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A case report of Crohn's disease mimicking intestinal tuberculosis: A clinical and diagnostic dilemma

Ramesh Raj Sunar[1]; Jeevan Gyawali[1]*; Bijaya Dhital[1]; Rohit Shrestha[1]; Anurag Jha[1,2]

[1]Internal Medicine Department, Chirayu National Hospital and Medical Institute (CNHMI), Maharajgunj, 44600 Kathmandu, Nepal.

[2]Department of Gastroenterology, Maharajgunj Medical Campus, Institute of Medicine, Kathmandu, Nepal.

***Corresponding Author: Jeevan Gyawali**
Internal Medicine Department, Chirayu National Hospital and Medical Institute (CNHMI), Maharajgunj, 44600, Kathmandu, Nepal.
Email: jibangyawalee@gmail.com
ORCID ID: 0009-0009-8350-2914

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Abstract

Crohn's Disease (CD) and Intestinal Tuberculosis (ITB) have similar clinical, endoscopic, and histopathological characteristics and possess a significant diagnostic challenge in tuberculosis-endemic regions. Misdiagnosis can lead to delayed treatment or use of inappropriate immunosuppressive therapy. A male in early 20's from a TB-endemic region presented with chronic abdominal pain, vomiting, diarrhea, hematochezia, and 6 kg weight loss. Chest X-ray was indicative of fibrotic changes, raising suspicion for tuberculosis. However, contrast-enhanced CT of chest, negative microbiological and immunological studies, and colonoscopy showing terminal ileal ulcers, pseudopolyps, and non-caseating granulomas on histopathology, revealed findings consistent with CD. MRI enterography showed asymmetric bowel wall thickening and mural stratification, supporting the diagnosis. The patient was initiated on azathioprine and adalimumab, with rapid resolution of symptoms. This case highlights the necessity of multimodal evaluation to differentiate CD from ITB and also the importance of excluding TB before starting immunosuppressive therapy to avoid catastrophic outcomes.

Keywords: Crohn's disease; Inflammatory bowel disease; Intestinal tuberculosis; TB endemic region; Immunosuppressive therapy.

Introduction

Crohn's Disease (CD), with its chronic nature, affects a person physically and mentally as it may involve any part of the gastrointestinal tract, usually the terminal ileum and colon. It is usually accompanied by nonspecific clinical signs like abdominal discomfort, diarrhea, fatigue, and unintentional weight loss [1]. The characteristic features of the disease include its relapsing-remitting course and transmural inflammation. Most patients have a variety of complications, such as strictures, fistulae, and intra-abdominal abscesses that significantly worsen the quality of life [2]. With a reported prevalence of 6.3%, Inflammatory Bowel Diseases (IBD), such as Crohn's Disease (CD) and Ulcerative Colitis (UC), are becoming more broadly accepted in Nepal [3]. UC is significantly more frequent than CD. However, because CD shares characteristics with intestinal tuberculosis (TB), it is frequently underdiagnosed, particularly in TB-endemic areas such as South Asia [4,5]. Differentiation is difficult due to similar clinical, endoscopic, and histological findings, which commonly result in incorrect diagnoses and postponed treatment [5,6]. Accurate identification is made more difficult by limited access to sophisticated tests. An organized, multi-modal diagnostic strategy and greater awareness are vital as the number of CD cases in emerging nations rises [7,8]. At the molecular level, changes in immune signaling pathways, especially with the nuclear factor-kappa B (NF-κB) cascade, have been linked to the chronic inflammatory response of Crohn's disease [9]. There are many pharmacological approaches, including biolog-

ics, immunosuppression, and surgery to treat complications of the disease [10]. This report presents a young male patient whose case was interpreted as having intestinal tuberculosis based on clinical and radiological features. After extensive diagnostic workup, which included microbiological, immunological, and histopathological analyses, he was ultimately diagnosed with Crohn's disease. This case emphasizes the value of layered diagnostic reasoning, especially in TB-endemic regions where misdiagnosis is common.

Case presentation

A 20-year-old university student presented to the emergency department with a one-month history of abdominal pain localized in the umbilical area associated with recurrent vomiting. Patients also complained of anorexia and diarrhea, two to three times a day, yellowish in color and semisolid in consistency. Additionally, he reported a single episode of hematochezia. Over the preceding two months, he had unintentional weight loss of approximately 6 kg. There was no history of fever, hemoptysis, and cough. His past medical and psychological history was unremarkable. Family history was non-contributory. He denied tobacco smoking, alcohol consumption, or illicit substance use. On presentation, the patient was afebrile, and blood pressure was 120/70 mmHg with sinus tachycardia (heart rate 120 beats per minute). Physical examination showed pink palpebral conjunctiva without evidence of pallor or icterus, and no cervical lymphadenopathy was noted. Abdominal inspection showed a flat contour without distension, surgical scars, or visible peristalsis. On palpation the abdomen was soft with mild periumbilical tenderness but no guarding or rebound tenderness. Bowel sounds were normoactive in all quadrants. There was no hepatosplenomegaly or other abdominal masses. The remainder of the physical examination was unremarkable.

Diagnostic assessment

Initial laboratory evaluation revealed systemic inflammation (C-reactive protein: 32 mg/L) accompanied by microcytic anemia (hemoglobin 11.9 g/dL; mean corpuscular hemoglobin 70 fL) with a normal total leukocyte count. Electrocardiogram revealed sinus tachycardia and transthoracic echocardiography revealed preserved biventricular function (left ventricular ejection fraction 60%) without structural abnormalities. Comprehensive metabolic panel, hepatic and renal function tests were unremarkable, including aspartate aminotransferase (22 U/L), alanine aminotransferase (18 U/L), and serum creatinine (1.1 mg/dL) (Table 1). Thyroid function tests showed no abnormalities. Stool analysis, including fecal occult blood testing, was negative. Chest X-ray showed fibrotic changes in the right upper lobe, raising suspicion of tuberculosis. However, contrast-enhanced Computed Tomography (CT) of the chest revealed no abnormalities. Fecal calprotectin was elevated (270 mcg/gm) which ruled out irritable bowel syndrome. Further diagnostic workup, including sputum acid-fast bacilli (AFB) staining, GeneXpert MTB/RIF assay, and interferon-gamma release assay (IGRA), yielded negative results, effectively excluding pulmonary and intestinal tuberculosis. These findings suggested inflammatory intestinal disorders. Colonoscopy revealed terminal ileal ulcers, deformed ileocecal valves with ulceration, as well as longitudinal and transverse ulcers with pseudopolyps in the ascending, transverse, and sigmoid colon-findings characteristic of Crohn's disease. Histopathological analysis of the terminal ileum and colon demonstrated mucosa with moderate villous blunting and areas of erosion with granulation tissue, dense neutrophilic infiltration, and congested blood vessels. Cryptitis and crypt abscesses were also noted, consistent with chronic, severely active colitis. The lamina propria exhibited dense mixed inflammatory infiltrates composed of lymphocytes, plasma cells, and neutrophils. The absence of caseating necrosis and a negative microbiological workup for tuberculosis served as key differentiating factors in ruling out intestinal tuberculosis. To further characterize disease extent and aid in differential diagnosis, contrast-enhanced abdominal MRI Enterography was performed. The study demonstrated characteristic features supporting Crohn's disease, including multifocal circumferential bowel wall thickening involving the terminal ileum, cecum, ascending colon, hepatic flexure, and descending colon (Figure 1). Asymmetric thickening with diffusion restriction, post-contrast enhancement, and mural stratification (Figure 2) and multiple ulceration on the colon in skip lesion pattern were also observed (Figures 3). Minimal peri-enteric soft tissue stranding was present, without evidence of fistulae or perianal disease. These findings, particularly the asymmetric involvement, mural stratification and preservation of the fat plane, helped distinguish inflammatory bowel disease from intestinal tuberculosis. The radiological features correlated well with both colonscopic and histopathological findings, reinforcing the diagnosis of Crohn's disease.

Treatment

After multidisciplinary evaluation, shared decision-making and informed consent, azathioprine 50 mg once daily was started for immunomodulation alongside subcutaneous adalimumab (induction dose 80 mg) with maintenance therapy (40 mg, every fortnight) over 26 weeks. Given the persistent sinus tachycardia, metoprolol 25 mg once daily was initiated for symptomatic control. Concurrent oral iron supplementation was prescribed to address the iron deficiency anemia.

Follow-up and outcomes

After one month of follow up the patient had significant clinical improvement with resolution of abdominal pain, normalization of bowel habits, and documented weight gain of 2 kg. Patient remains under outpatient surveillance with monitoring parameters including: clinical assessment of disease activity, inflammatory markers (CRP), (Table 2) and surveillance for potential adverse effects of immunomodulatory therapy. Additional follow-up focuses on anemia correction, monitoring for tachycardia, and nutritional status assessment through serial weight measurements. This comprehensive monitoring protocol adheres to current standards for IBD management while addressing the patient's specific clinical manifestations.

Discussion

Inflammatory Bowel Disease (IBD) are chronic, autoimmune disorders that primarily affects gastrointestinal system. IBD are characterized by systemic inflammation which is relapsing-remitting in nature. Although the cause of IBD remains unclear, genetic predisposition, environmental factors and gut bacteria are thought to play significant roles in its development [11,12]. IBD encompasses two conditions: Ulcerative Colitis (UC) and Crohn's Disease (CD). Some patients may exhibit overlapping

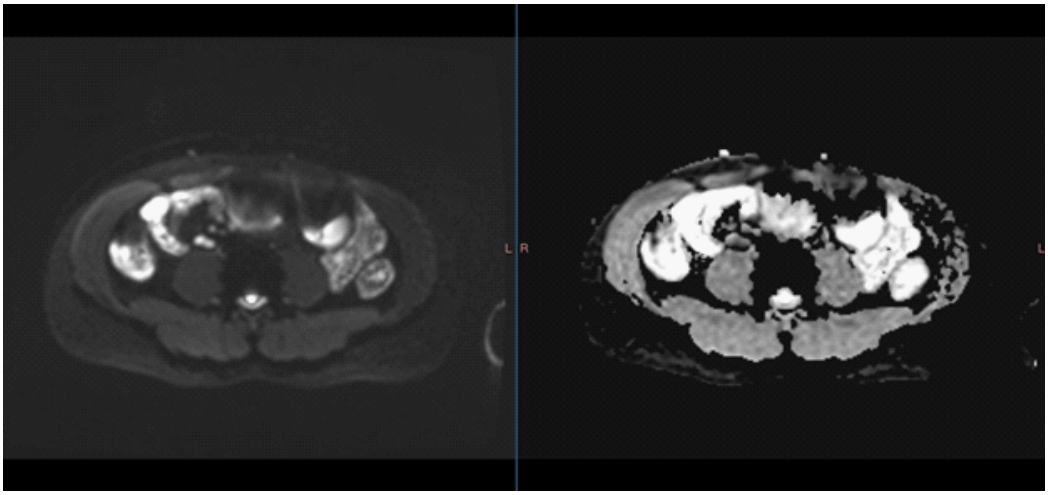

Figure 1: DWI and ADC map showing thickened bowel wall of the ascending and descending colon with high signal in DWI and low signal on ADC representing diffusion restriction.

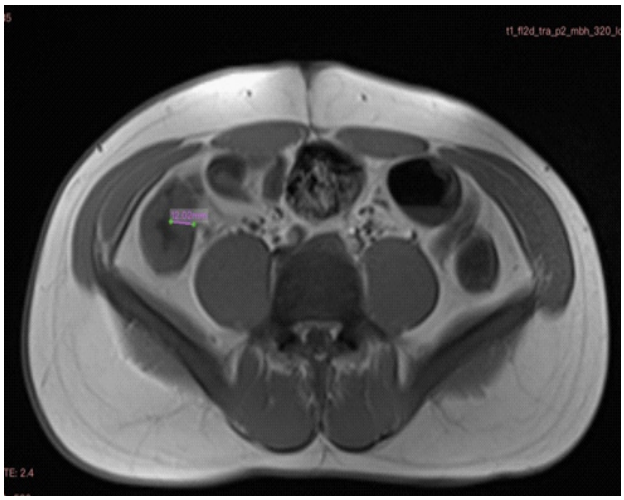

Figure 2: T1 weighed axial cut showing circumferential asymmetrical bowel wall thickening at the caecum reaching up to 12 mm in thickness.

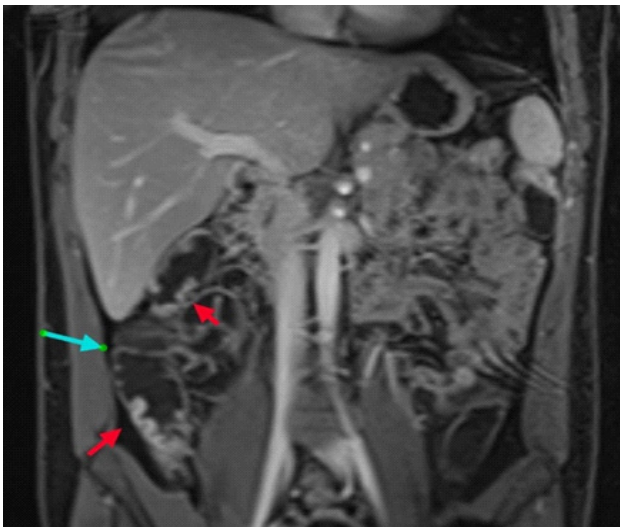

Figure 3: Multiple ulcerations on colon in skip lesion pattern (red-involve, green arrow-uninvolved area).

Table 1: Chronological presentation of symptoms.

Time before presentation	Symptom(s) developed	Clinical notes
8 weeks	Unintentional weight loss	6 kg reduction over 2 months
4 weeks	Pain abdomen	Umbilical area, constant, cramping nature
4 weeks	Recurrent Vomiting	Non- projectile, non-bloody, non bilious
4 weeks	Diarrhea	Semisolid, yellowish.
4 weeks	Anorexia	Significant appetite reduction
3 weeks	Hematochezia	Single episode noted
Presentation	Medical Evaluation sought	Progressive symptom concern

Table 2: Investigation reports at different times of visit.

Parameter	Result at presentation	Results (follow-up – 1 months)	Reference range:
Hemoglobin	10.9 g/dL	12 g/dL	14 - 18 g/dL
C-reactive protein	32 mg/L	8 mg/L	< 3 mg/L
Mean Corpuscular Hemoglobin (MCv)	70 fL	81 fL	80-100 fL
Fecal calprotectin	272 mcg/gm	160 mcg/gm	<50 mcg/gm

features of both UC and CD, a condition referred to as indeterminate colitis. Siew et all has described four epidemiological stages of IBD as emergence, acceleration in incidence, compounding prevalence, and prevalence equilibrium. By 2020 developing countries such as Nepal are in the emergence stage and there has been a two to threefold increase in the incidence of IBD in these regions [3]. Crohn's disease and intestinal tuberculosis both diseases present with similar clinical presentation, radiological features, and even histopathological findings, which remain challenging [7,8], particularly in TB-endemic regions like Nepal. This paper discusses the clinical, endoscopic, radiologic, and histological features that can help differentiate Crohn's disease from intestinal tuberculosis and ulcerative colitis. Crohn's disease has a usual bimodal distribution, with the first peak between the ages of 15 and 30. In contrast, the age distribution of intestinal TB is more consistent [13]. The presentation with periumbilical pain, diarrhea, and hematochezia is consistent with Crohn's disease, particularly involving the colon. The significant weight loss is common to both conditions and reflects the chronic inflammatory process and malabsorption occurring in the gastrointestinal tract [14]. Anemia is reported in 60-80% of Crohn's disease patients and similarly high percentages in intestinal tuberculosis [15]. Patient presented with gastrointestinal symptoms, weight loss, and a chest X-ray- Rays showing fibrotic changes signifying the diagnostic complexity. The presence of fi-

brotic changes on chest imaging initially raised strong suspicion for tuberculosis, which could have led to misdiagnosis without a comprehensive evaluation [16]. Misdiagnosis rates range from 50% to 70% due to similar clinical manifestations [12]. This distinction is important, as immunosuppressive treatment for Crohn's disease can lead to disseminated TB, the need for surgery, and even mortality if misdiagnosed [17-19]. Therefore, an accurate diagnosis at the earliest possible stage is essential [8]. The higher prevalence of intestinal tuberculosis complicates the diagnosis of CD in developing countries [20]. When a patient has B-symptoms, ascites, hepatomegaly, diarrhea, abdominal pain, abdominal distention, and abnormal liver function tests, intestinal TB should always be taken into consideration [21]. The absence of distinct clinical labels and the lack of a largely sensitive and specific individual tests for CD contribute to these individual difficulties. This issue is especially applicable in Nepal, a country with a significant tuberculosis burden. In 2022, Nepal struggle with a TB burden, estimating 70,000 total cases at an incidence rate of 229 per 100,000 populations [22]. The non-caseating granulomas seen in histopathological findings. While both conditions can present with granulomatous inflammation, the non-caseating nature of granulomas and transmural inflammation pattern strongly favored Crohn's disease. Granulomas with caseation are typically suggestive of tuberculosis, while scattered, non-caseating granulomas are suggestive of Crohn's disease [23]. Endoscopic features, such as involvement of the ileocecal valve, patulous ileocecal valve, and transverse ulcers, were more indicative of intestinal tuberculosis, while longitudinal ulcers, aphthous ulcers, cobblestone appearance, and rectal involvement were more indicative of Crohn's disease. Rectal involvement and contiguous involvement were more suggestive of ulcerative colitis, while deep ulcers, cobblestoning, skip areas, and ileal involvement were more characteristic of Crohn's disease. There should be emphasis on the significance of integrating colonoscopic findings with histopathology [7,15]. The decision to initiate immunosuppressive therapy with azathioprine and adalimumab required careful consideration in this case [24]. Comprehensive diagnostic approach, effectively ruling out tuberculosis, allowed us to proceed with appropriate treatment for Crohn's disease. The selection of adalimumab aligns with current treatment guidelines for moderate to severe Crohn's disease [24]. Anti-TNF agents have completely changed the way Crohn's disease is managed since they are effective at causing and sustaining remission. Nevertheless, these substances are connected to the significance of ruling out TB before starting treatment, as we did in this instance, is further highlighted by the elevated risk of tuberculosis reactivation [25]. This case illustrates particular challenges faced in regions where tuberculosis remains endemic. The World Health Organization reports that tuberculosis remains prevalent in many Asian countries, including Nepal, where our case was reported [26]. In such settings, clinicians must maintain heightened suspicion for tuberculosis while avoiding the pitfall of missing Crohn's disease due to over-diagnosis of tuberculosis [26]. This not only delays appropriate treatment but exposes patients to potential adverse effects of unnecessary medications case demonstrates the value of comprehensive diagnostic evaluation before initiating treatment, even in regions endemics in tuberculosis. New diagnostic methods have the potential to differentiate among these diseases Metagenomic sequencing of intestinal biopsy samples can detect Mycobacterium tuberculosis DNA with high sensitivity, which can improve diagnostic accuracy [27]. Novel serological markers such as perinuclear anti neutrophil cytoplasmic antibodies (p-ANCA) and Anti-Saccharomyces Cerevisiae Antibodies (ASCA) could also help in differentiation, with higher ASCA positivity in Crohn's disease than intestinal tuberculosis [28]. Artificial intelligence algorithms applied to endoscopic images have shown effective results in differentiating between these conditions [29]. These technologies may eventually complement traditional diagnostic approaches, particularly in challenging cases. A limitation in our approach was the absence of advanced diagnostic modalities, such as video capsule endoscopy or specific serological markers, which might have provided additional diagnostic clarity. However, our comprehensive evaluation with clinical, radiological, microbiological, immunological, endoscopic, and histopathological data represents significant strength, aligning with recommended multidimensional diagnostic approaches [30]. The relatively short follow-up period described in this case does not allow us to comment on long-term outcomes or treatment efficacy. However, the therapeutic response to Crohn's disease-specific therapy may provide additional retrospective confirmation of our diagnosis, as treatment response patterns differ between these conditions [31].

Conclusion

Distinguishing Crohn's disease from intestinal tuberculosis is a major diagnostic challenge, especially in areas where TB is common. In this case, the patient's symptoms and early assessments suggested possible TB, but negative confirmatory tests and histopathological evidence (non-caseating granulomas, transmural inflammation) ultimately supported a Crohn's diagnosis. This emphasizes the value of thorough testing-including colonoscopy, biopsies, and TB-specific assays-before starting treatment. Misdiagnosis can lead to inappropriate therapy and financial burden on patients risking worsened outcomes. Immunosuppressants like azathioprine and biologics such as adalimumab are effective for Crohn's but could aggravate undiagnosed TB on patients. Clearer diagnostic guidelines and specific biomarkers may help reduce uncertainty in such cases. Clinicians should maintain a high suspicion for both conditions and adopt a stepwise approach to guarantee precise diagnosis and proper management.

Learning points

1. **Diagnostic challenges:** Crohn's Disease (CD) and Intestinal Tuberculosis (ITB) present similar clinical, radiological, and histopathological features, making diagnosis difficult in TB-endemic regions. This can lead to misdiagnosis, delaying appropriate treatment and potentially resulting in adverse outcomes, especially since immunosuppressants used for CD can worsen TB.

2. **Importance of multimodal evaluation:** A multimodal diagnostic approach, including comprehensive clinical evaluation, imaging (CT and MRI), microbiological and immunological studies, colonoscopy, and histopathology, is crucial to differentiate between CD and ITB.

3. **Therapeutic considerations:** Ruling out active TB is essential before initiating immunosuppressive therapy for Crohn's disease, particularly when considering anti-TNF agents like adalimumab, due to the risk of TB reactivation. The case highlights the importance of a thorough diagnostic workup to guide appropriate treatment and avoid potentially harmful consequences.

Declarations

Ethics approval and consent to participate: Our institution does not require ethical approval for case studies. The patient's parent's consent was obtained.

Clinical Trial: Not applicable.

Consent for publication: Written Informed consent for publication of clinical details and clinical images was obtained from the patient's parents.

Availability of data and material: Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

Conflicts of interest/competing interests: The authors have no conflicts of interest to declare that are relevant to the content of this article.

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Authors' contribution statements:

R.R.S., J.G. provided clinical data and did the first revision.

A.J. participated in critical review and revision.

B.D., J.G. designed the study.

R.S., R.R.S., J.G., and B.D. wrote the first draft of the manuscript.

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