Serial Determinations of Carcinoembryonic Antigen for Early Detection of Recurrent Gastric Cancer

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ABSTRACT: In attempts to predict the recurrence of gastric cancer, postoperative changes in serum carcinoembryonic antigen (CEA) levels are monitored in our clinic by radioimmunoassay (Dainabot, Japan). Recurrences are suspected when serum CEA levels are 4 ng/ml, in the postoperative period. Out of 34 patients in whom there were increases in serum CEA, 18 were confirmed to have a recurrence and 15 of these 18 patients were assessed accurately by serial postoperative levels of CEA, two patients died of a recurrence after elevation of serum CEA levels. Thus, recurrence was predicted in 17 out of 34 patients (50 per cent) and in 12 out of 17 patients there was a metastasis to the liver. In 14 out of 34 patients there are no signs of recurrence 9 to 25 months after serum CEA elevations.

KEY WORDS: gastric cancer, recurrence, carcinoembryonic antigen (CEA)

INTRODUCTION

Carcinoembryonic antigen (CEA) was first reported by Gold and Freedman in 1965 to be a tumor specific antigen in human cancer and the levels of this antigen are determined in postoperative management of patients with gastrointestinal cancer. Increase in serum CEA concentrations are considered to be a valuable indicator for predicting the recurrence of cancer since these increases often precede abnormal physical, roentgenological or serological findings indicative of cancer recurrence.

For early detection of recurrence as a guide for a second-look operation of colorectal cancer, CEA examinations are sometimes done.

We have already reported in a retrospective study that serum CEA measurements were useful for predicting recurrences of gastric cancer only in patients with a high CEA producing tumor. Since 1978 we have carried out extensive studies on outpatients who had undergone gastrectomy and the possible recurrence of gastric cancer was investigated by monitoring the serum CEA levels. We now report the results of this study and the clinical significance of CEA level determinations for early detection of the recurrent cancer.
Materials and Methods

Serum CEA levels were examined after curative operation in 143 patients with gastric cancer during the period from June, 1978 to May, 1981. Blood samples were measured at one-three months intervals during the follow-up period, as a rule. We measured the serum CEA concentrations using a sandwich method of solid-phase radioimmunoassay Kit (Dainabot, Tokyo, Japan) as reported by Hirai in 1977. With this method, the CEA in 92 per cent of healthy adults was below the level of 2.5 ng/ml, 7.2 per cent were between 2.6 ng/ml and 5 ng/ml, and 1.4 per cent were between 5.0 ng/ml and 10 ng/ml.

Recurrence was suspected when the serum CEA levels increased to over 4 ng/ml in the postoperative period. This level was determined on the basis of our previous experience and the levels of CEA determined by the sandwich method were about half these seen with the Z-gel method.

Patients were studied for evidence of tumor recurrence by physical examination, chest roentgenography, upper and lower gastrointestinal series, liver biochemical analysis and scintigraphy and whole body computerised tomography.

Results

As shown in Table 1, in 55 patients in whom the CEA levels were less than 2.5 ng/ml, 52 patients were considered to be well and without any clinical evidence of recurrence at the time of examination of serum CEA. Recurrences were detected in 3 out of those 55 patients (5.4 per cent).

In 54 patients, the serum CEA levels were between 2.5 ng/ml and 4 ng/ml and recurrences were detected in 9 patients (16.7 per cent).

In 34 patients, the serum CEA levels exceeded 4 ng/ml during the assessment period and recurrences were suspected. Recur-

![Fig. 1. Postoperative changes of serum CEA levels in patients whose CEA levels were over 4 ng/ml before or after clinical detection of recurrence.](image-url)

- ••••, serum CEA level; ○, suspected recurrences as serum CEA levels were elevated; \», clinical detection of recurrence of gastric cancer; and d, died of a recurrence.