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Case Report

Chemotherapy causes cancer! A Rare case report of chemotherapy induced acute myeloid leukemia for Breast carcinoma

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Abstract

Chemotherapy has been a mainstay of treatment for various cancers and has helped prolong the lifespan of cancer patients. It is well known that chemotherapy is wraught with many debilitating side effects but very rarely it has been known to ironically cause cancer .We present here a case of carcinoma of breast who received doxorubicin and cyclophosphamide causing acute myeloid leukemia.

Keywords: RTA; Injuries; Vehicle.

1. Introduction

Adjuvant chemotherapy is an important part of breast cancer therapy because it improves survival among women with high-risk breast cancer.[1] Ironically aggressive chemoradiotherapy in rare cases can result in hematological malignancies. Incidence of acute myeloid leukemia after chemotherapy for breast cancer is 0.09%.[2] Incidence of spontaneous intracerebral bleed secondary to therapy induced acute myeloid leukemaia (AML) for carcinoma breast has not been reported yet. Here we report a rare case of chemotherapy induced AML with spontaneous intracerebral bleed.

2. Case Report

A 32year old female patient arrived to our hospital with two episodes of generalised tonic clonic convulsions and loss of consciousness. In casualty her vitals were stable but she was not responding to verbal commands. Her Glasgow coma scale was 5/15; she was immediately intubated and shifted to critical care ward for further management. She had undergone modified radical mastectomy (MRM) at a cancer hospital centre two years back for advanced stage breast carcinoma. According to her previous reports she had left sided carcinoma of breast with histopathology report revealed grade two infiltrating ductal cancer with two lymph nodes positive for metastasis with margins free of tumour corresponding to T2N1M0 stage. She had received six cycles of adjuvant chemotherapy consisting of cyclophosphamide, doxorubicin and 5flurouracil followed by 12 week course of radiotherapy.

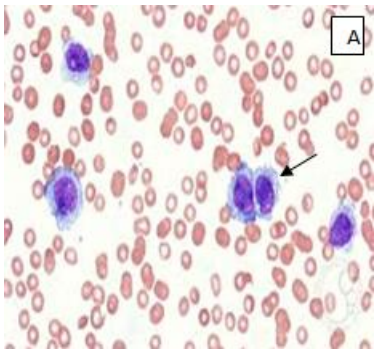
In the critical care unit the patient was on SIMV mode mechanical ventilator as her saturation was under 80%. Hemogram revealed numerous atypical cells and thus a bone marrow aspiration was done for further analysis. Her hemogram and bone marrow aspirate analysis are shown below.

Table: Complete hemogram of the patient

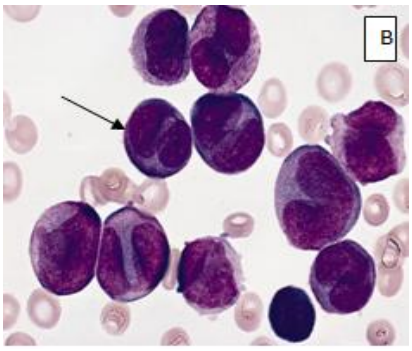
Complete blood count	
Total count	7300 cells/cumm
Differential count	
Neutrophils	20%
Atypical cells	70%
Metamyelocytes and band forms	10%
Monocytes	00%
Hemoglobin	4.9gm%
Platelet count	30,000/cumm

Figure 1: A- Peripheral smears showing atypical lymphocytes and metamyelocytes.
B- Bone marrow shows neoplastic promyelocytes with abnormally coarse and numerous azurophilic granules.

Peripheral smear



Bone marrow aspirate slide



The patient was given two units of fresh whole blood and four units of platelets transfusion. Imaging with Computed Tomography of brain showed acute intraparenchymal bleed in left temporo-parietal lobes and body of corpus callosum. Acute intraventricular bleed (3rd, 4th and lateral ventricle) with subfalcine herniation was also noted. Fundoscopy showed subhyloid haemorrhages in both eyes.

Figure 2: Computed tomographic image of brain

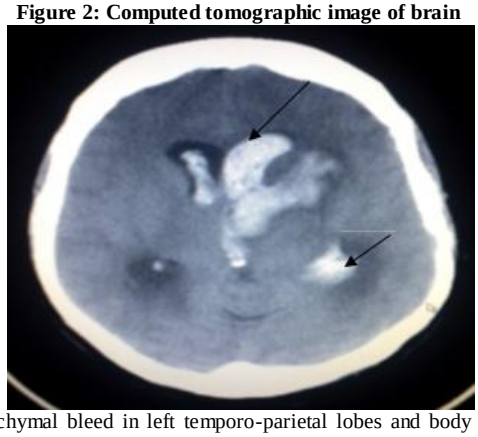


Figure 2: CT Scan shows acute intraparenchymal bleed in left temporo-parietal lobes and body of corpus callosum and acute subarachnoid hemorrhage, subfalcine herniation with midline shift.

The patient was on mechanical ventilation was for five days without any improvement. She expired on 5th day of hospital stay.

3. Discussion

Breast cancer is the most common solid organ malignancy in females. Early detection with mammography screening and improvement of therapeutic options has increased survival rates. It is treated with a range of chemotherapies, radiotherapy, hormonal therapy and biological agents. Many patients receive these treatments in the adjuvant setting to decrease the risk of systemic relapse but in the context of modest survival gains from therapy. These treatments have well recognised early acute complications including neutropenic sepsis, which is occasionally fatal. However long term complications from these therapeutic modalities, especially in patients who have potentially been cured of their primary cancer, are becoming increasingly important with improved survival. Patients with breast cancer often undergo chemotherapy with repetitive bone marrow suppression which unfortunately for some can result in Myelodysplastic and leukaemic syndromes. Therapy-related myeloid neoplasms (t-MN) represent a unique clinical entity in patients treated with chemotherapy or radiotherapy and unfortunately carry a poorer prognosis than de *novo* disease[3].

Certain cytotoxic drugs increase the risk of developing a secondary malignancy. Specifically, secondary leukemias, and myelodysplastic syndrome (MDS) can occur as a result of treatment with alkylating agents and topoisomerase II reactive drugs. Myeloid leukemias that are related to alkylating agents typically develop 5 to 7 years after initial cancer treatment; are frequently associated with MDS; are often classified under the French-American-British classification system as M1 or M2; can have abnormalities in chromosomes 5 or 7; and have a poor prognosis. Myeloid leukemias that are associated with a topoisomerase II reactive drug typically occur within 5 years of therapy, are not associated with MDS, and are frequently associated with a 11q23 cytogenetic abnormality[1].

Topoisomerase II inhibitors block the enzymatic reaction through re-ligation and enzyme release, leaving the DNA with a permanent strand break. Multiple DNA strand breaks lead to cell death and apoptosis. There is evidence that both the antineoplastic and the leukemogenic effect are due to chromosomal breakages which are resolved by chromosomal translocation and cause leukemic transformation[4].

Acute promyelocytic leukamia is the notorios sub type which causes fatal intracranial hemorrhage[5]. Surgical decompression is the treatment of choice, however prognosis in any case of SICH secondary to chemotherapy induced in an early stage AML is poor.

In this case our patient received a chemotherapy drug from both groups which is standard practice. On balance the shorter latency would tend to indicate that Doxorubicin was the more significant aetiological factor.

Aggressive breast ca can result in hematological malignancies which are difficult to treat. So clinician must be aware of such complications and one should be careful in choosing treatment modality for early breast carcinoma.

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