Case Report

Chronic myeloid leukemia following colon cancer treatment: A case report and literature review

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Abstract

Background: Solid tumors may occur in 3% of the patients with chronic myeloid leukemia (CML). In this paper, we presented a case of CML following treatment of colon cancer.

Case Presentation: A 25 year old man was diagnosed of adenocarcinoma of rectosigmoid treated with fluorouracil-based chemotherapy. Following relapse, he received florouracil, oxaliplatin and irinotecan during the next year. Then he developed BCR-ABL positive CML. With Imatinib 400 mg/day, he achieved hematologic response but died because of progressive colon cancer.

Conclusion: This article emphasizes that there is a possibility for etiologic correlation between CML and chemotherapeutic agents in solid cancers.

Keywords: Chemotherapy, Chronic myelogenous leukemia, Colon cancer

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Chronic myelogenous leukemia (CML) is a pluripotential stem cell disease characterized by anemia, extreme blood granulocytosis and granulocytic immaturity, basophilia, often thrombocytosis, and splenomegaly. The hematopoietic cells contain a reciprocal translocation between chromosomes 9 and 22. The acquisition of the *BCR-ABL* fusion gene as a result of the t (9; 22) (q34; q11.2) in a single multipotential hematopoietic cell results in the CML stem cell (1). Solid tumors may occur in 3% of the patients with CML (2).

It has also been reported that mainly elderly patients with hematologic malignancies, including CML, are likely to have multiple malignant neoplasms, in the main of the gastrointestinal tract. However, single cases of CML in patients treated for other malignancies have been reported (3). In this paper, we reported a case of CML following colon cancer chemotherapy.

Case presentation

A 25-year old man was admitted because of abdominal pain. Colonoscopy rectosigmoid cancer was reported and 1 day later, colectomy was done because of obstructive symptoms. Pathologist reported well differentiated adenocarcinoma T3N0 (a 2 cm nodule was seen in the mesenter of resected colon). Chemotherapy with Mayo clinic regimen was started. Two months after chemotherapy, CEA raised to 12. Colonoscopy and abdominal CT scan were negative. Three months later, CT scan was repeated and liver metastasis was reported (figure1). FOLFOX4 regimen was started and after 3 months, small metastases in lung were reported in a follow up CT scan (figure 2).

Surgery was not done, chemotherapy was completed and because of unresponding tumor, FOLFRI regimen was started. One month after the 6th course of chemotherapy (23 months after the diagnosis of the cancer) the patient developed mild left upper quadrant discomfort and leukocytosis (90000/µl). On PBS, granulocytosis with shift to left and <5% meyloblasts were seen.

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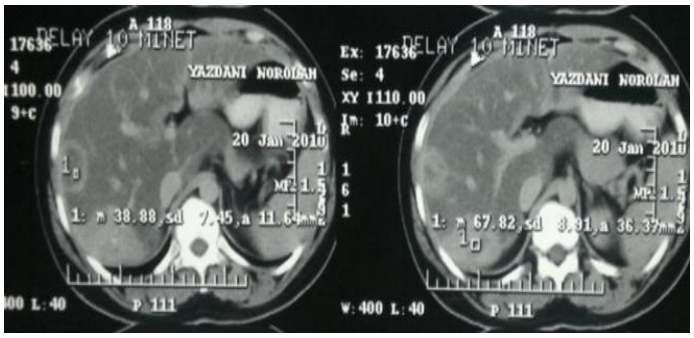

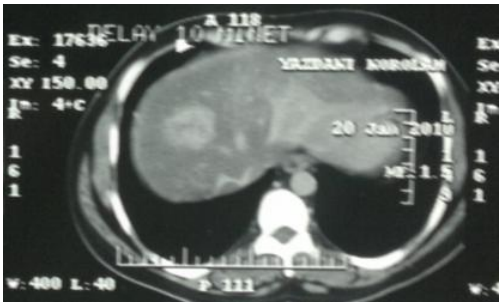

Figure 1. CT Scan of liver after 3 month

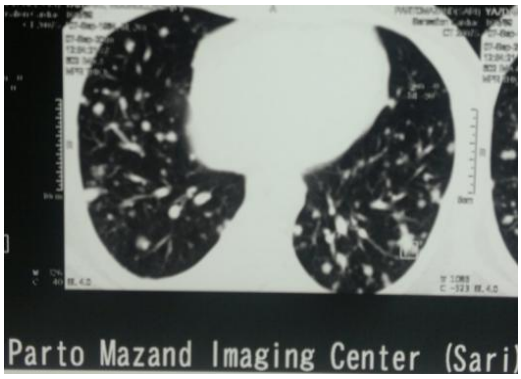

Figure 2. CT Scan of long after 3 month

Bone marrow biopsy revealed hypercellularity with myeloid proliferation. Quantitative RT-PCR detected 9.9% (BCR/ABL fusion gene mRNA)/abl. Imatinib was prescribed, symptoms and leukocytosis were controlled. After three months, he developed dyspnea and CXR showed diffuse bilateral metastasis and bone scan revealed multiple bone metastases (figure 3). Palliative chemotherapy was started, the patient stopped imatinib and after 6 months he expired because of colon cancer progression while his leukocyte count was about 20000/µl and CML was in chronic phase.

In family history, the father of the patient died because of colon cancer when he was in the sixth decade of his life.

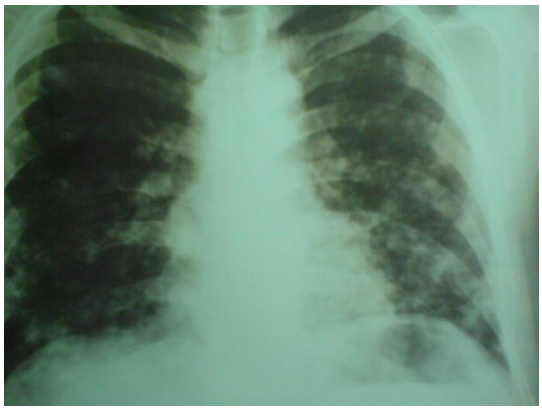

Figure 3. Chest x Ray of lung

Discussion

Secondary malignancies such as myelodysplastic syndrome (MDS), acute leukemia, and non-Hodgkin lymphoma may be observed in some cancer patients. Although CML accounts for a small percentage of secondary leukemia, reports on treatment-related CML are increasing and several cases of CML in patients treated for thyroid cancers, esophageal, gastric, lung, cervical, malignant fibrous histiocytoma and breast cancers have been reported (2, 4-13). Also, CML have been reported following treatment of non-malignant diseases. A literature review from 1950 revealed 248 cases of treatment-related CML, of which 28 cases occurred following the treatment of non-malignant diseases (14).

Treatment related -CML cannot be distinguished from de novo CML cytogenetically, and, in contrast to treatment related -Acute myeloid leukemia and treatment related -MDS, typical chromosomal aberrations related to treatment related -CML have not been described (15). Also, CML reported with immunosuppressive drugs follow organ transplantation (2). Whereas, a reasonable amount of data is available regarding the epidemiology, molecular pathogenesis, clinical behavior and response to therapy of second primary acute leukemia, very little is known about therapy-related chronic myeloid leukemia (16). Radiation as an etiology for CML was known for many years (1).

Between the case reports some had history of radiation exposure (radiation therapy or radioactive therapeutic agent) but in our case we had only history of chemotherapy. Review of 32 treatment related -CML cases suggests that there are no clinically appreciable differences between

treatment related -CML and de novo CML cases (16). The time range from initial diagnosis of the primary malignancy to CML was about 1–16 years in various reports (2). So far, only three patients with CML following colorectal treatment were reported in literature, all of them were males and more than 60 years old (2, 17, 18). Our patient was 27 years at the time of CML diagnosis. Although the patient's father had colon cancer, there is not enough evidence for the known familial cancer syndromes, although no familial cancer syndrome was associated with increased risk of CML. Our patient received 5-flurouracil, oxaliplatin, irinotecan, each of them can be carcinogenic (2).

The results of our patients show that it is probable that chemotherapy causes translocation in bone marrow stem cells as show by others (9, 22).

In conclusion, it is then suggested that complete blood count should be checked in the follow-up of cancers after treatment.

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Conflict of Interest: There was no conflict of interest.

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