Cytomegalovirus (CMV) infection can cause organ-specific damage or severe complications such as bowel perforation in immunocompromised patients. On the other hand, CMV infection in an immunocompetent individual is very rare, and only anecdotal reports have described CMV-associated bowel perforation in these patients. In the present report, we describe a healthy human immunodeficiency virus (HIV)-negative elderly man with CMV enteritis resulting in ileal perforation, and have reviewed the relevant English literature with specific reference to different ages at diagnosis.

An 88-year-old healthy man was admitted with six days history of diarrhea with diffuse abdominal pain. He had no noteworthy past history or any conditions of immunosuppression, including diabetes. He denied any weight loss or fever at admission. His physical examination revealed mild distension and tenderness in the right lower abdomen without rebound tenderness. Laboratory investigation showed leukocytosis of 14.3 × 10^6/µL (normal range, 4.0-10.0) and elevated C-reactive protein of 26 mg/dL (normal range, 0.0-5.0). Electrolyte disturbances and azotemia were attributed to dehydration and were easily corrected after rehydration. Blood and stool cultures were negative, and Clostridium difficile toxin was not detected. Widal test and HIV serology were also negative. Colonoscopy revealed no specific lesions from the rectum to the cecum, but intubation into the...
The whole gastrointestinal tract can be affected by CMV, however, small bowel was rarely the only site of disease in all reported cases of CMV infection, therefore, this case is unusual in that there was CMV-associated ileal perforation without evidence of colonic lesions. In contrast to CMV infection in immunocompromised hosts,1 only a few reports have described clinically evident CMV infection and their prognosis in immunocompetent individuals.

We reviewed reports of CMV enterocolitis in immunocompetent adults, identified using a computerized search...
| Author          | Year of publication | Reference Number | Age / Sex | Clinical feature                     | Comorbidity | Location        | Treatment                      | Outcome   |
|-----------------|---------------------|------------------|-----------|-------------------------------------|-------------|-----------------|--------------------------------|-----------|
| Less than 70 yrs old |                     |                  |           |                                     |             |                 |                                |           |
| Maignan         | 1992                | 9                | 36 / M    | Fever, diarrhea, hematochezia       | None        | Rectum-SC       | None                           | Survived  |
| Blair           | 1992                | 10               | 35 / M    | Diarrhea, fever, malaise            | None        | SC - HF         | Foscarnet                      | Survived  |
| Lortholary      | 1993                | 7                | 27 / F    | Fever, diarrhea                     | Ulcerative colitis | Left colon | Ganciclovir                      | Survived  |
| Orvar           | 1993                | 12               | 33 / F    | Abdominal pain, diarrhea, fever     | Ulcerative colitis | Pan colon | Ganciclovir                      | Survived  |
| Consten         | 1993                | 13               | 68 / F    | Diarrhea, malaise, weight loss      | None        | SC              | Ganciclovir                      | Survived  |
| Chau            | 1996                | 5                | 62 / F    | Bloody diarrhea                     | Shigellosis  | Ileum           | None                           | Survived  |
| Taniwaki        | 1997                | 16               | 68 / F    | Diarrhea, perforation               | None        | Ileum           | Enterectomy                     | Survived  |
| Klauber         | 1998                | 18               | 67 / M    | Diarrhea                            | Parkinson’s disease | Rectum - SC | Ganciclovir                      | Survived  |
| Chamberlain     | 2000                | 2                | 52 / M    | Abdominal pain, perforation         | Renal failure, MI | Ileum     | Enterectomy                     | Survived  |
| Choi            | 2001                | 21               | 57 / M    | Hematochezia                        | None        | Ileum           | Enterectomy                     | Survived  |
| Pfaul           | 2001                | 8                | 24 / F    | Diarrhea, fever, fatigue            | Ulcerative colitis | Pancelon  | Ganciclovir                      | Survived  |
| Sakamoto        | 2002                | 19               | 57 / F    | Hematochezia, diarrhea              | Uterine myoma | Rectum - TI | None                           | Survived  |
| Sugisaki        | 2004                | 23               | 22 / M    | Fever, diarrhea                     | DM, rubella  | Rectum - SC | None                           | Survived  |
| Petrogiannopoulos | 2004             | 24               | 60 / F    | Diarrhea, fever, perforation        | None        | Jejunum         | Enterectomy                     | Survived  |
| Lee             | 2004                | 6                | 29 / M    | Diarrhea, fever                     | Amebiasis    | SC-SF           | None                           | Survived  |
| Lookwood        | 2006                | 27               | 64 / F    | Diarrhea, nausea                    | Stroke, pneumonia | Rectum    | Ganciclovir + valgancyclovir    | Survived  |
| More than 70 yrs old |                  |                  |           |                                     |             |                 |                                |           |
| Coll            | 1992                | 11               | 81 / F    | Delirium, fever, diarrhea           | Osteoarthritis | DC              | Ganciclovir                      | Survived  |
| Machens         | 1996                | 3                | 75 / M    | Diarrhea, perforation               | Multiple trauma | AC              | Right hemicolectomy             | Died      |
| al Mahdy        | 1998                | 17               | 72 / F    | Diarrhea                            | IHD          | SC              | None                           | Survived  |
| Klauber         | 1998                | 18               | 85 / M    | Abdominal pain, perforation         | Pneumonia    | SC              | Ganciclovir + colectomy         | Died      |
| Grimsehl        | 1999                | 20               | 70 / F    | Diarrhea, hematochezia              | Multi-organ failure | TC-HF | Colectomy + ganciclovir         | Died      |
| Karakozis       | 2001                | 22               | 79 / M    | Hematochezia, perforation           | None        | SC              | Colectomy + ganciclovir         | Survived  |
| Siegal          | 2005                | 25               | 82 / M    | Diarrhea                            | None        | rectum - SC    | Ganciclovir                      | Survived  |
| Carter          | 2006                | 26               | 76 / F    | Abdominal pain, diarrhea            | DM, hypertension | SC              | Ganciclovir + valgancyclovir    | Survived  |
| Current case    | 2007                | 30               | 88 / M    | Diarrhea, perforation               | None        | Ileum           | Enterectomy                     | Survived  |

M, male; F, female; SC, sigmoid colon; HF, hepatic flexure; DC, descending colon; AC, ascending colon; IHD, ischemic heart disease; TI, terminal ileum; MI, myocardial infarction; TC, transverse colon; HF, hepatic flexure; DM, diabetes mellitus; SF, splenic flexure.
of PubMed database (articles in English between 1992 and 2007) and their references. As there is no consensus on how to define the immunocompetent individuals, the immunocompetence in this analysis was defined with the same definition reported by Galiatsatos, et al. as the absence of congenital immune deficiency, acquired immune deficiency syndrom (AIDS), transplantation, prior chemotherapy, or immunosuppressive medication (including corticosteroids). Patients with malignancies or chronic renal failure undergoing hemodialysis were also excluded. Under this definition, 27 of the cases identified by the computerized search were reviewed (Table 1). They are composed of 13 men and 14 women with a median age of 60 years. The clinical spectrum ranged from a mild self-limiting colitis to severe complications and death. Surgery was performed in 9 (33%) of 27 patients, who suffered from severe complications including profuse bleeding, toxic megacolon or perforation. Among eight patients more than 70 years old, four (50%) patients underwent laparotomy and 3 (38%) patients were died from severe bacterial sepsis or multiple organ failure. In contrast, overall prognosis in 19 patients less than 70 years old was rather good, as only five (26%) of them underwent laparotomy and none of them was died. In this regard, the prognosis of CMV enterocolitis in immunocompetent individuals more than 70 years old may be worse and depend mainly on their comorbidities.

The diagnosis of CMV infection has been considered probable by histology of biopsies or detection of more than 4-fold increase in anti-CMV antibody titer and/or CMV-specific IgM. In the meta-analysis of CMV colitis in immunocompetent hosts, only 38.6% had supporting serology. Klauber, et al. also reported that CMV-IgM antibody was detected in 6 of 13 immunocompetent hosts with CMV colitis. In the cases reviewed here, CMV-IgM antibody was not detected in 6 cases including our patient. Therefore, serology is not sufficient to make a timely diagnosis of CMV infection, and the absence of CMV-IgM antibody may not exclude CMV infection. There is no consensus on the use of antiviral drugs, such as ganciclovir, in the treatment of immunocompetent individuals with CMV infection, and CMV enterocolitis resolves spontaneously after surgical resection without antiviral drugs in some immunocompetent cases. In this regard, no antiviral drugs were administered to our patient. However, the administration standard requires further discussion in immunocompetent individuals, especially elderly patients.

In elderly individuals, even though they are immunocompetent, CMV enteritis may result in major complications such as bowel perforation, and it should be included in the differential diagnosis of diarrhea if it is resistant to conventional treatment. Serology is not sufficient to make a timely diagnosis of CMV infection, and the absence of CMV-IgM antibody may not exclude acute CMV infection as in our case.

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