Clinical Image

Intestinal TB v/s Crohn’s disease – Mystery solved?

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Abstract

In countries like India where TB is endemic, it is extremely difficult to differentiate between Intestinal-TB and Crohn’s-disease as both have overlapping clinical, radiological, endoscopic and histological features [1-4]. Incorrect diagnosis causes increased morbidity and mortality. Hence, there is a need for an imaging test that can accurately diagnose both and can be easily integrated into existing clinical practice.

We describe a new technique of CT perfusion for differentiation between the two diseases. We present 2 cases (biopsy proven) of intestinal-TB and Crohn’s-disease. The clinical, laboratory investigations, imaging and endoscopic findings will be discussed along with analysis of the perfusion parameters. The final diagnosis will be considered according to the biopsy findings. We conclude that CT perfusion is a highly sensitive and specific non invasive imaging modality for differentiation between intestinal-TB and crohn’s-disease.

Keywords: Intestinal TB; Crohn’s disease; CT enterography; CT perfusion; Inflammatory bowel disease
**Abbreviations:** ATT- Anti Tuberculosis Treatment; BF- Blood Flow; BV- Blood volume; CT- Computed Tomography; CECT- Contrast enhanced Computed Tomography; ESR- Erythrocyte Sedimentation Rate; Hb- Hemoglobin; IV- Intra-venous; MIP- Maximum Intensity Projection; MTB- Mycobacterium tuberculosis; MTT- Mean Transit Time; PMB- Permeability; ROI-Region of Interest; TB- Tuberculosis; v/s- Versus

1. Introduction

Intestinal-TB and crohn’s-disease are characterised by chronic granulomatous inflammation that resemble each other in their clinical presentation and pathology. Any of the available modalities cannot differentiate them with high accuracy. Incorrect diagnosis is hazardous- if a patient with Intestinal-TB is given immunosuppressive drugs, it will result in flare up of the disease, whereas, if a patient with crohn’s-disease is given ATT, it will lead to unnecessary exposure to hepatotoxic drugs. Hence, it is very important to make the correct diagnosis at the earliest possible stage [5].

CT-perfusion is a technique to assess vascularity of tissues. In this technique, IV contrast is administered and changes in tissue density are measured by dynamically acquired CT [6]. This technique has been used extensively in onco-imaging especially large-bowel, however, studies in small bowel are limited. No study has been conducted till date to assess CT-perfusion in IBD and infections like TB. Herein, we report 2 cases to show its utility in differentiation of intestinal-TB and crohn’s-disease.

2. Case Report

2.1 Case 1

An 18-year-old female presented to Gastroenterology-OPD with complaints of abdominal pain, increased stool frequency for 1 year and fever with evening spikes for 2 months. She was given ATT in another institute, however, there was no improvement. On examination, the vitals were stable with grossly normal examination findings. Blood investigations revealed anemia (Hb-10.5 g/dl), decreased serum albumin and total protein. Her ESR was normal with increased CRP (11mg/L) and fecal calprotectin (75ug/gm). A provisional diagnosis of intestinal-TB v/s crohn’s-disease was made.

Ultrasonography showed diffuse hypoechoic mural thickening of ileum and IC junction without any proximal bowel dilatation with increased surrounding mesenteric echogenicity. CT enterography revealed long segment circumferential mural thickening of terminal-ileum with mural stratification, hypervascularity and locoregional lymphadenopathy. CT-perfusion was carried out and perfusion parameters were assessed (Figure 1). According to our derived cut-offs, this case was of active Crohn’s-disease.
Colonscopy revealed aphthous ulcers at IC junction. The colonoscopic biopsy showed shortened ileal mucosa with intraepithelial leucocytes and discrete foci of pyloric metaplasia with non-caseating granulomas. Hence, final diagnosis was crohn’s-disease.

Figure 1: (A) Axial high resolution ultrasonographic image shows diffuse long segment circumferential hypoechoic mural thickening of terminal ileum (arrow) with surrounding mesenteric fat stranding; (B) Axial section of CT enterography of the same patient shows marked circumferential heterogeneously enhancing mural thickening of terminal ileum (arrow); (C and D) Post-processing CT perfusion images showing ROI(region of interest) placement and values of perfusion parameters (C) with corresponding color-coded perfusion maps showing MIP(maximum intensity projection), BF(blood flow), BV(blood volume), MTT(mean transit time) and PMB(permeability) images (D).

2.2 Case 2
A 19-year-old male presented with abdominal pain, fever and weight loss for 5 months. On examination, vitals were stable. Blood investigations revealed anemia, decreased serum albumin and total protein. ESR, CRP and fecal calprotectin were increased. Mantoux test was positive. Ultrasonography showed hypoechoic mural thickening of terminal-ileum and caecum with surrounding lymphadenopathy and mild ascites. CTenterography revealed mural thickening of terminal-ileum, IC junction and deformed caecum along with mesenteric-lymphadenopathy and mild ascites. A provisional diagnosis of intestinal-TB v/s Crohn’s-disease was made. CTperfusion was carried out and perfusion parameters were assessed (Figure 2). According to our derived cut-offs, this case was of intestinal-TB.
Colonoscopy showed IC junction narrowing and caecal ulcers. Colonoscopic-biopsy showed denuded epithelium and granulation tissue, lymphoid collection with fibrosis. Caseating granulomas were also seen. So, final diagnosis of TB was made.

**Figure 2:** (A) Axial CECT chest shows patches of consolidation with surrounding ground glass opacities and centrilobular nodules with tree-in-bud pattern (arrows) in bilateral lower lungs; (B) Coronal reconstruction of CT enterography of the same patient shows marked circumferential heterogeneously enhancing mural thickening of terminal ileum and ileo-caecal junction (solid arrow) and sub-centimetric necrotic lymph nodes(dotted arrow); (C and D) Post-processing CT perfusion images showing ROI(region of interest) placement and values of perfusion parameters (C) with corresponding color-coded perfusion maps showing MIP(maximum intensity projection), BF(blood flow), BV(blood volume), MTT(mean transit time) and PMB(permeability) images (D).

**3. Discussion**

Intestinal-TB and Crohn’s-disease are chronic inflammatory diseases with similar clinical and imaging features. The available modalities cannot differentiate between the two with high sensitivity and specificity. Therefore, there is a need to find a diagnostic tool that can help in making the correct diagnosis so that the correct treatment can be provided resulting in reduced morbidity and mortality.

We tried to differentiate between the two using CTperfusion and found that the perfusion-parameters are significantly raised in crohn’s-disease as compared to intestinal-TB. This is due to the fact that active crohn’s-
disease shows hypervascularity of the bowel wall due to inflammation [7]. Also, vasculitis is well documented in pulmonary/CNS/renal/ TB. However, very few studies have evaluated mesenteric-vasculitis in intestinal-TB. One such study showed thrombosis of mesenteric vessels in TB [8]. It is considered that endarteritis of submucosal-vessels leads to ulceration and finally perforation. Hence, intestinal-TB shows less perfusion as compared to active crohn’s-disease.

4. Conclusion
Considering the high sensitivity, specificity and reproducibility of PerfusionCT, it is clear that it can serve as a promising diagnostic tool which can differentiate intestinal-TB and crohn’s-disease and hence, can play a critical role in guiding management.

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Informed Consent
The patients provided written consent for publication of the case report.

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