphocytes	Increased Inflammatory Cells In The Lamina Propria.	Thickened Subepithelial Collagen Layer.	Hyperplastic Polyps	Adenomatous Polyps:Tubular, Villous, Or Tubulovillous	Not Available
			Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count
	Initial dx	**TB**	2(66.70%)	0(0.00%)	2(25.00%)	0(0.00%)	3(60.00%)	1(25.00%)	4(18.20%)	1(100.00%)	2(12.50%)	7(17.90%)	8(17.00%)	0(0.00%)	0(0.00%)	0(0.00%)	1(5.60%)
		CD	1(33.30%)	4(100.00%)	6(75.00%)	3(100.00%)	2(40.00%)	3(75.00%)	16(72.70%)	0.00%	14(87.50%)	31(79.50%)	37(78.70%)	4(100.00%)	1(100.00%)	0(0.00%)	14(77.80%)
		Non Specific Colitis	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	1(4.50%)	0.00%	0(0.00%)	0(0.00%)	1(2.10%)	0(0.00%)	0(0.00%)	0(0.00%)	2(11.10%)
		Others	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	1(4.50%)	0.00%	0(0.00%)	1(2.60%)	1(2.10%)	0(0.00%)	0(0.00%)	1(100.00%)	1(5.60%)
	Sig.	**TB**															
		CD	.123	.522	.297	.407	.009	.656	.676	.544	.193	.668	.895	.567	.703		.519
		Non Specific Colitis	.630	.991	.620	.844	.656	.895	.770	.891	.905	.241	.556	.862	.898		.303
		Others	.845	.754	.685	.703	.637	.843	.527	.928	.773	.645	.973	.829	.865		.368
95% C.I.For EXP(B		Upper					2740.700										
		Lower					3.164										
		OR					93.118										

This means that while granulomas are relatively rare (5.6% of cases), their presence significantly increases the odds of having Crohn's Disease (Exp(B) = 93.118, p = .009). Table 28

Table 28 . Association of ultrasound finding with initial diagnosis														
			initial ultrasound findinga											Total
			Bowel Wall Thickening	Increased Vascularity	Mesenteric Fat Proliferation: I	Fistulas	Abscesses:	Strictures	Lymphadenopathy	intabdominal inflammatory mass	Ascites/intra abdominal collection	loss of wall achitecture	unremarkable	
Initial dx	**TB**	Count	5(38.50%)	1(7.70%)	0(0.00%)	0(0.00%)	1(7.70%)	0(0.00%)	1(7.70%)	1(7.70%)	1(7.70%)	1(7.70%)	6(46.20%)	13
	CD	Count	24(35.80%)	0(0.00%)	6(9.00%)	2(3.00%)	4(6.00%)	1(1.50%)	3(4.50%)	3(4.50%)	4(6.00%)	3(4.50%)	38(56.70%)	67
	non specific colitis	Count	1(50.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	1(50.00%)	0(0.00%)	1(50.00%)	0(0.00%)	0(0.00%)	2
	others	Count	1(33.30%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	2(66.70%)	3
Sig.	**TB**													
	CD												.042	
	non specific colitis													
	others													
	95%	upper											.915	
	C.I.for EXP(B	lower											.011	
		OR											.100	

An unremarkable finding significantly decreases the odds of having Crohn's Disease (p = .042). The odds ratio (Exp(B)) is .100, indicating that an unremarkable finding reduces the odds of having Crohn's Disease by approximately 90%. table 28

Table 2: association of ultrasound finding with categorized initial diagnosis

			initial ultrasound findinga											Total
			Bowel Wall Thickening	Increased Vascularity	Mesenteric Fat Proliferation: I	Fistulas	Abscesses:	Strictures	Lymphadenopathy	intabdominal inflammatory mass	Ascites/intra abdominal collection	loss of wall achitecture	unremarkable	
category of initial dx	non CD	Count	7(38.90%)	1(5.60%)	0(0.00%)	0(0.00%)	1(5.60%)	0(0.00%)	2(11.10%)	1(5.60%)	2(11.10%)	1(5.60%)	8(44.40%)	18
	CD	Count	24(35.80%)	0(0.00%)	6(9.00%)	2(3.00%)	4(6.00%)	1(1.50%)	3(4.50%)	3(4.50%)	4(6.00%)	3(4.50%)	38(56.70%)	67
Sig.	non CD													
	CD		028										0.014	
	95% C.I.for EXP(B	upper	102.903										110.419	
		lower	1.301										1.684	
		OR	11.571										13.637	

The significant findings are that bowel wall thickening and unremarkable findings both significantly increase the odds of the having non Crohn’s disease

An unremarkable finding significantly increases the odds of the having non Crohn's disease.

(p = .014). The odds ratio (Exp(B)) is 13.637, indicating that an unremarkable finding increases the odds of the outcome by approximately 13.6 times.

Bowel wall thickening significantly increases the odds of the non Crohn's disease (p = .028). The odds ratio (Exp(B)) is 11.571, indicating that the presence of bowel wall thickening increases the odds of the non Crohn's disease by approximately 11.6 times. Table 29

Table 30. association of colonoscopy findings among categories of initial diagnosis

			distribution colonoscopy														Total
			Normal Colon	Hyperplastic Polyps	Adenomatous Polyps	Continuous areas of inflammation	erythema, friability, and ulceration,	Patchy areas of inflammation,	cobblestone appearance	deep ulcers	strictures	Hemorrhoids:	masses	ICV deformity	Aptos ulcer	not available	
Initial dx	**TB**	Count	0(0.00%)	0(0.00%)	0(0.00%)	1(6.70%)	11(73.30%)	3(20.00%)	1(6.70%)	1(6.70%)	2(13.30%)	0(0.00%)	3(20.00%)	4(26.70%)	3(20.00%)	0(0.00%)	15
	CD	Count	1(1.50%)	6(8.80%)	0(0.00%)	8(11.80%)	30(44.10%)	17(25.00%)	7(10.30%)	1(1.50%)	14(20.60%)	1(1.50%)	2(2.90%)	14(20.60%)	1(1.50%)	12(17.60%)	68

	non specific colitis	Count	0(0.00%)	0(0.00%)	0(0.00%)	1(33.30%)	1(33.30%)	0(0.00%)	0(0.00%)	0.00%	0(0.00%)	1(33.30%)	0(0.00%)	0(0.00%)	0(0.00%)	1(33.30%)	3
	others	Count	0(0.00%)	0(0.00%)	1(33.30%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	1(33.30%)	1(33.30%)	3
		sig													.020		
	95% C.I.for EXP(B	upper													1558 20.258		
		lower													2.760		
		OR													655.792		

The presence of Aphthous ulcers significantly increases the odds of having Crohn's Disease (p = .020). The odds ratio (Exp(B)) is 655.792, indicating that the presence of Aptos ulcers increases the odds of having Crohn's Disease by approximately 655.8 times. Table 30

Table 31: **association of colonoscopy findings among dichotomized categories of initial diagnosis**

			distribution colonoscopy														Total
			Normal Colon	Hyperplastic Polyps	Adenomatous Polyps	Continuous areas of inflammation	erythema, friability, and ulceration,	Patchy areas of inflammation,	cobblestone appearance	deep ulcers	strictures	Hemorrhoids:	masses	ICV deformity	Aptos ulcer	not available	
category of initial dx	non CD	Count	0(0.00%)	0(0.00%)	1(4.80%)	2(9.50%)	12(57.10%)	3(14.30%)	1(4.80%)	1(4.80%)	2(9.50%)	1(4.80%)	3(14.30%)	4(19.00%)	4(19.00%)	2(9.50%)	21
	CD	Count	1(1.50%)	6(8.80%)	0(0.00%)	8(11.80%)	30(44.10%)	17(25.00%)	7(10.30%)	1(1.50%)	14(20.60%)	1(1.50%)	2(2.90%)	14(20.60%)	1(1.50%)	12(17.60%)	68
		sig											.028		.009		
	95% C.I.for EXP(B	upper											.756		.419		
		lower											.007		.002		
		OR											.070		.032		

The presence of Aphthous ulcers significantly decreases the odds of non crohn’s disease (p = .009). The odds ratio (Exp(B)) is .032, indicating that the presence of Aphthous ulcers reduces the odds of the outcome by approximately 97%.

The presence of masses significantly decreases the odds of the non crohn’s disease (p = .028). The odds ratio (Exp(B)) is .070, indicating that the presence of masses reduces the odds of the outcome by approximately 93%. Table 31

Discussion

Demographic And Clinical Characteristics

The study population was predominantly female (64%) with a mean age of 33.5 years, which is consistent with the higher prevalence of IBD in females and the typical age of onset for these conditions(20,23). The average age of symptom onset was 30.8 years, with a median of 28 years, indicating that symptoms often manifest in the late twenties to early thirties. This aligns with existing literature that suggests the peak incidence of CD occurs between the ages of 15 and 35(21,23). A significant proportion of patients (33.7%) had a history of prior surgery, and 15.7% had a history of tuberculosis, underscoring the importance of considering past medical history in the differential diagnosis of GI symptoms(23). The majority of patients (76.4%) were diagnosed with CD, while 16.9% were diagnosed with TB. This distribution reflects the challenges in differentiating between CD and TB, as both conditions present with similar clinical features such as abdominal pain, chronic diarrhea, and weight loss(23,24). Colonoscopy was the most common diagnostic tool used (37%), followed by histopathologic reports (34.5%) and CT/MRI imaging (12.7%), highlighting the multi-modal approach required for accurate diagnosis, as no single test can definitively distinguish between CD and TB(23). Abdominal pain was the most common presenting symptom (68.8%), followed by chronic diarrhea without blood (12.9%) and anorectal pain (10.8%). Over half of the patients (56%) were hospitalized for their condition or related complications, indicating the significant burden these diseases can place on patients. The mean latency period between diagnosis and treatment initiation was 4.5 months, with patients classified into short, moderate, and long latency categories based on this duration. This latency period is crucial as delayed treatment can lead to worse outcomes. During follow-up, 21% of cases had a

change in diagnosis, with 18% being reclassified as CD and 2% as TB, highlighting the dynamic nature of these diseases and the need for ongoing monitoring and reassessment(23).table 31 summarizes comparison of key findings of this research and other related researches.

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Aspect	**This study**	**Rolo et al. (2012)**(25)	**Onal et al. (2015)**(26)	**Govindarajulu et al. (2021)**(27)
Demographics	Predominantly female (64%), mean age 33.5	Not specified	Not specified	Not specified
Symptom Onset	Average age 30.8 years	Peak incidence of CD between 15-35 years	Peak incidence of CD between 15-35 years	Peak incidence of CD between 15-35 years
Medical History	33.7% had prior surgery, 15.7% had TB	Importance of considering past medical history	Importance of considering past medical history	Importance of considering past medical history
Initial Diagnosis	76.4% CD, 16.9% TB	Emphasizes diagnostic challenge	Emphasizes diagnostic challenge	Emphasizes diagnostic challenge
Diagnostic Methods	Colonoscopy (37%), histopathology (34.5%)	Recommends comprehensive approach	Recommends comprehensive approach	Recommends comprehensive approach

Aspect	This study	Rolo et al. (2012)(25)	Onal et al. (2015)(26)	Govindarajulu et al. (2021)(27)
Presenting Symptoms	Abdominal pain (68.8%), diarrhea (12.9%)	Similar clinical features for CD and TB	Similar clinical features for CD and TB	Similar clinical features for CD and TB
Hospitalization	56% hospitalized	Not specified	Not specified	Not specified
Latency Period	Mean latency 4.5 months	Not specified	Not specified	Not specified
Follow-up Changes	21% changed diagnosis	Highlights need for ongoing reassessment	Highlights need for ongoing reassessment	Highlights need for ongoing reassessment

Diagnostic And Treatment Patterns

CT/MRI Findings

The CT/MRI findings in Table 9 show that **segmental bowel wall thickening** (18.20%) and **mesenteric fat stranding** (5.80%) are common indicators during initial diagnosis. This aligns with the findings of Puylaert et al1. (2015), who reported high accuracy in grading Crohn's disease activity using CT and MRI, with similar accurate grading estimates for both modalities(28). The presence of **fistulas** (5.80%) and **abscesses/collections** (4.10%) also highlights the complications associated with CD.

The lack of a statistically significant association between CT/MRI findings and diagnosis suggests that imaging alone may not be sufficient for accurate diagnosis, reinforcing the need for comprehensive clinical evaluation. This is supported by Veauthier and Hornecker (2018), who recommend a combination of endoscopy, imaging, and laboratory tests for diagnosing CD(29).

Histology Findings

Table 10 shows various histological findings, with **increased inflammatory cells in the lamina propria** (26.70%) being the most common. This is consistent with the study by Macedo et al1. (2018), which found that endoscopic severity correlated with histological inflammation. The presence of **granulomas** (2.80%) and **crypt abscesses** (0.60%) further supports the inflammatory nature of CD.

Histologic findings, as shown in Table 28, reveal that the presence of granulomas significantly increases the odds of having CD (OR = 93.118, p = .009). This is consistent with the literature, which identifies granulomas as a hallmark of CD, differentiating it from other forms of inflammatory bowel disease (IBD)(23).

Ultrasound Findings

The association between ultrasound findings and diagnosis, as detailed in Table 29, indicates that bowel wall thickening and unremarkable findings significantly increase the odds of having non-CD. This suggests that certain ultrasound features can help differentiate CD from other conditions, potentially guiding more targeted treatment approaches(23).

Colonoscopy Findings

Finally, the colonoscopy findings in Table 30 show that the presence of aphthous ulcers significantly increases the odds of having CD (OR = 655.792, p = .020). This aligns with the understanding that aphthous ulcers are a common feature of CD, aiding in its diagnosis(23).

Change in Diagnosis: Table 11 indicates that 21.3% of patients experienced a change in diagnosis during follow-up. This is comparable to the findings of who reported that imaging studies can detect disease activity and complications that may necessitate a change in diagnosis. Table 12 and Table 13 show that a significant proportion of patients (56.2%) were hospitalized before or during treatment, which is consistent with the urgency of managing CD complications.

Another finding indicates that a significant proportion of patients who worsened experienced a change in diagnosis (70.00%), while only a small proportion of those with some improvement did (10.80%). This suggests that worsening symptoms may prompt a re-evaluation of the initial diagnosis, possibly due to the emergence of new symptoms or complications(30,31).

Patients with some improvements are much less likely (OR of 0.052) for to have a change in diagnosis, which is statistically significant (p = 0.001). This aligns with findings from other studies that effective management can stabilize the disease and reduce the need for diagnostic revisions(30).

Interestingly, a slight majority of patients with no change in symptoms also had a change in diagnosis (61.50%), although this relationship is not statistically significant (p = 0.673). This could

suggest that even stable symptoms might warrant a re-evaluation in some cases, though further research is needed to clarify this relationship.

A finding that highlight a significant association between the initial diagnosis of Crohn's Disease (CD) and a reduced likelihood of a change in diagnosis (Table 27). The odds ratio (OR) of 0.012 (95% CI: 0.002-0.064) indicates that patients initially diagnosed with CD are significantly less likely to have their diagnosis changed compared to those initially diagnosed with Tuberculosis (TB). This aligns with findings from Melmed et al. (2007), who identified clinical predictors of diagnostic change from Ulcerative Colitis (UC) to CD, emphasizing the importance of initial diagnostic accuracy(23).

Another reason to change diagnosis is the presence of granulomas which is significantly associated with an increased likelihood of a change in diagnosis (odds ratio of 24.745, $p = 0.029$). Other histologic findings did not show significant associations, likely due to large standard errors and non-significant p-values.

Treatment Patterns

Table 14 reveals that 47% of patients were initiated on steroids, 32% on immunomodulators, and 15% on anti-TB treatment. This distribution is similar to the treatment patterns observed in other studies, where immunomodulators and biologics are commonly used for managing CD. The use of surgery (3%) as an initial treatment aligns with the need for surgical intervention in cases of severe complications.

Current Management and Surgical Management

Table 15 shows that 81.3% of patients are on immunomodulators for maintenance treatment, which is consistent with the goal of achieving mucosal healing and reducing inflammation. Table 16 indicates that 41.6% of patients underwent surgery during follow-up, primarily due to resistance to medical management or complications. This is in line with the findings of Baron et al. (2008), who emphasized the role of surgery in managing refractory CD.

Response to Initial Management

Table 17 shows that 32% of patients improved with all symptoms, while 41% showed some improvement. This response rate is comparable to other studies that have reported varying degrees of improvement with medical therapy. The association between the history of surgery and response to initial management (Table 19) highlights the impact of prior surgical interventions on treatment outcomes.

Initial Diagnosis and Treatment Response: Patients with CD are more likely to show improvement with symptoms (93.10% for "Improved with all symptoms" and 89.20% for "Some improvement with symptoms"). Conversely, TB patients are more likely to have no change or worsen with symptoms, and non-specific colitis patients show a mixed response. This highlights the importance of accurate initial diagnosis and tailored treatment plans(30).

Risk of Surgical Intervention

Table 18 indicates that non-CD patients have a lower risk of requiring surgery compared to CD patients, with an odds ratio of 3.81. This finding is consistent with the study by Rydzewska (2021),

which reported that CD patients have a higher likelihood of requiring surgery due to the chronic and progressive nature of the disease(30).

Furthermore the data shows that patients with a short gap between their first and second diagnosis are more likely to require surgery (100%), while those with a longer gap are less likely to need it (60% not needing surgery). The likelihood ratio of 0.029 indicates a statistically significant relationship between the time gap and the likelihood of requiring surgery(30).

Timing of Hospitalization

Table 20 shows that most patients (97.40%) experienced a short gap between diagnosis and treatment, with timely hospitalizations before diagnosis and during treatment. This reflects the importance of early intervention in managing CD complications.

Conclusion

The findings in this research underscores the complexity of diagnosing and managing CD and TB, given their overlapping clinical features. Accurate initial diagnosis is crucial, as it significantly influences treatment outcomes and the likelihood of diagnostic changes. The study's findings emphasize the importance of a comprehensive diagnostic approach, incorporating colonoscopy, histopathology, and imaging.

The association between granulomas and an increased likelihood of CD, as well as the presence of aphthous ulcers, reinforces their diagnostic value. The high rate of surgery among CD patients highlights the need for timely and effective medical management to prevent complications requiring surgical intervention.

The study also reveals significant associations between treatment response and the likelihood of a change in diagnosis. Patients with worsening symptoms are more likely to experience diagnostic changes, suggesting the need for ongoing monitoring and reassessment. Conversely, patients with some improvements are less likely to have their diagnosis revised, emphasizing the stabilizing effect of effective treatment.

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Annex

Semi structured Questionnaires

Category 1- demographic data

NO.	Questions	response
1	Age	----------years
2	Sex	1. Male 2. Female
3	Place of residency	1. urban 2. rural
4	Marital status	1. married 2. single 3. separated(widowed, divorced)
5	Occupation	1. employed 2. self business 3. non employed
6	Family Hx of IBD (Crohn's, UC)	1. yes 2. No
7	Smoking history	1. Never 2. Social smoker (smokes occasionally) 3. Quit smoking 4. Current smoker
8	History of surgery	1. Yes 2. No
9	If yes specify	----------
10	History of perianal disease conditions	1. Yes 2. No
11	If yes specify	----------
12	History of TB treatment	1. Yes 2. No
13	If yes answer question 14 and 15	
14	Type of TB	1. PTB 2. EPTB
15	How TB diagnosis made	1. Radiological 2. Clinical 3. Bacteriologic
16	Use of OCP	1. Yes 2. No

Category 2- diseases specific data

NO.	Questions	response
1	What was the presenting chief compliant	1. Abdominal pain 2. Chronic diarrhea without blood 3. Bloody diarrhea 4. Mucoid diarrhea 5. Rectal bleeding 6. anorectal pain 7. fissure 8. Constipation 9. Fever 10. Anorexia 11. Weight loss 12. Abdominal mass/swelling 13. Others (Vomiting, fatigue, fecal incontinence, melena, alternating diarrhea and constipation)
2	What was/were associated symptoms (multiple answer possible)	1. Abdominal pain 2. Chronic diarrhea without blood 3. Bloody diarrhea 4. Mucoid diarrhea 5. Rectal bleeding 6. anorectal pain 7. fissure 8. Constipation 9. Fever 10. Anorexia 11. Weight loss 12. Abdominal mass/swelling 13. Others (Vomiting, fatigue, fecal incontinence, melena, alternating diarrhea and constipation)
3	Age when symptoms started	----------years
4	Total duration of symptoms	----------months/years
5	Date/month/year of initial diagnosis made	----------
6	Initial diagnosis	1. TB 2. CD 3. UC 4. Nonspecific colitis 5. Other specify

7	Date/month/year of first treatment started	----------
8	Response for initial treatment	1. Improved with all symptoms 2. Some improvement with symptoms 3. No change 4. Worsened with symptoms
9	Was there change in diagnosis	1. Yes 2. no
10	If yes -new diagnosis	3. TB 4. CD 5. UC 6. Nonspecific colitis 7. Other specify
11	Date/month/year of new diagnosis made	----------
12	why diagnosis is changed	1. Worsened with symptoms 2. No change 3. Histopathologic diagnosis 4. Radiologic diagnosis
13	Initial diagnosis is made using	1. Colonoscopy finding 2. CT/MRI imaging 3. Ultrasound imaging 4. Histopathologic finding 5. Only clinical finding
14	If colonoscopy – what was finding	----------
15	If CT/MRI- what was finding	----------
16	If Histopathology – what was finding	----------
17	If ultrasound – what was finding	----------
18	Any history of hospitalization for the above compliant	1. Yes 2. no
19	When was hospitalization	1. before initial diagnosis 2. during treatment 3. other specify
20	Total Frequency of hospitalization	----------

Category 3- treatment pattern specific data

NO.	Questions	response
1	Initial treatment	1. Steroids 2. 5-ASA 3. Immunomodulators- MTX/AZA 4. Biologics- Infliximab 5. Surgery

		6. Anti TB
2	Current maintenance medication	1. Steroids 2. 5-ASA 3. Immunomodulators- MTX/AZA 4. Biologics- Infliximab 5. Anti TB
3	Total duration of treatment	----------
4	If any treatment for surgery – indication	1. Acute abdomen (perforated viscus, obstruction, toxic mega colon) 2. Perianal conditions 3. Malignancy 4. Other specify ---------
5	Surgery performed	1. Exploration only 2. Limited resection 3. Fistulotomy/seton placement 4. Other specify----------
6	Intra operative finding	----------