CASE REPORT

Persistent elevation of carcinoembryonic antigen as first presentation of a medullary thyroid carcinoma

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SUMMARY

Carcinoembryonic antigen (CEA) is still the most widely used tumour marker for gastrointestinal cancer. CEA was originally thought to be a specific marker for colorectal cancer, but it turned out to be a non-specific marker for further studies. CEA levels can be elevated in breast, lung and liver cancers, among others, including medullary thyroid cancer. The authors report a case of a 73-year-old woman who had a right hemicolectomy for an ascending colon adenocarcinoma and showed a persistent elevation in the CEA marker during follow-up. After several imaging tests, recurrence of the colon cancer was not found, but the presence of thyroid nodules had been detected. The diagnosis of a medullary thyroid carcinoma was made after the finding of a high value of calcitonin. The patient had a total thyroidectomy with resection of the central and lateral lymph nodes.

BACKGROUND

Carcinoembryonic antigen (CEA) was first described by Gold and Freedman in 1965.¹ CEA is a large family of 36 different, but related, glycoproteins which are part of the immunoglobulin superfamily.² CEA is present in the gastrointestinal tract during fetal life and occurs at low concentrations in adults. It constitutes a potentially useful marker of systemic recurrence, even for patients who had normal levels at the time of diagnosis because venous drainage from the recurrence is into the systemic circulation.

Medullary thyroid carcinoma accounts for 5%–8% of all thyroid cancers. It is a C cell, calcitonin producing tumour that contains amyloid or an amyloid-like substance. In addition to calcitonin, it may elaborate or secrete other peptides and amines such as CEA and serotonin, among others.³ In patients with medullary thyroid cancer with detectable calcitonin levels, ultrasonography of the neck (including the thyroid bed and lymph node areas) and liver is performed on a routine basis.⁴

CASE PRESENTATION

A 73-year-old Caucasian woman had a right hemicolectomy after the diagnosis of an adenocarcinoma in the ascending colon, staged as pathologic tumour size (pT)3 pathologic lymph nodes (pN)1 metastasis (M) 0 according to the American Joint Committee on Cancer. After surgery, the patient had adjuvant chemotherapy.

During the follow-up consultations, the patient had felt well with no complaints, but she presented with persistent elevation in the CEA values: 56.2 ng/mL (normal value <5 ng/mL). Other tumour markers such as Ca19.9 or Ca15.3 had normal values. The patient had an upper and low digestive endoscopy and a thoracoabdominopelvic CT. There was no sign of lesions on the upper endoscopy, and there was no sign of recurrence on the colonoscopy. The CT revealed the presence of a large liver with regular borders but did not show evidence of local recurrence in the ileocolic anastomosis or metastatic lesions on the lungs, liver, peritoneum, bones or other organs. A positron emission tomography (PET) CT with 18F-fluorodeoxyglucose (18F-FDG) was performed which did not reveal any signs of recurrence but showed an increased uptake on the left side of the thyroid (figure 1). The analytical values of thyroid function were normal although the value of calcitonin was extremely high: 781.3 pg/mL (0–6.4 pg/mL). The thyroid ultrasound revealed the presence of several calcified nodules, the biggest measuring 27 mm. A fine-needle aspiration (FNA) was performed, and the cytological result was consistent with a medullary carcinoma.

TREATMENT

The patient had a total thyroidectomy with resection of the central compartment lymph nodes. The histological analysis was consistent with a pT2N0M0 stage.

OUTCOME AND FOLLOW-UP

The postsurgery period went well, and the levels of CEA and calcitonin normalised. The patient

Figure 1 Positron emission tomography CT showing an anomalous captation on the left thyroid.

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has continue follow-up of the colon and thyroid cancer and is currently asymptomatic.

DISCUSSION

CEA is produced by the columnar and goblet cells of the colon, as well as colonic cancer cells. Currently, CEA monitoring is the most cost-effective modality for follow-up of patients with colon carcinoma, given the fact that serum CEA levels may increase 4.5–8 months before the development of symptoms.⁵ However, CEA levels often are increased in smokers, patients with inflammatory bowel disease and other epithelial tumours, as well as after the initiation of adjuvant chemotherapy which can transiently increase serum CEA levels. For these reasons, CEA measurements have only 60%–70% sensitivity and 80% specificity in the diagnosis of colorectal cancer. When serum CEA levels are elevated, imaging is necessary to confirm and localise the recurrence. A persistently elevated CEA level should prompt a comprehensive investigation for evidence of distant or local recurrence. This examination should be initiated by a history and physical examination and concluded with a thoracoabdominopelvic CT scan and

colonoscopy which our patient had but with no evidence of local or distant recurrence. In the face of persistently elevated CEA, a PET-CT has been performed in addition to the previous examinations that failed in identifying colon cancer recurrence but showed an anomalous capitation on the left thyroid. This finding pulls the trigger to investigate a possible medullary thyroid carcinoma which has been confirmed by the FNA of the thyroid nodule and the high value of calcitonin.

In patients with no evidence of neck lymph node metastases by ultrasound examination and no evidence of distant metastases, the gold standard of treatment is total thyroidectomy and central compartment lymphadenectomy⁶ which our patient has undergone.

Contributors AMA: performed initial colon surgery, patient follow-up, design of manuscript, research, manuscript revision and approval. AG and TA: analysis, revision and approval. AMi: director of general surgery department, revision and approval.

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Learning points

- Carcinoembryonic antigen (CEA) monitoring is the most cost-effective modality for follow-up of patients with colon carcinoma among other types of cancers, given the fact that serum CEA levels may increase months before the development of symptoms.
- Although useful, CEA is not a specific marker of systemic recurrence.
- In patients on follow-up of colon carcinoma with no evidence of recurrence and elevation of CEA value, it is important to seek other cautions for this increase.
- Medullary thyroid carcinoma can be the cause of elevation of this marker and has to be sought.

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