Case report

Successful curative resection of gastric cancer with AIDS infection

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Abstract

This report describes the case of a 47-year-old Japanese man with human immunodeficiency virus (HIV) infection with AIDS, who was successfully treated for gastric cancer. A review of gastric cancer associated with HIV is also presented. Prior to surgical treatment, azidothymidine (AZT), nerfinavir (NFV), and lamivudine (3TC) were administered to the patient in order to improve his blood CD4 count and reduce the viral burden. Consequently, distal gastrectomy was performed as a curative resection without any complications. The gastric cancer included a signet-ring cell carcinoma, as was noted in eight of the nine reported cases associated with HIV. This suggests that the HIV virus may play a role in causing signet-ring cell carcinoma, especially in the stomach.

Key words Gastric cancer · Signet-ring cell carcinoma · HIV · AIDS · Curative resection

Introduction

As the number of people infected with human immunodeficiency virus (HIV) has increased, the opportunity to treat HIV infection associated with other diseases, such as malignant neoplasms, is increasing [1–3]. With the introduction of new pharmacological agents and a better understanding of HIV infection, survival in these patients has improved. Consequently, the incidence of associated diseases that may determine the prognosis of a patient with HIV infection has continued to rise. We experienced successful curative resection of gastric cancer in a patient with acquired immunodeficiency syndrome (AIDS) treated with medication prior to surgical operation.

Case report

A 47-year-old Japanese man visited a doctor in private practice because of diarrhea, pyrexia, and abdominal pain, at the end of February 1999. These symptoms were alleviated as a result of medication (for acute colitis). Gastrointestinal fiberscope (GIF) examination was carried out and 0'-IIc gastric carcinoma was revealed in the gastric body. He was, therefore, referred to our hospital for surgical treatment, on March 4, 1999. We found that he had HIV infection from a blood serum test before admission. However, peripheral lymphadenopathy and Kaposi's sarcoma were not noted. In his past history, he had had homosexual contact. Prior to admission, there was evidence of esophageal candidiasis and a 0'-IIc gastric carcinoma in the lower body of the stomach, shown by GIF (Fig. 1a,b). The tumor was a clearly demarcated depressed lesion with fusion folds. However, no evidence of liver and lymph node metastasis was detected by computed tomography (CT) or ultrasonography (US). The patient's blood CD4 T lymphocyte count was 100/mm³, and serum HIV-1 RNA level was 6.3×10^4 copy/ml. At that time, we diagnosed the patient with AIDS, according to the criteria of the AIDS Surveillance Committee of the Japanese Ministry of Health and Welfare. Consequently, azidothymidine (AZT; 400 mg/day), nerfinavir (NFV; 2250 mg/day), and lamivudine (3TC; 300 mg/day) were administered to the patient, from March 31, 1999, prior to the operation. Seven weeks after the beginning of this medication, his CD4 count had increased to 378/mm³ and his serum HIV-1 RNA level had decreased to less than 4.0×10^2 copy/ml. There was no evidence of side effects of the drug therapy. Accordingly, we performed a curative operation.

On May 19, 1999, distal gastrectomy and D2 lymphadenectomy were performed. Before the operation, in order to avoid the risk of HIV infection, we imposed a limitation on the number of staff in the operating

Fig. 1a,b. Preoperative endoscopy. **a** Endoscopy revealed a depressed tumor with fold convergence (0'-IIc) located in the lower anterior gastric body. **b** Indigo-carmin dye contrast

method showed a clearly demarcated depressed lesion with fusion folds and with encroachment of the fold

Fig. 2a,b. Histological findings. **a** Poorly differentiated adenocarcinoma (por 1) infiltrated into the muscularis propria (mp). **b** Signet-ring cell carcinoma (sig) showed in the mucosa. **a** and **b** H & E, $\times 200$

room. We wore double gloves, face-shield masks, socks over our shoes, and head caps, with skin exposure kept to a minimum. Gastric resection and anastomosis were carried out with stapling devices in order to reduce blood contact. Operative findings showed T2, N1, P0, H0, M0 and stage II. The resected specimen of the stomach contained a 0-IIc type tumor, measuring 20×20 mm, in the lower anterior body. In regard to histological type, poorly differentiated adenocarcinoma (por 1) was predominant, compared with signet-ring cell

carcinoma in the muscularis propria (mp) (Fig. 2a). Lymphatic and venous invasion was ly 1 and v 1, respectively, according to the Japanese Research Society for Gastric Cancer *Japanese classification of gastric carcinoma* [4]. A signet-ring cell carcinoma was shown in the gastric mucosa (m) (Fig. 2b). Lymph node metastasis was not found. As a result, stage Ib (t2, n0, P0, H0, M0) was confirmed as a conclusive stage grouping.

The patient's postoperative course (as well as his clinical course before the operation) is shown in Fig. 3.

Fig. 3. Clinical course of the patient. **d**, days; **w**, weeks; **m**, months

Regarding the serum HIV-1 RNA level, it increased from the time of gastrectomy to the beginning of the postoperative medication. The peak level was 1.7×10^5 copy/ml. The blood CD4 T lymphocyte count decreased from $378/\text{mm}^3$ to $159/\text{mm}^3$ on day 1 postoperatively. In proportion to the blood CD4 T lymphocyte count decreases, body temperature rose to 38.6°C , especially on the first and the fifth postoperative days. In order to prevent infection, the patient was given cefmetazole (2g/day) by intravenous drip for 7 days. Intake of water and peroral medication was started on the fifth postoperative day. The administration of AZT, NFV, and 3TC was resumed in the same way as before the operation. With regard to his diet, ingestion was begun on the seventh postoperative day. The drainage tube into the abdominal cavity was extracted on the tenth postoperative day, and we removed the stitches 10 days after the gastrectomy. No postoperative complications were noted thereafter. The patient was discharged from our hospital on the 19th postoperative day.

Discussion

Since the first report of HIV infection in 1981 [5], several classifications have been proposed for a staging system of HIV-infected patients [6–8]. In the present patient, candidiasis of the esophagus was observed in an endoscopic examination. Moreover, the CD4 T lymphocyte count was $100/\text{mm}^3$. As a result, his clinical stage was IV, according to the staging system of Montaner et al. [7], which provides a prognostically meaningful classification. Eriguchi et al. [6] have proposed surgical indications for major operations in HIV-infected pa-

tients, as determined by the staging system of Montaner et al. For stage IV patients, consideration is given only to palliative operations for alleviating symptoms. Even if the general condition of the patient is well controlled, curative operations for neoplasms could cause some complications. We therefore chose management for AIDS in order to improve the patient's CD4 lymphocyte count and reduce the HIV-1 RNA level; namely, the administration of AZT, NFV and 3TC prior to the operation for gastric cancer. It has been controversial whether surgeons should operate on patients with HIV infection in the late stage, because of delayed wound healing [9,10]. It has been described previously that anorectal surgery in patients with HIV infection and AIDS, particularly those who are severely immunodeficient according to the Centers for Disease Control (CDC) category B and C, is associated with a high incidence of delayed wound healing [9,11,12].

In most of the reported AIDS patients with gastric carcinoma, the patients had a poor prognosis as a result of their far-advanced neoplastic disease. Our patient was the only one in whom a curative resection of the gastric carcinoma was performed.

Patients with HIV infections more often present with a specific malignancy, such as Kaposi's sarcoma and non-Hodgkin lymphomas. In our patient, however, a macroscopic view demonstrated epithelial tumor that was clearly different from other types of non-epithelial tumor [13,14]. Other neoplasms have also been described in patients with AIDS. However, an adenocarcinoma of the stomach is fairly rare in these patients. As far as we know, nine cases have been reported in literature (Table 1 [15–22]). Interestingly, the histologic type of gastric carcinoma associated with HIV infection was

Table 1. Reported cases of gastric carcinoma in patients with HIV infection

Case no.	Author	Age/sex	Infection route	Treatment	Histology	Depth of invasion	Metastases	Outcome
1	Uchida (1989) [15]	50/M	Injection of clotting factor	Chemotherapy	Sig			Death (3 months)
2	Ravalli (1989) [16]	26/F	Heterosexual contact	Gastrectomy	Por (sig)	≥mp	Lymph node	
3	Ravalli (1989) [16]	35/F	Intravenous drug abuse	Gastrectomy	Sig	≥mp	Lymph node Ovary	
4	Cappell (1990) [17]	36/F	Intravenous drug abuse	Gastrectomy	Por (sig)	se	Lymph node Peritoneum	
5	Singer (1990) [18]	36/M	Unknown	Chemotherapy	Sig		Orbita Peritoneum	Death (27 days)
6	Leatherwood (1991) [19]	33/M	Homosexual contact	Jejunostomy	Por	se	Mesentery	Death (2 months)
7	Wynants (1992) [20]	32/F	Heterosexual contact	Jejunostomy	Sig	se	intestines ureter	Death (2 months)
8	Simicco (1993) [21]	52/M	Heterosexual contact	Chemotherapy	Sig		Skin	Alive (12 weeks)
9	Ishikawa (1994) [22]	39/M	Injection of clotting factor	Chemotherapy	Sig	sm	Lymph node	Death (17 days)
10	Kaetsu, present study (2000)	47/M	Homosexual contact	Gastrectomy	Por (sig)	mp	No metastasis	Alive (1 year)

"Histology" indicates predominant type; items in parentheses indicate containing type of the gastric carcinoma
 Figures in parentheses under "outcome" show the period from admission or operation to confirmation of the patient's fate
 Por, poorly differentiated adenocarcinoma; sig, signet-ring cell carcinoma; mp, muscularis propria; se, serosa-exposed; sm, submucosa

signet-ring cell carcinoma in nine of the ten patients (including our patient). However, a signet-ring cell carcinoma in the mucosa can change to a poorly differentiated adenocarcinoma in the deeper layer. Therefore a signet-ring cell carcinoma could have existed in the case no. 6 (Table 1). Furthermore, in patients with HIV infection, gastric cancer has been observed more often in young adults than it is in non-HIV-infected patients. It has been reported that, in young adults, undifferentiated adenocarcinomas predominate compared with differentiated types of gastric cancer [23]. However, the age factor alone cannot explain why undifferentiated adenocarcinoma in all cases, particularly signet-ring cell carcinoma, predominated in gastric cancer with HIV infection. In regard to histological type, undifferentiated adenocarcinoma is not a typical neoplasm associated with AIDS, such as Kaposi's sarcoma and non-Hodgkin lymphomas. These malignant neoplasms are implicated in the immunodeficiency induced by AIDS and are associated with opportunistic virus infections [24]. In addition to the age factor, it appears that HIV infection may have a role in causing undifferentiated adenocarcinoma, particularly signet-ring cell carcinoma, in the stomach.

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