



## Extreme Elevation of Carcinoembryonic Antigen should not Encourage Deviation from Established Surgical Practices

Ariane M. Abcarian\*

John H. Stroger Hospital of Cook County, Chicago, USA

### Abstract

Carcinoembryonic Antigen (CEA) is an established marker for disease progression in colon and rectal cancers. Baseline CEA when elevated far above normal thresholds can be discouraging when considering overall treatment plan and potential disease free survival. This case supports the utility of CEA when used as a trend and not as an independent predictor of overall disease free survival. Furthermore, extreme elevation of CEA should not dissuade practitioners from following established surgical treatment guidelines. This case highlights the importance and necessity of discussing patients in a multidisciplinary cancer conference.

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**Keywords:** Carcinoembryonic antigen; Colon and rectal cancer; Multidisciplinary cancer

### Introduction

Serum CEA level has been widely accepted as part of workup and surveillance for colon and rectal cancers. Obtaining serum CEA preoperatively and monitoring its level and trend postoperatively can help identify recurrent local or metastatic disease, especially when combined with surveillance CT scanning. The prognostic value of preoperative serum CEA has not been universally embraced. Controversy exists as to whether a high serum CEA portends an increase in postoperative recurrence rates even though Amri et al. showed that preoperative elevated serum CEA could not be linearly extrapolated to increased risk of postoperative recurrence or death. In line with the aforementioned findings, it is our view that elevation of preoperative serum CEA does not increase surgical morbidity, nor does it predict long term outcomes in certain individuals. The following case illustrates that the utility of preoperative serum CEA as a prognostic marker is of limited use.

### Case Presentation

FS is a 57yo woman initially admitted from ER with worsening abdominal pain, nausea and emesis. The patient gave a history of spending more than half the day in a chair to avoid abdominal pain that came with movement. She had self palpated an abdominal mass. The ER physician found mild tachycardia and right sided abdominal tenderness on examination with hepatosplenomegaly. Computerized Tomography (CT) scan revealed a large liver lesion measuring 13 cm × 10 cm × 10 cm highly suspicious for metastasis and irregular wall thickening of the proximal rectum (Figure 1). She was admitted for further workup and management. Flexible sigmoidoscopy revealed a friable mass in the rectosigmoid at 17 cm and her serum carcinoembryonic antigen was measured at >989 ng/ml which is the maximum limit at our institution. She was evaluated by the hepatobiliary surgeons for concomitant low anterior resection and hepatectomy. However, given the size of the liver lesion, it was decided in multidisciplinary tumor board that she should undergo neoadjuvant chemotherapy to help downstage the tumor for ease of resection. She was expeditiously started on FOLFOX (Fluorouracil, Folinic Acid, Oxaliplatin) and bevacizumab.

Approximately one year after starting chemotherapy, she underwent laparoscopic Low Anterior Resection (LAR), and one month later, open right hepatic lobectomy for removal of metastatic disease (Figure 2). Pathology from LAR was pT3N2aM1. She was discharged on POD2 after LAR and after the hepatic resection, on POD5. She suffered no perioperative morbidity after either

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#### \*Correspondence:

Ariane M. Abcarian, Cook County Health, John H. Stroger Hospital of Cook County, 1950 W. Polk Street, Chicago, USA, Tel: 773-580-7057;

E-mail: abcarian@yahoo.com

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Figure 1: Pretreatment CT scan performed at presentation.



Figure 2: Liver metastasis prior to resection.



Figure 3: Surveillance CT scans 18 months after presentation.

operation. CEA prior to these operations was 9.78.

After postoperative recovery, and an overall 3 month hiatus from chemotherapy, she was started on XELOX (capecitabine, oxaliplatin). Ultimately she was switched to capecitabine alone due to neuropathy. Currently she continues on chemotherapy. Her CEA remains slightly elevated at 5.85. Surveillance CT scans has shown no evidence of recurrent local or distant disease (Figure 3). She is clinically and radiologically in remission (NED) after almost 12 months.

## Discussion

As approached in a linear fashion, CEA has no independent correlation between long term outcomes and death and notion of any link should be discarded. Elevated spot serum CEA should not give the surgeon pause to resect the primary cancer, or even metastatic disease. It has been argued that the correlation to long term outcomes and death might be more closely related to the presence of metastases at the time of diagnosis rather than the elevation of CEA itself [1]. Furthermore, only one series has shown an increase in postoperative mortality related to elevated CEA and this is likely due to a correlation between elevated CEA and obstruction and hemorrhage in that report [2].

Our case had both extreme elevation of CEA (over the upper limit of measurement in our laboratory) and a large solitary liver metastasis. Giving chemotherapy as primary treatment allowed two

important outcomes: 1. No further metastatic disease developed and 2. The liver lesion was chemotherapeutically down staged to allow resection. This hepatic resection along with the low anterior resection, allowed for R0 resection in this patient. More than six months later, the patient remains radiologically and clinically in remission. CEA levels have remained slightly elevated, but the overall trend is stable and encouraging in light of the fact that Konishi et al. [3] noted that normalization of CEA postoperatively correlated with the outcomes of patients with normal preoperative CEA levels.

When viewed objectively, colon cancer with liver metastasis and very high CEA value might seem inoperable. However, by continuing to follow her clinical course and her response to chemotherapy, we were eventually able to offer R0 surgical resection of the primary tumor as well as the liver metastasis. She had no additional morbidity undergoing two separate operations due to her elevated CEA. This case is a perfect illustration that no preoperative CEA level, no matter how elevated, should dissuade the surgeon from operating in light of favorable preoperative course of chemotherapy. This case also highlights that with regards to prognosis, it is the postoperative rather than the preoperative CEA that should be emphasized. Furthermore, the case illustrates the necessity of a multidisciplinary cancer conference where patients are presented and represented at different points throughout their treatment course.

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