Significance of Elevated CEA Levels as a Marker for Splenic Metastases in a Patient with Colorectal Carcinoma

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The liver is one of the most common sites of distant metastasis from colorectal cancer, whereas isolated splenic metastasis is very rare. Hepatic metastases commonly occur in 60% of patients following resection for colorectal cancer. While all carcinomas can metastasize to other sites such as the lung, splenic metastases are considered to be very uncommon secondary lesions, usually seen as a manifestation of extensive disease.

INTRODUCTION

Human carcinoembryonic antigen (CEA) is produced by 90% of colorectal cancers and is used as a marker to detect recurrent or metastatic colorectal cancer. Intensive follow-up including CEA levels in serum has led to earlier detection of metastatic disease, though survival in this patient population remain unchanged. In addition to postoperative CEA monitoring, aggressive imaging, such as computed tomography (CT) and positron emission tomography (PET) scans, should be also pursued in order to facilitate the early identification of such metastases. We present a rare case of splenic metastasis isolated in a patient with colorectal cancer and prior right lobectomy for hepatic colorectal metastasis. While splenic metastases in the context of colorectal carcinoma may be rare, it is important to consider all potential sites of metastasis.

CASE DESCRIPTION

A 67-year-old male complains of sporadic abdominal pain localized in the left lower quadrant (LLQ) for 10 days, which is associated with intermittent fever, night sweats and constipation. Upon examination of the abdomen, tenderness to palpation was present in the LLQ. Colonoscopy was done and a large colonic mass was detected. The patient underwent subtotal colectomy with ileosigmoid anastomosis en bloc jejunectomy with duodenoejunostomy for an obstructing descending colon neoplasm (T4aN0MX). Significant operative findings included a large neoplasm in the left upper quadrant (LUQ) originating from the descending colon just anterior to the left kidney and malignant fistulization to a single loop of proximal jejunum. There was no evidence of metastatic disease.

At one, two and three months postoperative, CEA levels were monitored and measured to be 4.7, 7.3, 12.3 µg/mL (normal range < 2.50 µg/mL), respectively. (Figure 1) With the rise in CEA levels, a PET scan was performed which produced normal results. The patient's CEA levels at seven months postoperative were 29 µg/mL. A CT scan of the chest, abdomen and pelvis produced normal results. At nine months postoperative, CEA levels were 132 µg/mL. A PET scan showed an abnormal uptake only involving the posterior right lobe of the liver measuring 2.7cm, suggestive of metastatic disease. (Figure 2) A liver biopsy confirmed the presence of an isolated hepatic metastasis and a right hepatic lobectomy was performed. This procedure included dissection of the porta hepatis and resection of the gallbladder with pericholecystic and periportal lymph nodes. Abdominal exploration at the time of resection revealed no signs of other metastatic spread.

Two months later, the patient presented with fever, chills, rigors, sweats, an intermittent cough with pinkish sputum, and LUQ abdominal pain. His CEA...
levels had not normalized. Five days prior, the patient had received his first dose of leucovorin, fluorouracil, oxaliplatin and bevacizumab. The CT imaging showed right upper quadrant (RUQ) fluid collection and increased density in the posterior LUQ. (Figure 3) A splenic biopsy confirmed the presence of an isolated splenic metastasis.

DISCUSSION

The most common sites of colorectal carcinoma metastases include the liver, lungs and axial skeleton. Split metastases, however, are rare. An autopsy study of 7246 subjects with malignant tumors found splenic metastases in only 21 out of 1019 colon and rectal cancer patients, a rate of 2%. The exact reason for the low rate of metastasis is unknown, though it has been suggested that the sharp angulations of the splenic artery at its origin in the celiac trunk, along with the organ’s rhythmic contractions, prevent tumor implantation in the spleen. The absence of directly-related afferent lymphatics to the spleen has also been suggested as an explanation for the rarity of splenic metastases, among other factors.
In the context of colorectal carcinoma, isolated splenic metastases are particularly rare, and less than 16 cases are currently documented in the English literature. In most of these cases, the patients were asymptomatic, and diagnosis was made by imaging studies during the evaluation of postoperatively rising CEA levels. While CEA, an oncofetal antigen, is produced in high volume by the developing fetus as well as some cancers, it is only produced in trace amounts by normal adult cells. Its functions include promoting cellular aggregation, as well as serving as an immunosuppressant. These factors, along with others, contribute to its role in tumor formation, and CEA has become one of the most widely known markers for tumors of the gastrointestinal tract, and is particularly useful as a tool for predicting recurrence postoperatively. A retrospective analysis of 209 postoperative patients found that the sensitivity and specificity of recurrence was 77% and 98% respectively, with a positive predictive value of 95%, a negative predictive value of 88%, and an accuracy of 90.

The PET-CT scan used to identify the liver metastasis here did not identify a splenic metastasis found less than two months later on CT scan. In retrospective review of the PET-CT there is an area of minimal uptake at the level of the splenic-diaphragm interface. Prior retrospective review documents PET-CT has greater sensitivity and equal specificity as 64-MDCT. In a tumor site-based analysis, the sensitivities of PET-CT and MDCT were 98.1% and 66.7% (P < .0001), with no significant difference in specificities. Tumors correctly identified with PET-CT and missed with MDCT were local pre-sacral space recurrence, metastatic sub-centimeter lymph nodes, peritoneal deposits and recurrences at the periphery of radiofrequency ablated metastatic lesions of the liver. Our case may represent one of a rapidly proliferating tumor, as there were no lesions visualized during the operative exploration of the abdomen.

CONCLUSION
Since almost all documented cases of splenic metastases from colorectal carcinoma, including our case, demonstrated rising CEA levels prior to diagnosis, it is possible that there is an association between splenic metastases and increasing CEA levels. In our case, the patient’s CEA levels, while decreasing dramatically after the initial colectomy and subsequent hepatic resection, still failed to normalize to baseline levels, and the splenic metastasis was later diagnosed via CT scan. Despite the rarity of splenic metastases, this case demonstrates the importance of aggressive surveillance for potential metastases, especially in the context of postoperatively rising CEA levels. Intensive follow-up yields potentially curative re-resection for metastatic disease three times more frequently than conservative follow-up. While the cost effectiveness of aggressive follow-up is debatable, we recommend early and frequent CEA measurements along with aggressive PET-CT imaging be pursued in order to diagnose splenic and other metastases as early as possible.

REFERENCES


