

CASE REPORT

High serum levels of both carcinoembryonic antigen and carbohydrate antigen 19-9 in a patient with sigmoid colon cancer without metastasis

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Abstract : Carcinoembryonic antigen (CEA) and carbohydrate antigen (CA)19-9 are well known as the most common tumor markers of colon cancer, and levels are used not only for preoperative assessment of extent and outcome of cancer, but also postoperative monitoring of recurrence. We encountered a patient with sigmoid colon cancer showing abnormally high serum levels of CEA (311.1 ng/ml) and CA19-9 (5731.2 U/ml) preoperatively. We could not detect any metastases on computed tomography (CT) or ¹⁸F-fluorodeoxyglucose positron emission tomography/CT. Sigmoidectomy and lymph node dissection were performed. Pathological analysis revealed well-differentiated tubular adenocarcinoma of the sigmoid colon with cancer cells infiltrating to the subserosa, but no lymph node metastases. As of postoperative day 60, serum levels of CEA and CA19-9 were 3.4 ng/ml and 9.2 U/ml, respectively, without any further anti-tumor treatment. This represents a rare case of sigmoid colon cancer with high levels of tumor markers in sera that improved following sigmoidectomy without further anti-cancer treatment. *J. Med. Invest.* 59 : 280-283, August, 2012

Keywords : carcinoembryonic antigen, carbohydrate antigen 19-9, sigmoid colon cancer

INTRODUCTION

Carcinoembryonic antigen (CEA) and carbohydrate antigen (CA)19-9 are widely known as the most common tumor markers of colon cancer, and

levels are used not only for the preoperative assessment of extent and outcome of cancer, but also for postoperative monitoring of recurrence. Combined data on preoperative increases in CEA and CA19-9 in sera can help predict the prognosis of patients with colorectal carcinoma (1).

We encountered a patient with abnormally high preoperative serum levels of CEA (311.1 ng/ml) and CA19-9 (5731.2 U/ml), with no sign of metastases on computed tomography (CT) or ¹⁸F-fluorodeoxyglucose (FDG)-positron emission tomography

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(PET)/CT. After performing sigmoidectomy with lymph node dissection, CEA and CA19-9 levels normalized even without further administration of anti-cancer treatments. This represents the first report of extremely high serum levels of CEA and CA19-9 in a patient with advanced colon cancer but no metastases.

CASE REPORT

In August 2010, a 69-year-old Japanese healthy woman noticed occult blood in her feces. No relevant medical history was elicited. She did not smoke or drink alcohol. Colonoscopy was performed and sigmoid colon cancer was diagnosed (Fig. 1). Biochemical analysis of serum showed : CEA, 311.1 ng/ml (normal, 0.0-5.0 ng/ml) ; and CA19-9, 5731.2 U/ml (normal, 0.0-37.0 U/ml). FDG-PET/CT was performed, but did not reveal any metastases (Fig. 2a, b).

Sigmoidectomy with lymph nodes dissection was performed. No dissemination into the intraabdominal space was identified. The resected specimen was diagnosed as advanced colon cancer without lymph node metastases. Pathological analysis revealed well-differentiated tubular adenocarcinoma cells infiltrating to the subserosa (pSS, ly0, v0, pN0). No anti-tumor agents were administered immediately post-operatively. Postoperative serum levels of CEA and CA19-9 are shown in Figure 3. No recurrence of sigmoid colon cancer had been detected as of 18 months postoperatively.

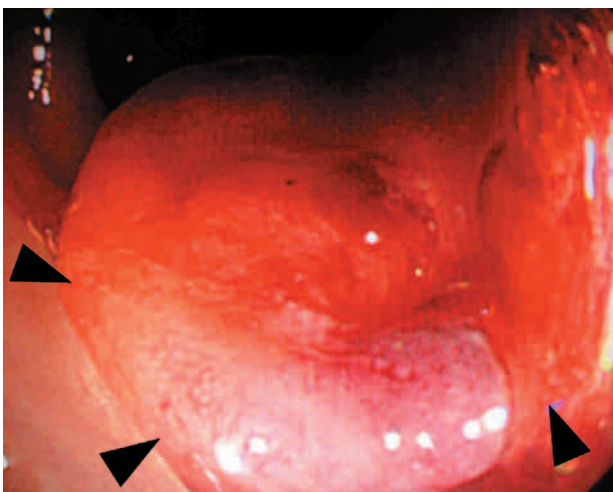


Figure 1 : Colonoscopy. Arrowheads show advanced sigmoid colon cancer (Type 2, size ; 2.8×1.5 cm).

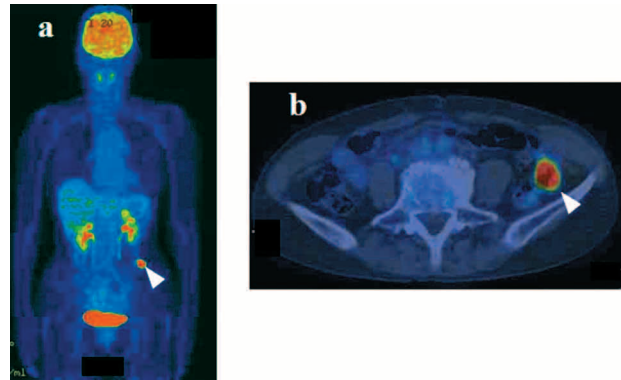


Figure 2 : FDG-PET/CT. a) Coronal FDG-PET/CT. Arrowhead shows the primary lesion in the sigmoid colon. b) Axial FDG-PET/CT. Arrowhead shows the primary lesion in the sigmoid colon. SUVmax=15.9

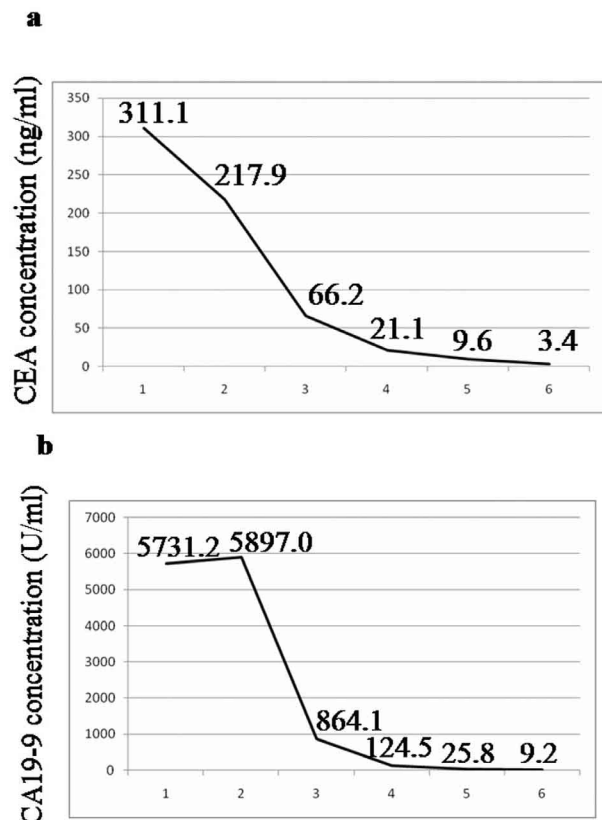


Figure 3 : Changes in CEA and CA19-9 concentrations. a) Y-axis : CEA concentration (ng/ml). X-axis : 1) preoperative day 1 ; 2) postoperative day 1 ; 3) postoperative day 10 ; 4) postoperative day 21 ; 5) postoperative day 40 ; 6) postoperative day 60. b) Y-axis : CA19-9 concentration (U/ml). X-axis : 1) preoperative day 1 ; 2) postoperative day 1 ; 3) postoperative day 10 ; 4) postoperative day 21 ; 5) postoperative day 40 ; 6) postoperative day 60.

Immunohistochemical studies revealed high expression of both CEA and CA19-9 in tumor cells of the resected specimen (Fig. 4b, c).

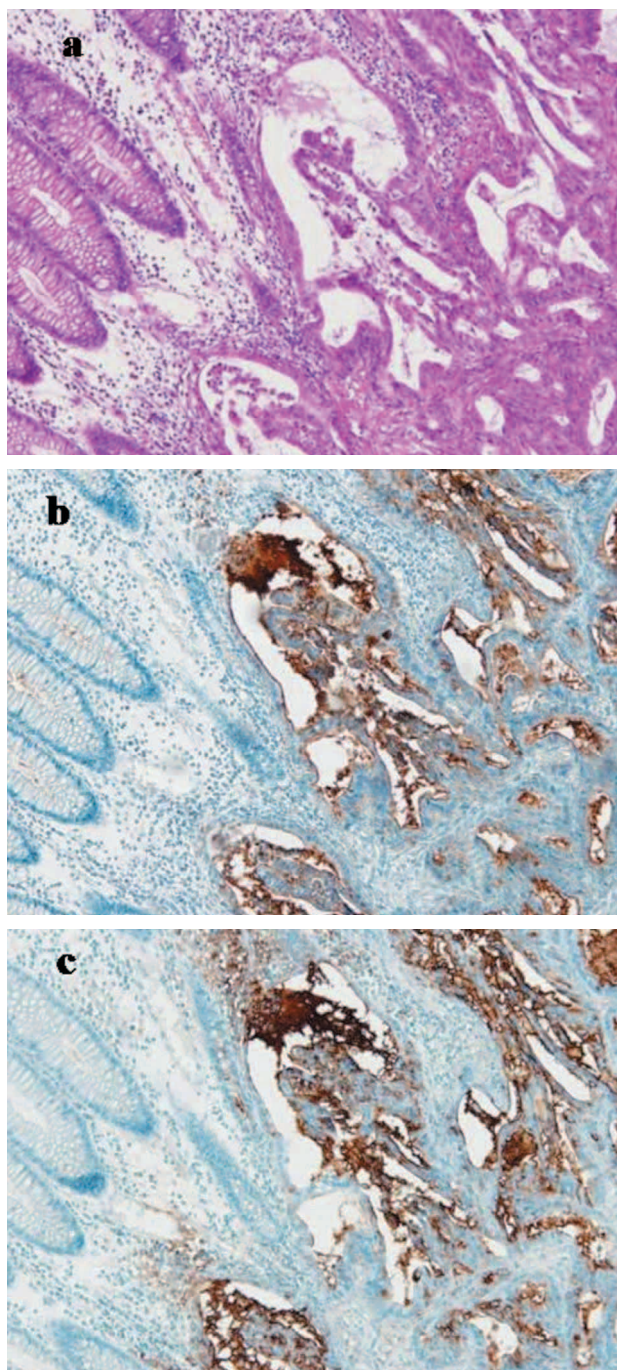


Figure 4 : Pathological examination.

a) Hematoxylin and eosin (HE) stain ; magnification $\times 10$. b) Immunohistochemical staining with anti-CEA antibody ; magnification $\times 10$. c) Immunohistochemical staining with anti-CA19-9 antibody, magnification $\times 10$.

DISCUSSION

CEA is a high molecular weight glycoprotein that plays a pivotal role in biological phenomena such as adhesion, immunity and apoptosis of the tumor cells (2). CA19-9 recognizes sialyl Lewis^A, a glycoprotein present with cancers such as colon cancer, pancreatic cancer, and biliary tract cancer. Sialyl Lewis^A

is involved in cancer cell adhesion to endothelium and metastases via selectin interactions (3). Serum levels of CEA and CA19-9 correlate with histological progression of tumors and the degree of metastasis and allow the evaluation of prognosis for patients with colon cancer (1, 4, 5). Sun *et al.* reported that patients with serum CEA levels ≥ 5 ng/ml were 2.38 times more likely to die of cancer than those with serum CEA levels < 5 ng/ml, based on cancer-specific survival (5). Conversely, Park *et al.* reported high preoperative CA19-9 levels as an independent prognostic factor for recurrence, but among patients with recurrence, 21.4% showed a high postoperative CA19-9 (4). In the present case, the abnormally high levels of CEA (311.1 ng/ml) and CA19-9 (5731.2 U/ml) detected in serum preoperatively required attempts to detect metastases, but none were apparent on FDG-PET/CT (Fig. 2a, b). Sigmoidectomy was therefore performed with lymph node dissection. Operative specimens revealed no metastases to lymph nodes. This represents the first report to identify extremely high serum levels of both CEA and CA19-9 in a patient with colon cancer without metastases. Postoperatively, we did not immediately administer anti-tumor agents to allow observation of the natural course of CEA and CA19-9 levels.

The half-lives of tumor markers are not well known. Yoshimasu *et al.* reported mean half-lives of 1.5 days for CEA and 0.5 days for CA19-9 (6). In this case, the half-lives of CEA and CA19-9 were < 10 days (Fig. 3a, b). Although we could not determine the exact half-lives, these results indicated curative operation. No recurrence of sigmoid colon cancer had been observed by 18 months postoperatively.

Reasons for elevated serum levels of CEA and CA19-9 remain unclear in general. In the present case, both CEA and CA19-9 were highly expressed in the resected tumor cells (Fig. 4). Excessive expression of both CEA and CA19-9 by tumor cells would thus have drained into surrounding vessels and resulted in high serum levels.

In conclusion, we encountered a rare case of sigmoid colon cancer with abnormally high levels of the tumor markers CEA and CA19-9, but with no metastases. FDG-PET/CT offers a useful tool for preoperative evaluation of colon cancer metastases in such cases.

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