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Spontaneous CMV-Associated Intestinal Perforation in Advanced HIV Infection with Concomitant Pulmonary Aspergillosis: A Rare Case Report

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Abstract: Gastrointestinal complications remain a significant source of morbidity in patients with advanced Human Immunodeficiency Virus (HIV) infection. This case describes a 43-year-old male truck driver presenting with respiratory and constitutional symptoms who was diagnosed with severe immunosuppression (CD4 count: 54 cells/µL). During conservative management for co-infections, he acutely developed an acute abdomen. Imaging and urgent exploratory laparotomy revealed a 5×3 cm² perforation in the distal ileum along with an incidental Meckel's diverticulum. A segmental resection and end-to-end ileo-ileal anastomosis were successfully performed. This report highlights the challenges of diagnosing secondary opportunistic or mechanical abdominal catastrophes in severely immunocompromised individuals.

Keywords: *HIV Infection; Cytomegalovirus (CMV); Intestinal Invasive Perforation; Pulmonary CMV Colitis; Aspergillosis; Infections; Antiretroviral Opportunistic Immunosuppression; Therapy.*

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I. INTRODUCTION

Advanced HIV infection predisposes individuals to a wide spectrum of opportunistic infections and unusual surgical emergencies. Gastrointestinal perforations in these patients are frequently associated with opportunistic pathogens such as Cytomegalovirus (CMV), *Mycobacterium tuberculosis*, or fungal agents. This case report discusses the clinical trajectory, multi-system investigations, and emergency surgical management of a patient presenting with advanced HIV, pulmonary ground-glass opacities, and an acute ileal perforation.

II. CASE PRESENTATION

A 43-year-old male truck driver presented to the emergency department with complaints of shortness of breath, fever with chills, and loss of appetite lasting for 10–12 days. He reported no history of altered sensorium or hemoptysis. Personal history was notable for chronic bidi smoking over 10 years and tobacco chewing for 15 years.

On initial evaluation, the patient was vitally stable, maintaining SpO_2 of 97% on room air. He was admitted to the Tuberculosis and Chest Diseases (TBCD) department, where empirical management was initiated with injectable antibiotics, nebulisation, and symptomatic therapy.

- *Comprehensive Blood and Microbiological Investigations Revealed a Complex Status of Immunosuppression and Co-Infections:*

- HIV-reactive status with a critically low CD4 count of 54 cells/µL (CD4 percentage: 2%) and absolute lymphocytes

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at 2457/µL.

- Hemoglobin was 10.5 g/dL. Total Leukocyte Count (TLC) was 9600/µL, and platelets were 2.7 Lakhs/µL. Renal and liver function tests were within normal limits. Urine routine examination showed 10 to 15 pus cells per high-power field (HPF).
- Sputum culture grew *Candida albicans* (sensitive to fluconazole, voriconazole, and caspofungin). Serum *Aspergillus* antigen was positive (index: 1.15).
- *Brucella* IgG antibody was positive at 2.20. Sputum samples were negative for Tuberculosis (Acid-Fast Bacilli) and Potassium Hydroxide (KOH) fungal mounts. COVID-19 RT-PCR and H1N1 RNA PCR were both negative.
- 2D Echocardiography was normal.
- High-Resolution Computed Tomography (HRCT) of the thorax revealed *multiple ground-glass opacities distributed across both lung fields.*
- Abdominal ultrasonography demonstrated a gaseous abdomen with evidence of inflammation at the terminal ileum, caecum, and ileocecal (IC) junction.

Based on these findings, conservative management was modified to include highly active Antiretroviral Therapy (ART) using a Tenofovir/Lamivudine/Dolutegravir (TLD) regimen, targeted antifungals, and supportive care. Specialized consultations were sought; ophthalmology performed an evaluation to rule out CMV retinitis, and physicians advised conservative observation for the positive Brucellosis serology.

➢ *Acute Abdomen Progression*

On the fifth day of admission, the patient developed acute, severe pain in the right upper abdomen, accompanied by progressive abdominal distension and obstipation. Per abdomen examination revealed a distended abdomen with generalized tenderness present. Digital rectal examination was unremarkable. An erect AXR was immediately performed, showing multiple air-fluid levels with dilated bowel loops, indicating mechanical or paralytic bowel obstruction.



Fig 1 AXR (Erect) Shows Prominent, Gas-Distended Small Bowel Loops Central to the Abdomen with Distinct Air-Fluid Interfaces

An urgent CECT of the abdomen and pelvis was done and the scan confirmed pneumoperitoneum, showing free air foci localized in the perihepatic region, along the falciform ligament, and within the periumbilical space, accompanied by free fluid in the pelvic cavity.

The patient was immediately transferred to the General Surgery department, kept NBM, catheterized, and nasogastric tube was inserted for hourly aspiration. He was then taken for an emergency exploratory laparotomy. Upon opening the peritoneal cavity,

- Approximately 10–20 cc of purulent peritoneal fluid was encountered and drained.
- A 5×3 cm² perforation located on the distal ileum, approximately 50 cm proximal to the ileocecal junction (ICJ). The anti-mesenteric wall surrounding the perforation was completely sloughed off.
- Meckel's diverticulum was found approximately 60 cm proximal to the ICJ (10 cm proximal to the perforation site).

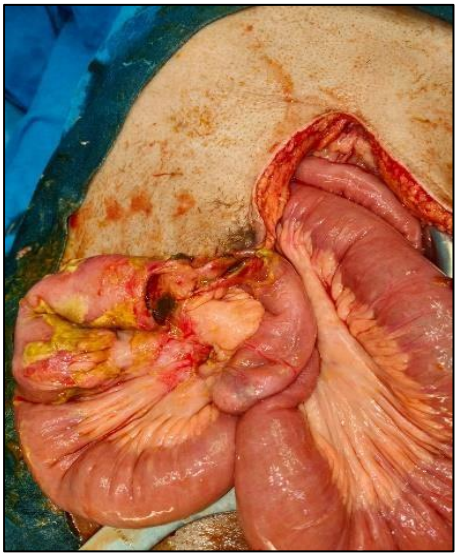


Fig 2 The Intraoperative Photograph Showing Distal Ileal Perforation

Following thorough peritoneal lavage, a 15 cm segment of the distal ileum—containing both the sloughed perforation site and the Meckel's diverticulum—was resected, end-to-end ileo-ileal anastomosis was done. A 24 Fr abdominal drain was positioned in the pelvis, and the abdomen was closed in layers. The patient was transferred to the Surgical Intensive Care Unit (SICU) intubated with an endotracheal tube in situ. The resected specimen was submitted for histopathological evaluation.

Histopathology was conclusive of endothelial cells having cytomegalovirus inclusion having basophilic inclusions at many places, ovoid bodies at places, Large ovoid or pleomorphic nucleus with basophilic intranuclear inclusions (cowdry bodies) surrounded by a clear halo seen at many places. Overall findings s/o cytomegalovirus infection.

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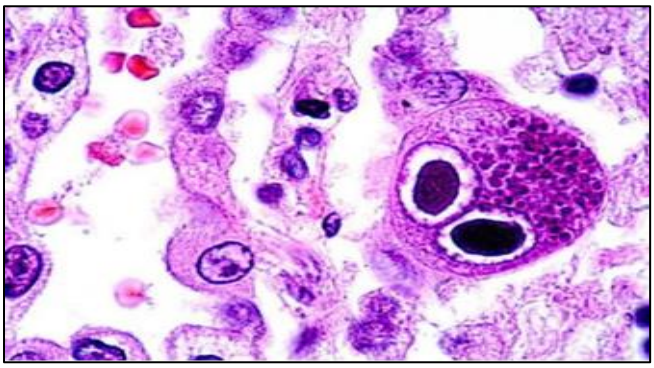


Fig 3 Histopathology Image of Resected Bowel Segment Showing Cowdry Bodies s/o Cytomegalovirus Infection

III. DISCUSSIONS

Cytomegalovirus (CMV) is a ubiquitous double-stranded DNA virus belonging to the Herpesviridae family. Although primary infection is usually asymptomatic, reactivation can cause severe end-organ disease in immunocompromised individuals, particularly patients with advanced human immunodeficiency virus (HIV) infection. CMV seroprevalence varies geographically and is generally high in many low- and middle-income settings. CMV colitis occurs in approximately 5–10% of individuals with advanced HIV infection, and the risk of end-organ disease increases markedly with severe CD4+ T-cell depletion, particularly below 50 cells/mm³. Although gastrointestinal involvement is well recognized, CMV-associated intestinal perforation remains an uncommon and potentially fatal complication.

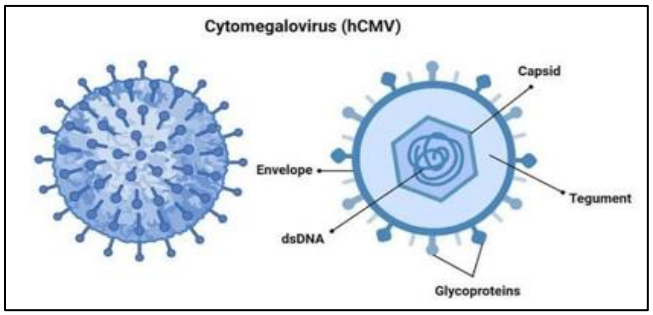


Fig 4 Structure of Cytomegalovirus

The pathogenesis of CMV-associated intestinal perforation involves viral reactivation in the setting of impaired cell-mediated immunity. CMV infects gastrointestinal epithelial, endothelial, and stromal cells, producing cytopathic changes, inflammation, vascular injury, and mucosal ulceration. Progressive ulceration may extend through the intestinal wall, resulting in transmural necrosis and perforation. The ileum was the most frequently reported site of perforation, emphasizing that CMV-associated perforation may involve both the small and large intestines.

The clinical presentation of CMV gastrointestinal disease is variable and includes fever, abdominal pain, diarrhea, gastrointestinal bleeding, anorexia, and weight loss. Intestinal perforation may present abruptly with severe abdominal pain, guarding, rigidity, and features of generalized peritonitis or septic shock.

Computed tomography may demonstrate bowel-wall thickening, inflammatory changes, free intraperitoneal air, or associated collections. However, these findings are not specific to CMV, and differential diagnoses include intestinal tuberculosis, bacterial enterocolitis, lymphoma, and other causes of bowel perforation.

Histopathological examination of intestinal tissue is essential for establishing the diagnosis, with characteristic cytomegalic cells containing intranuclear inclusions and positive CMV immunohistochemistry providing strong evidence of tissue-invasive infection. Blood CMV polymerase chain reaction (PCR) may support the assessment but cannot independently establish CMV gastrointestinal disease.

Management of CMV-associated intestinal perforation requires urgent surgical assessment and timely source control, along with fluid resuscitation, broad-spectrum antibiotics, and appropriate postoperative support. Antiviral therapy is essential for confirmed tissue-invasive CMV disease. Intravenous ganciclovir is generally recommended for severe CMV colitis, with a treatment duration of approximately 21–42 days or until clinical resolution. Oral valganciclovir may be considered when the patient is clinically stable and gastrointestinal absorption is adequate. Renal function and complete blood counts should be monitored because ganciclovir can cause nephrotoxicity and bone marrow suppression. Concomitant invasive pulmonary aspergillosis requires systemic antifungal therapy, with voriconazole generally recommended as first-line treatment; isavuconazole or liposomal amphotericin B are alternatives in selected circumstances. Treatment is usually continued for at least 6–12 weeks, depending on clinical response, radiological improvement, and immune recovery. Potential interactions between antifungal agents and antiretroviral drugs must be carefully evaluated.

Finally, optimization of antiretroviral therapy is fundamental to immune recovery and the prevention of further opportunistic infections. The timing and regimen should

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