Cytomegalovirus Colitis in an Immunocompetent Host: A Case Report And Review Of The Literature

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Citation

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Abstract

CMV is a common pathogen worldwide. Clinically significant CMV infection is mostly seen in the context of immunosuppression, whether congenital, acquired, or iatrogenic. In the recent past, however, an increasing number of moderate-to-severe cases of colitis have been described among immunocompetent patients, both adults and children. We describe a rare case of CMV reactivation in an immunocompetent post-surgical host. Many factors, such as pain and poor nutrition, are common after surgery and have been shown in the literature to weaken the immune system. We propose that the post-surgical state may be a significant risk factor for the reactivation of CMV infection.

INTRODUCTION

Cytomegalovirus (CMV) is an extremely common pathogen worldwide, in which 40-100% of the world's population estimated to be seropositive, especially those in developing countries. [1] In the United States, 50-80% of adults are infected by the age of 40 years. [2] CMV usually affects patients with weaker immune systems, whether from chronic immunosuppressive diseases (HIV, leukemia) or immunosuppressive medications for the treatment of autoimmune diseases or cancers. However, CMV infections may also affect individuals who are immunocompetent, those lacking a congenital or acquired immunodeficiency, transplant, or immunosuppressive medication. [3,4]

CMV infections in immunocompetent hosts range from asymptomatic to CMV-induced mononucleosis, pneumonitis, or hepatitis, with asymptomatic predominating. [4,5] CMV affects many different organ systems, including the GI tract. [6]

Gastrointestinal CMV infection has been mostly described in immunosuppressed patients with luminal disease, such as colitis or esophagitis, being the most commonly observed entity. [7] However, an increasing number of moderate-to-severe cases of colitis have been described in immunocompetent patients, both adults and children. [8,9,10,11,12,13,14] This case represents a rare but serious condition of CMV colitis in an immunocompetent patient.

CASE REPORT

Patient was a 63 year-old male with a past medical history of abdominal aortic aneurysm, hyperlipidemia, and morbid obesity who was admitted for repair of an enlarging abdominal aneurysm. Intra-operatively, the procedure was complicated by a loss of 3 liters of blood. Post-operatively, the patient was taken to ICU, where he was noted to have a SBP of 66 mmHg and hemoglobin of 6.3 g/dL. Due to the lack of clinical response to fluid boluses and multiple pRBC transfusions, the patient underwent exploratory laparoscopy. A 4 liter hemoperitoneum was discovered. Post-operatively, he returned to ICU on mechanical ventilation and vasopressors. Soon thereafter, he developed acute renal failure requiring hemodialysis. Nutritional goals were accomplished through nasogastric tube feeding.

Subsequently, he was started on vancomycin and piperacillin-tazobactam for possible ventilator-associated pneumonia. On hospital day #8, he experienced loose green-brown stools and elevated post-feed residuals. Laboratory data revealed an elevated WBC count (23,400/cm ^{2}), BUN (62 mg/dL), Cr (6.2 mg/dL), total bilirubin (2.7 mg/dL), alkaline phosphatase (125 IU/L), AST (79 IU/L), and BNP (541 pg/mL), and a decreased hgb (9.2 g/dL), sodium (130 mEq/L), and albumin (2.1 g/dL). Stool Clostridium difficile toxin was negative. Patient was started on metronidazole based upon high suspicion for C. difficile or ischemic colitis with improvement in the diarrhea and leukocytosis.

On hospital day #27, the diarrhea returned. The WBC count

trended upward to 23,800/cm ^{2} . Stool C. difficile toxin assays were again negative. Patient underwent flexible sigmoidoscopy on hospital day #29 demonstrating diffuse mucosal erythema and edema, numerous erosions, and whitish exudates. (Figure 1) Histopathology demonstrated ulcerations with granulation tissue and mixed inflammation with frequent stromal cells containing intranuclear and cytoplasmic inclusions, suggestive of cytomegalovirus. (Figure 2) Iron stains were positive for hemosiderin-laden macrophages. Although serum CMV IgG was positive, serum CMV IgM was found to be negative. He was started on ganciclovir with significant improvement in diarrhea.

After several months in the ICU, during which time the patient experienced multiple wound infections and several bouts of sepsis, the family decided to withdrawal cardiopulmonary support.

Figure 1

Figure 1: Endoscopic images of ulcerated and friable mucosa in the sigmoid colon on flexible sigmoidoscopy.

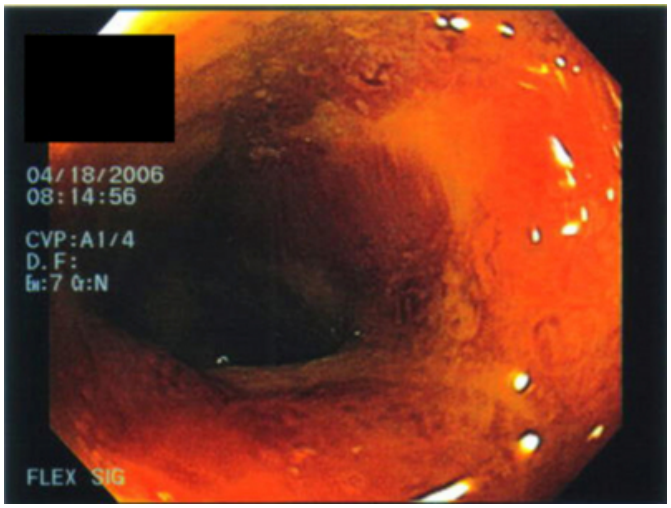
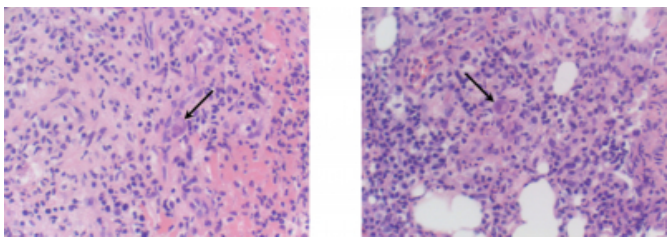


Figure 2

Figure 2: Histopathological specimens revealing large cells with eosinophilic intranuclear and intracytoplasmic inclusions (black arrows), indicative of CMV.



DISCUSSION

CMV colitis is a rare disease in immunocompetent hosts, with only 43 cases identified in the English literature. [3] CMV colitis may be the result of primary infection or secondary reactivation. Whether primary infection or secondary reactivation, CMV induces ulcerations of colonic mucosa resulting in systemic symptoms, such as abdominal pain and fever. [9] The inflamed colonic mucosa may result in diarrhea, which may become bloody as the ulcerations become deeper and erode into colonic blood vessels. [10] CMV also promotes the formation of micro-thrombi, leading to subsequent ischemic damage. [15] The diagnosis may be obtained by colonoscopy with biopsies. [16] Upon direct visualization by colonoscopy, inflammation with focal mucosal hemorrhage, edematous folds, and polypoid lesions may be seen. [16] Histological specimens may show intranuclear inclusion bodies, indicative of the virus replicating in the nucleus rather than the cytosol. These inclusions are also known as “owl's eye” bodies, which stain dark pink on H&E stains. [17]

Treatment of CMV colitis in immunocompetent patients is based mostly on case reports due to no randomized control studies being published. Treatment with ganciclovir for 2-3 weeks should be sufficient for resolution of colitis. [18,19,20] Ganciclovir treatment may also result in dose-related granulocytopenia and mental confusion which may affect treatment. The risks and benefits of treatment must be considered in each individual. If induction fails with ganciclovir, foscarnet may be utilized. [21]

This case represents a rare reactivation of CMV in an immunocompetent post-surgical host. The patient's reactivation of CMV may have been related to the turbulent post-surgical course. Potential risk factors for decreased survival in patients with CMV colitis have been identified, including age (> 55 years-old), male gender, renal failure, diabetes mellitus, and untreated non-heme carcinoma (pancreatic or colonic). [3] While this patient had three of the risk factors (age, male, and renal failure), his post-surgical state may have been the most significant risk factor. Studies have shown that pain and poor nutrition following surgery can weaken the immune system. [22] In this case, our patient experienced invasive surgery and infection, as well as older age, male sex, and renal failure, contributing to his CMV reactivation.

In conclusion, reactivation of CMV in immunocompetent patients is a rare event. This case not only represents an uncommon pathological entity, but the potential for a rare inciting event, the post-surgical state. For those patients experiencing diarrhea after surgery, the differential diagnosis

should include CMV colitis as well as the more common etiologies.

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