Life-threatening gastrointestinal bleeding caused by cytomegalovirus-induced duodenal ulcer in a patient with AIDS: a case report

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Case Report

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Abstract

Background Diagnosis and treatment for gastrointestinal bleeding among patients with acquired immune deficiency syndrome (AIDS) were challenging. Here we present a rare case of life-threatening gastrointestinal bleeding in an AIDS patient.

Case presentation

A 31-year-old male with a three-month history of HIV infection was admitted on July 18, 2023, complaining of abdominal pain for over one month and hematochezia for the past twelve days. During his hospitalization, gastrointestinal endoscopy identified the source of bleeding as a duodenal ulcer associated with cytomegalovirus (CMV) infection confirmed through comprehensive determination methods involving metagenomic next-generation sequencing (mNGs), hematoxylin-eosin (HE), and immunohistochemistry (IHC) staining of biopsy tissue from the ulcer. The patient received interventional embolization to manage emergency gastrointestinal bleeding in addition to four-week anti-CMV treatment and remained in stable clinical condition during two months follow-up.

Conclusions

This case highlights potential complexity of CMV infection in HIV-infected patients with gastrointestinal bleeding.

Background

As known, the mortality of alimentary tract hemorrhage is still high, and the reasons is multifactorial. The majority reasons includes gastroduodenal ulcer, varices, gastritis, stress ulcer, etc[1]. For AIDS patients, the reasons of gastrointestinal bleeding are more complex, the opportunistic infection (OI) should be specially considered[2]. CMV is a common OI for AIDS patients, which can cause life-threatening and tissue-invasive risks, especially for alimentary tract and fundus[3, 4]. The typical clinical types of CMV-caused gastrointestinal disease are colitis, esophagitis and gastritis, which rarely leads to severe bleeding[5]. Here we present a case of AIDS patient with life-threatening gastrointestinal bleeding caused by cytomegalovirus-induced duodenal ulcer.

Case presentation

A 31-year-old male was admitted to hospital on July 18, 2023 with a chief complaint of abdominal pain for more one month and hematochezia for 12 days. The patient experienced the onset of abdominal pain on June 9, 2023 and was hospitalized from June 16 to July 18, 2023 in local hospital. The puncture biopsy for lymph node was performed on June 19 due to multiple enlarged retroperitoneal and
intermesenteric lymph nodes, the results did not find infective pathogens or malignant tumor. After receiving antibacterial treatment (meropenem), antifungal treatment (voriconazole), and diagnostic anti-tuberculosis treatment, the abdominal pain did not alleviate. On July 6, 2023, the patient presented with hematochezia. The pharmacological hemostasis therapy were provided, however, there was no improvement in the bleeding.

Furthermore, the patient had a history of engaging in MSM behavior. He was confirmed with HIV infection on 6 April 2023, with CD4+ T lymphocyte count 2 cells/ml and HIV viral load 5,021,465 IU/ml. Between April 13 and May 9, 2023, the patient was hospitalized and was treated for septic shock, disseminated aspergillosis, novel coronavirus infection and syphilis.

The physical examination revealed emaciation, pale eyelids and skin, mild epigastric tenderness and rebound pain, as well as subcostal accessibility of the liver and spleen.

Laboratory tests revealed hemoglobin level was 59g/L (130-175g/L), platelet count was 49×10^9/L (125–350×10^9/L), albumin of 27.2g/L (40-55g/L), CMV-DNA and CMV IgM were negative and CMV IgG was positive. CT scan revealed enlarged retroperitoneal and intermesenteric lymph nodes and hepatosplenomegaly.

After admission, the patients presented with intermittent hematochezia and consistently low hemoglobin levels. Comprehensive treatments were performed, for example, encompassing fasting, proton pump inhibitors therapy, blood transfusion, etc. There was a reduction in bleeding episode, then the esophagogastroduodenoscopy and colonoscopy were performed, and a giant ulcer at the duodenal bulb was observed (Fig. 1A). CMV was found by metagenomic next-generation sequencing analysis (mNGs) for the tissue biopsy. The hematoxylin-eosin (HE) staining revealed characteristic intranuclear inclusion bodies (Fig. 2A) and the immunohistochemistry (IHC) staining further confirmed positive reaction for antigens of CMV (Fig. 2B). The large duodenal ulcer was considered to be caused by CMV infection, so the intravenous ganciclovir was provided. In the initial stage of anti-CMV treatment, patients experienced reduced gastrointestinal bleeding. However, hematochezia recurred after approximately one week after anti-CMV treatment. Interventional embolization was performed on the gastroduodenal artery, resulting in cessation of hematochezia. Following a 2-week course of anti-CMV treatment, a reduction in both the extent and depth of the large duodenal ulcer was observed via gastroduodenoscopy (Fig. 1B). By anti-CMV treatment with 4 weeks, substantial healing of the ulcer was observed (Fig. 1C). Subsequently antiretroviral therapy ART was resumed for AIDS. The patient's condition was assessed as stable based on a follow-up telephone call two months later.

**Discussion and Conclusions**

The hematochezia arises from a complex array of etiologies. For persistent upper gastrointestinal bleeding poses a life-threatening risk, the diagnostic process becomes increasingly complex and challenging, especially for AIDS patients. Our case contributed a better understanding of diagnosis and
treatment for CMV-induced duodenal ulcer leading to life-threatening gastrointestinal bleeding in AIDS patients.

CMV can cause disseminated or localized end-organ disease in AIDS patients. The commonest clinical manifestations of severe CMV end-organ disease are retinitis, colitis, esophagitis and gastritis[5]. For AIDS patients with gastrointestinal bleeding, the etiology is rarely attributed to CMV infection. Some studies had indicated that the clinical manifestations of CMV-caused duodenitis and duodenal ulcers are characterized by non-specific symptoms including initial presentation with epigastric abdominal pain, bloating, nausea and vomiting, and advanced stages with melena, hematemesis and hematochezia[6–9]. Our patient suggested the ulcer caused by CMV infection should be considered for AIDS patients with life-threatening gastrointestinal bleeding.

Diagnosing duodenal ulcers caused by CMV infection is challenging. The study indicated blood CMV IgM and IgG levels and plasma CMV-DNA detection do not appear to be reliable for diagnosis of CMV infective alimentary ulcers[10]. Endoscopic mucosal biopsy is important for the specific diagnosis for gastrointestinal CMV infection. However, identifying CMV based solely on endoscopic appearance is difficult due to nonspecific presentations. Primary findings typically include ulcerations, erosions, and mucosal hemorrhage[7, 9, 11]. According to the guideline[3], the diagnosis of CMV end-organ disease is typically based on the clinical presentation and detection of the virus in tissue. In our case, the patient did not exhibit any other typical symptoms of CMV infection (fever, retinitis, enteritis, esophagitis). Furthermore, the negative blood CMV-IgM and CMV-DNA brought challenges for an accurate diagnosis. Our case suggests that mNGS testing along with histopathological examination using HE and IHC staining can provide robust diagnostic evidence for duodenal ulcers caused by CMV infection. For AIDS patient with gastrointestinal ulcer, in addition to pathological examination for tissue, IHC staining and mNGS analysis are indispensable, with particular emphasis placed on tissue mNGSs for the identification of the infectious pathogen.

Delayed treatment might increase the mortality for gastrointestinal bleeding caused by CMV infection[8]. So anti-CMV treatment should be provided as soon as possible when the etiology was confirmed. It's worth noting that anti-CMV treatment is not enough for hemostasis in short time, especially for giant ulcer. The hemorrhage still recurred in our patient with one week anti-CMV treatment, which suggested other measures should be performed. The endoscopic hemostasis might lead to a risk of perforation because the ulcer was deep, and surgical intervention might result in higher risk for the patient. Therefore interventionalal embolization therapy was chosen as an optimal option for managing emergency bleeding caused by CMV infection ulcers. Other experience from our case is the enough duration of anti-CMV treatment should be provided for AIDS patients with giant duodenal ulcer caused by CMV infection. According to the current guideline[3], anti-CMV therapy is recommended that at least 3 weeks or until signs and symptoms have resolved for colitis or esophagitis caused by CMV infection. The study found that the duration of anti-CMV treatment longer than 14 days was associated with a better survival[12]. For our patient, the giant duodenal ulcer healed with four weeks of anti-CMV treatment, which suggested the
longer duration of anti-CMV treatment was needed for AIDS patients with giant duodenal ulcer caused by CMV infection.

In conclusion, for AIDS patients with life-threatening gastrointestinal bleeding, it is important to consider the possibility of an ulcer caused by CMV infection. The analysis of mNGs, as well as histopathological examination using HE staining and IHC on tissue biopsy samples, are crucial for accurately identifying CMV-induced gastrointestinal ulcers. Interventional embolization therapy should be prioritized for giant duodenal ulcers in AIDS patients experiencing gastrointestinal bleeding. Additionally, a minimum 4-week course of anti-CMV treatment is necessary for managing giant duodenal ulcers caused by CMV infection.

**Abbreviations**

AIDS Acquired immune deficiency syndrome ()
CMV Cytomegalovirus
mNGs metagenomic next-generation sequencing,
HE Hematoxylin-esin
IHC Immunohistochemistry
HIV Human immunodeficiency virus
OI Opportunistic infection
MSM Men who have sex with men
DNA Deoxyribonucleic acid
IgM Immunoglobulin M
IgG Immunoglobulin G
CT Computed tomography

**Declarations**

**Ethics approval and consent to participate**

Written informed consent for participation in this study was provided by the participant.

**Consent for publication**
The patient provided written informed consent for the publication of this information, and measures were taken to ensure the preservation of their anonymity.

**Availability of data and materials**

The raw data supporting the conclusions of this article will be made available by the authors without any hesitation. For data inquiries, please contact shsong@whu.edu.cn

**Competing interests**

All authors declare that they have no conflicts of interest

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**Authors' contributions**

All authors contributed to the study conception and design. Shihui Song, Shi Zou, Li Chen, Mingqi Luo and Ke Liang were involved in the clinical management of this patient. Wei Guo, Feng Zhou collected the data of the patient. Shihui Song and Ke Liang wrote the article. All authors read and approved the final manuscript.

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**References**


**Figures**
Figure 1

A The duodenal ulcer before anti-CMV treatment. B The duodenal ulcer after anti-CMV treatment for two weeks. C The duodenal ulcer after anti-CMV treatment for four weeks.
Figure 2

A The intranuclear inclusion bodies (black arrow) in the cell of tissue. H&E ×400. B Immunohistochemistry reaction for CMV (black arrow) in the cell of tissue. IHC ×400.