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Cytomegalovirus Enteritis with Multiple Small Bowel Perforations in a Patient with Undiagnosed Acquired Immunodeficiency Syndrome

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1. Abstract

1.1. Introductory Statement

Cytomegalovirus (CMV) clinical manifestations primarily affect immunocompromised individuals and can rarely lead to small bowel (SB) deep ulcers and micro perforations. This is most commonly seen in patients with AIDS and a CD4 count <50 who are not receiving antiretroviral therapy (ART). Due to diagnostic challenges and severe complications, the outcome of CMV gastrointestinal (GI) disease is associated with high morbidity and mortality.

Purpose: This case report demonstrates the challenges in diagnosing, managing, and treating a rare manifestation of CMV involving the SB and colon.

1.2. Case Description

A 38-year-old female from Ecuador 4-months postpartum with unknown cause of infant demise presented to the ED with a 15-day history of abdominal pain, diarrhea, vomiting, and hypotension. Two exploratory laparotomies revealed multiple SB and colon microperforations, leading to bowel resections. Infectious etiology was suspected resulting in a new diagnosis of AIDS (CD4 count 13). Final surgical pathology was positive for CMV. The patient recovered well from surgery and was started on appropriate systemic therapy, however ultimately left AMA and was noncompliant with ART. The patient was readmitted three days later with DIC, GI bleed, multi-system organ failure and disseminated toxoplasmosis. The patient ultimately passed away approximately 45 days after initial presentation.

1.3. Relevance/Significance to Clinical Practice

This case underscores the complexities of managing CMV GI disease. Early recognition of immunity status is crucial to broadening the differential to include opportunistic infections.Timely diagnosis and initiation of therapies with good patient compliance could significantly impact outcomes.

2. Introduction

Cytomegalovirus (CMV), or human herpes 5 (HH5), is a virus that commonly causes asymptomatic infection in immunocompetent individuals. Globally, CMV seroprevalence among the general population has been estimated to be around 50%, increasing with age and exposure risk [1]. A large majority of these infections in healthy hosts are asymptomatic and the remainder typically present with a mononucleosis-like syndrome. However, in immunocompromised patients CMV can lead to devastating effects including severe end-organ disease in almost any organ system. The most common manifestations in those with severe immunosuppression include retinitis, pneumonitis, encephalitis, and gastrointestinal tract disease [2]. Although GI involvement by CMV is a relatively rare complication, it has been well-documented in patients with AIDS and severe immunosuppression [3]. The GI tract may be affected anywhere from the esophagus to the rectum, with the colon being the most frequently involved site, followed by the duodenum, stomach, esophagus, and very rarely the small intestine [4]. Patients with advanced HIV/AIDS, especially those with CD4 counts <50 cells/μL and who are not on effective antiretroviral therapy (ART), are at highest risk for severe CMV GI disease. Clinical presentations vary depending on the site of involvement. For example, CMV colitis often presents with abdominal pain, diarrhea, fever, and hematochezia and is one of the leading causes of lower GI bleeds in AIDS patients. In the upper GI tract, CMV can cause ulcerations leading to odynophagia or epigastric pain [5]. On the other hand, small intestinal CMV disease typically manifests as nonspecific abdominal pain and chronic diarrhea [6]. Life-threatening complications such as massive hemorrhage or intestinal perforation

can occur, though most commonly reported in the colon and are rarely encountered in the small bowel [7,8]. Before the advent of potent ART, CMV enterocolitis with perforation carried a very poor prognosis. Given the rarity of CMV enteritis with small bowel perforation, each documented case adds valuable insight [9]. We report a case of CMV enteritis causing multiple small bowel perforations in a young postpartum woman with undiagnosed HIV/AIDS. This case is unique in that it highlights an unusual presentation of advanced AIDS and CMV infection. Additionally, it underscores several important challenges in diagnosis and management including delayed pathology results, patient noncompliance, and language barriers. We discuss how this case contributes to the existing knowledge and emphasize key lessons for clinical practice.

3. Case Presentation

A 38-year-old hispanic female, who had recently immigrated from Ecuador, presented with a 15-day history of worsening abdominal pain, vomiting, profuse diarrhea, and two episodes of hematochezia. She was approximately four months postpartum and had recently lost her newborn to a reported hepatitis-related illness. She had no known medical history, had not received regular medical care, and denied alcohol or illicit drug use. On arrival, she appeared acutely ill with hypotension requiring IV fluids and vasopressors. Due to a language barrier, interpreter services were used throughout her care. On initial evaluation, the patient was febrile (38.5°C) and hemodynamically unstable with a blood pressure of 80/50 mmHg despite fluid administration. The patient was alert but in obvious distress from pain. Physical examination revealed diffuse abdominal tenderness with rebound and guarding. Bowel sounds were hypoactive. Labs revealed leukopenia, normocytic anemia, hyponatremia, hypokalemia, and an elevated serum lactate consistent with shock. A summary of initial laboratory findings is provided in Table 1. In the ED, an urgent contrast CT scan of the abdomen and pelvis was obtained, which revealed severe small bowel enteritis, lymphadenopathy, and microperforations (see Figure 1). Given these concerning findings, the patient was emergently taken to the OR. In the OR, diagnostic laparoscopy converted to exploratory laparotomy revealed multiple small bowel perforations near the terminal ileum and cecum with significant adhesions and fibrinous exudate (see Figure 2). An 80 cm segment of small bowel was resected, along with a partial cecectomy. Due to bowel friability, primary anastomosis was deferred and a temporary abdominal closure was placed. The postoperative course was complicated by inability to wean the patient from pressor requirements. Infectious disease was consulted in the interim for infectious workup. On postoperative day two, the patient was taken to the OR for a second look laparotomy, which revealed additional small bowel and right colon perforations along the mesenteric border requiring further resection. A third-look laparotomy was performed the following day. No new perforations were discovered and an ileocolic anastomosis was performed with abdominal closure. Postoperatively, the patient was weaned off pressors and extubated. In the following days, the patient exhibited confusion, persistent fever spikes, worsening pancytopenia, and continued hypotension. Infectious workup revealed a new AIDS diagnosis with a viral load of 1,070,000 copies/mL and a CD4 count of 13. She was also found to be CMV positive. Additionally, surgical pathology was found to be positive for CMV mRNA. She was initiated on HAART, intravenous ganciclovir, and broad-spectrum antibiotics. Despite treatment, the patient continued to have recurrent fever spikes but seemed to be improving clinically. However, the patient started to exhibit worsening emotional distress and depressive symptoms and became increasingly noncompliant with medications. Eventually, the patient left the hospital against medical advice. Three days after leaving, the patient was readmitted with worsening abdominal pain, weight loss, and generalized weakness. On examination, she was found to be hypotensive, jaundiced, and encephalopathic. The patient was in septic shock with DIC, multi-system organ failure, and acute metabolic encephalopathy. There was concern for disseminated fungal infection which prompted initiation of amphotericin B in addition to broad-spectrum antimicrobials and vasopressor support. Over the next few days, the patient remained in critical condition with ongoing hemodynamic instability. The family ultimately transitioned the patient to comfort care and she passed away. The patient's initial admission was 17 days long and subsequent admission 9 days long.

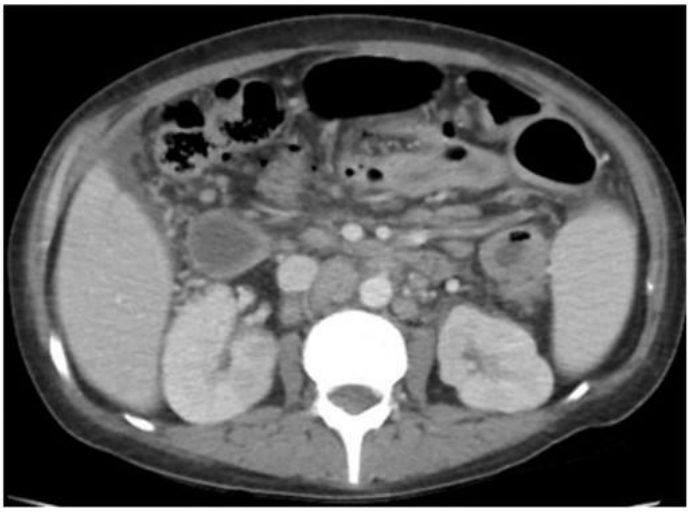

Figure 1: Axial view of patient's CT scan revealing evidence of severe SB enteritis and perforations.

Figure 2: Perforations on the patient's small bowel found during first exploratory laparotomy.

Table 1: Notable laboratory findings on initial presentation.

Laboratory test	Result	Reference range
White blood cell count	2.1 x 10^9/ L	4.0 - 11.0 x 10^9/L
Hemoglobin	9.5 g/dL	12 - 16 g/dL
Sodium	128 mmol/L	135 - 145 mmol/L
Potassium	2.9 mmol/L	3.5 - 5.0 mmol/L
Serum lactate	4.1 mmol/L	0.5 - 2.0 mmol/L

4. Discussion

CMV enteritis is an uncommon yet devastating opportunistic infection seen primarily in severely immunocompromised patients. Since the advent of effective ART, CMV gastrointestinal disease is rarely encountered as a complication of AIDS, with a decrease in incidence from 40 cases per 1000 person-years before HAART to 4 cases per 1000 person-years [10-13]. However, it still occurs in patients with advanced HIV who are untreated or fail to respond to therapy. Our patient demonstrated the classic risk factors for severe CMV disease including, a CD4 count below 50 and no prior ART coverage. This case highlights the risks of diagnostic delays, patient noncompliance, and social barriers in managing complex infections. The pathogenesis of cytomegalovirus gastrointestinal disease arises from several mechanisms involving direct viral injury, immune-mediated inflammation, and vasculitis. CMV primarily targets intestinal epithelial cells, inducing apoptosis and disruption of tight junctions, which increases transepithelial permeability and promotes bacterial translocation ultimately weakening the gut wall's integrity [14,15]. The subsequent inflammatory response driven by CMV-infected monocytes and macrophages, further damages the mucosa and submucosa [14-16]. Vasculitis is another key factor, as CMV can infect endothelial cells leading to microvascular damage and ischemia. This ischemic process can progress to bowel wall necrosis, significantly increasing the risk of perforation [17-19]. In an immunocompromised patient, such as in this case, an impaired immune response permits extensive viral replication and tissue damage [20,21]. Consequently, the risk of perforation is heightened due to an impaired immune response, which allows for more extensive viral replication and tissue damage [20,21]. The combination of direct cytopathic effects, inflammatory damage, and ischemic necrosis results in a fragile intestinal wall prone to perforation under the stress of ongoing infection and inflammation. As demonstrated by our patient, the diagnosis of CMV enteritis can be challenging and often delayed. Endoscopic biopsy with histopathology remains the gold standard for diagnosis, which typically reveals the characteristic CMV "inclusion bodies" [19]. Current guidelines recommend specifically immunohistochemical staining or in situ hybridization [22]. The Additional modalities that are frequently discussed include polymerase chain reaction and serology testing. Although tissue PCR can be supportive, blood PCR is only sensitive for systemic infection but not sensitive or specific for gastrointestinal disease [23,24]. Additionally, patients with CMV enteritis can have negative blood PCR and viremia does not confirm tissue invasion [25]. Similarly, serology testing in this context is not useful, as it only indicates prior exposure or recent infection but not active tissue-invasive disease [19]. Our patient did have a positive serum CMV PCR with a viral load that only indicated low-level viremia. The management of CMV enteritis involves antiviral therapy and surgical intervention when necessary. Intravenous ganciclovir is the first-line treatment for CMV disease in immunocompromised patients [22]. In our case, due to high clinical suspicion and positive serum CMV PCR, the care team appropriately started ganciclovir before the release of final pathology results. This may have helped to control the infection to some extent during her first admission. There is evidence that early treatment with antivirals can induce remission and healing of ulcers in CMV colitis [26,27] However in our case, there were full-thickness perforations with acute peritonitis requiring surgical intervention. The risks of surgery in these patients are significant as patients with AIDS and CMV colitis who undergo emergent surgery have high morbidity and mortality [19]. Common postoperative complications include anastomotic leaks, recurrent perforations, and continued sepsis[19]. Our patient did survive the immediate postoperative period and even improved transiently, which could be attributed to successful source control and antiviral therapy. However, our patient eventually discontinued her treatment and left against medical advice. When she was readmitted five days later, she was found to have CMV relapse, suspected disseminated Toxoplasma and other opportunistic infections which ultimately led to her death. It remains unclear how her clinical course may have differed had she remained hospitalized and continued ART therapy. Sustained treatment and close monitoring may have altered the patient's outcome. Additionally, several psychosocial factors contributed to the complexity of treating this patient. Her recent immigration status, limited knowledge of her medical history, and the language barrier posed challenges to establishing rapport, delivering education, and ensuring adherence to treatment. These factors were intensified by the profound emotional trauma of having recently lost her newborn. The degree of suffering and isolation she must have experienced, while navigating

a new healthcare system in a foreign country, was undoubtedly immense and likely played a major role in her leaving against medical advice. This case highlights the importance of integrating psychosocial and cultural support into the management of critically ill patients, particularly those from underserved or vulnerable backgrounds. Our patient's outcome highlights the grim prognosis associated with CMV enteritis with perforations in late-stage AIDS. Despite modern advances, this pathology remains a highly lethal condition even with appropriate interventions. Contributing to high mortality is the fact that these patients often have multiple simultaneous opportunistic infections and their organ reserves are poor. Therefore, early HIV diagnosis and treatment is paramount. In patients who do develop CMV GI disease, aggressive antiviral therapy and supportive care are necessary. Notably, there is literature to suggest that surgical resection of affected bowel segments prior to frank perforation may improve outcomes.

5. Conclusion

We report a rare and fatal case of CMV enteritis presenting with multiple small bowel perforations in a young woman with previously undiagnosed AIDS. This case highlights the extreme severity with which CMV can affect the gastrointestinal tract in immunocompromised patients and underscores several critical lessons. First, clinicians must maintain a high index of suspicion for CMV gastrointestinal disease in immunosuppressed patients presenting with severe abdominal symptoms. Second, early initiation of empiric antiviral therapy can be life-saving, especially when confirmatory pathology is delayed. Third, rapid diagnostic tools such as CMV PCR and immunohistochemistry should be utilized when available to expedite diagnosis. Lastly, this case highlights the profound impact of psychosocial factors such as language barriers, immigration status, trauma, and mental health on treatment adherence and outcomes. Comprehensive, multidisciplinary care that integrates medical and psychosocial support is essential to improving survival and quality of life in vulnerable patient populations.

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