Unusual Elevation of CEA in a Patient with History of Colon Cancer

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A 35-year-old female received right hemicolectomy for a poorly differentiated adenocarcinoma of the ascending colon with lymph node metastasis (1/28) in February 1997. CEA was 1.68 ng/μl prior to colectomy. Adjuvant chemotherapy with weekly 5-FU and leucovorin intravenously was started following surgery and discontinued after 17 doses in May 1997. She received bilateral salpingo-ophorectomy for metastatic cancer in August 1999. Intravenous chemotherapy was resumed with weekly 5-FU and leucovorin intravenously in August 1999. CEA was 93.8 ng/μl in November 1999. Intravenous chemotherapy was discontinued after 20 doses and oral chemotherapy with futraful and leucovorin was started in January 2000. CEA was found to be 240.3 ng/μl in December 1999 and then elevated to 1521.3 ng/μl in June 2001, which was 10 months after resection of metastatic ovarian cancer. No metastatic lesions could be detected, however, with image studies. The CEA decreased to 396.6 ng/μl three months later. Futraful was switched to uracil-tegafur (UFUR) in September 2001. The CEA for the patient ranged from 68.5 to 298.9 ng/μl for the following 5 years without aggressive chemotherapy. No evidence of recurrence could be demonstrated by imaging studies. The patient is not a smoker and denied exposure to a smoking environment. She was also not known to have persistent infections, inflammatory bowel disease, pancreatitis, cirrhosis of the liver, or any benign tumors. The current case suggested that: (i) elevation of CEA is not necessarily well correlated with presence of metastatic colon cancer; (ii) some patients may live with elevated CEA for years without evidence of recurrence or metastasis; (iii) aggressive chemotherapy may not be necessary in patients with only elevated CEA.

Key words: CEA – elevation – colon cancer – 5-FU – leucovorin

INTRODUCTION

CEA is a glycoprotein absent in the normal adult intestinal mucosa but present in the primitive endoderm. Levels of CEA can be applied in assessing the prognosis of individuals with colorectal cancer (1,2). The primary application of the CEA test is in the post-operative patient, when increasing values suggest recurrence and persistently normal values suggest absence of recurrence (3). However, this report describes a case of a patient in whom extremely unusual elevation of CEA followed resection of the ovarian metastasis from colon cancer.

CASE REPORT

A 35-year-old female received right hemicolecotomy for adenocarcinoma of the ascending colon on 5 February 1997. Pathology revealed the carcinoma to be poorly differentiated with metastasis to one out of 28 dissected lymph nodes. Adjuvant chemotherapy with weekly 5-FU and leucovorin was started on 15 February 1997 and discontinued after 17 doses on 29 May 1997, because the patient refused further adjuvant treatment. She was found to have ovarian metastasis in August 1999. CEA was 668.6 ng/μl at this time. She received bilateral salpingo-ophorectomy for metastatic cancer on 9 August 1999. She received weekly 5-FU and leucovorin intravenously as adjuvant chemotherapy and refused further chemotherapy after 20 doses. CEA was 93.8 ng/μl on 15 November 1999. Oral chemotherapy with futraful and leucovorin was started on 29 January 2000. CEA was found to be 240.3 ng/μl on 13 December 1999 and then elevated to 1521.3 ng/μl on 5 June 2000, which was 10 months after resection of the metastatic ovarian cancer. However, no metastatic lesion could be detected with imaging studies, which included ultrasound examination, CT scan and MRI scan of abdomen. A PET scan was not used because the National Health Insurance Company of
Taiwan would not reimburse the high cost of the scan and the patient was not willing to pay for the charge of the PET scan herself. The CEA decreased to 396.6 ng/μl 3 months later on 8 September 2000. Futraful was switched to uracil-tegafur (UFUR; TTY Biopharm, Taiwan) on 6 September 2001. Her serum CEA (in ng/μl) was 298.9 in December 2000, 136.4 in March 2001, 269.6 in November 2001, 236.1 in July 2002, 237.5 in September 2002, 273.2 in February 2003, 68.6 in December 2003, 80.8 in June 2004, 122.8 in February 2005 and 196.9 in September 2005 (Fig. 1). No evidence of metastasis could be demonstrated by imaging studies and the patient was not regularly taking UFUR during the period. After thorough discussion with patient, UFUR was stopped in September 2005. Follow-up visits every 6 months were recommended.

The patient is not a smoker and denied exposure to a smoking environment.

She was also not known to have persistent infections, inflammatory bowel disease, pancreatitis, cirrhosis of the liver, or any benign tumors.

DISCUSSION

Gold and Freedman identified CEA in extracts from colon cancer tissue (1,2). Thompson and associates described a radio-immunoassay for CEA in the serum and reported positive results in 97% of patients with colon cancer (4). However, the high accuracy of CEA as a diagnostic test for bowel cancer reported in earlier articles apparently resulted from the fact that most of the patients studied had advanced disease with extensive metastases, especially liver involvement. The use of CEA as a screening technique for the asymptomatic population cannot be justified (3,5,6).

However, levels of CEA can be applied usefully in assessing the prognosis of individuals with colorectal cancer. A limited decrease to an intermediate level following resection is indicative of incomplete excision. Subsequent elevation after return to normal levels implies recurrence of the tumor. Various studies in the literature attest to the usefulness of pre-operative and post-operative assessment of the serum CEA level in determining whether the tumor has been left behind after operation (7,8). This is true not only after resection of the primary cancer but also after resection for recurrent tumor. Ashton and colleagues demonstrated a statistically significant association between survival and a high pre-operative CEA level (9).

The primary application of the CEA test is for the post-operative patients, when increased values suggest recurrence and persistently normal values suggest absence of recurrence.

However, this current report describes a patient in whom extremely unusual elevation of CEA followed resection of the ovarian metastasis from colon cancer.

Some interesting observation was noted in the patient. She had a long survival following resection of ovarian metastasis, her CEA was persistently elevated without evidence of recurrence and fluctuation of her CEA is only partially influenced by chemotherapy. A literature review showed that ovarian metastasis in patients following resection of colon cancer indicates poor prognosis (10). The patient lived more than six years following resection of her ovarian metastasis. More importantly, there was no further evidence of local or distant metastasis in the patient. She had elevation of CEA from 240.3 to 1521.3 ng/μl, 10 months following resection of ovarian metastasis. The CEA level would be more easily explained if the elevation was detected immediately following surgery when residual CEA produced by the tumor was still present. Even more puzzling was the decrease in CEA with low doses of oral fluoropyrimidine. The elevation of CEA in the patient did not reflect the occurrence of metastasis. As previously mentioned the patient was not a smoker and was also not known to have persistent infections or any benign tumors. Besides, it was also well known that benign disease does not usually cause an increase of CEA above 10 ng/ml. Although chemotherapy can cause a temporary

Figure 1. Serial change of CEA level.
rise in CEA as a result of the death of tumor cells and release of CEA into the blood stream, this scenario can be ruled out because similar anticancer drugs had been administered previously without a corresponding change in CEA level. The CEA for the patient had ranged from 68.5 to 298.9 ng/μl for the following 5 years without aggressive chemotherapy and without evidence of metastasis. Chemotherapy probably did not play an important role in the management of the patient because her CEA level decreased with only low doses of oral fluoropyrimidine. Continuous chemotherapy in the patient may not be justified. Close observation and follow-up may have been all that the patient needed.

CONCLUSION

This case suggested that: (i) elevation of CEA is not necessarily correlated well with presence of metastasis of colon or rectal cancer; (ii) some patients may live with elevated CEA for years without evidence of recurrence or metastasis; (iii) aggressive chemotherapy may not be necessary in the patient with only elevation of CEA without evidence of metastasis.

References