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Case Report
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Acute Leukemia Masquerading as Fatigue and Anemia of Pregnancy: A Case Report

Miller AH[1], Garza J[2], Miller HE[3] and Miller MM[4]*

[1]Department of Emergency Medicine, University of Texas MD Anderson Cancer Center, USA

[2]Department of Leukemia, University of Texas MD Anderson Cancer Center, USA

[3]Our Children Pediatrics, USA

[4]Department of Pediatrics, University of Texas Children's Hospital, USA

Abstract

This 17-year-old female presented to the emergency department in Louisiana complaining of feeling tired. She was 28 weeks pregnant. Although rare in pregnancy, occurring in one in 1000 pregnancies, she was found to have acute leukemia after a bone marrow biopsy. The biopsy revealed acute myelomonocytic leukemia with 21% blasts, FLT3WT, deletion 9q. She was referred to our cancer hospital where she was treated acutely then transferred to the Children's and Women's hospital where she delivered a 3.3 pound baby boy. She then returned to the cancer hospital for definitive chemotherapy. This case reveals the importance of early recognition of leukemia by the acute care provider because prompt management of the cancer and appropriate timely delivery of the baby requires a multidisciplinary approach so as to maximize the most favorable maternal and fetal outcomes.

Keywords: Leukemia; Acute lymphocytic leukemia (ALL); Acute myeloid leukemia (AML); Chronic myeloid leukemia (CML); Fatigue; Intrauterine pregnancy; Anemia

Introduction

This 17-year-old female presented to the emergency department complaining of feeling tired. She was 28 weeks pregnant. She was found to have acute myelomonocytic leukemia on bone marrow biopsy. At our cancer hospital her child was birthed and she began receiving definitive chemotherapy. We review the literature with regard to second vs. third trimester delivery in leukemia during pregnancy prior to chemotherapy initiation vs. after chemotherapy initiation. This case reveals the importance of early recognition of leukemia by the acute care provider to maximize the most favorable maternal and fetal outcomes.

Case Presentation

This 17-year-oldprimigravida female presented to the local emergency department (ED) in Louisiana complaining of progressively feeling tired for the past several weeks. Blood testing performed revealed severe anemia and a high phosphorus level. She was referred to our cancer hospital ED where she endorsed fatigue and that her last menstrual period was 28 weeks prior. She denied vaginal bleeding, shortness of breath, nausea and vomiting, fever, chest pain, headaches, or change in her bowel or bladder habits. Past medical and surgical histories included a right hand boxer's fracture with subsequent surgical repair. She did not smoke or drink.

Physical Exam revealed blood pressure of 121/70, pulse of 102, respiratory rate of 18, temperature of 37.2˚C, and a pulse oximetry on room air of 100%. She was well developed, oriented to person, time, and place. Neurologically she was normal with deep tendon reflexes intact, and 5/5 motor strength in all extremities. Neck was supple; pupils were equal, round, and reactive to light; oral mucus membranes were within normal limits (wnl); Heart was wnl; peripheral pulses were normal in all extremities; Lung, extremities, skin, and abdominal exams were wnl; Fundal height was several centimeters above her umbilicus and fetal heart tones were rapid. Her echocardiogram, EKG, and chest x-ray were uneventful; the bone marrow aspiration (results below) and a pelvic ultrasound revealed a 28-week intrauterine pregnancy. She was treated with dexamethasone 60mg IV q 6 hours on two occasions initiated in the ED.

Laboratory: The complete blood count included white blood cell count =26.5 K/μL (nl=5.1-

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Correspondence:
Adam H. Miller, Department of Emergency Medicine, Division of Internal Medicine, University of Texas MD Anderson Cancer Center, 1400 Pressler Street, Unit 1468, Houston, Texas 77030, USA, Tel: 9726720704; Fax: 8174303403; E-mail: ahmiller@mdanderson.org

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15.5), red blood cell count =2.31 M/μL (nl=3.40-4.70), Hemoglobin = 7.7 G/DL (nl=9.5-13.3), Hematocrit =21.9 % (nl=27.9-39.6), mean corpuscular volume = 95 FL (nl=82-98), mean corpuscular HGB = 33.3 PG (27.0-31.0), mean corpuscular HGB concentration = 35.2 G/DL (nl=31.0-36.0), red cell distribution width =17.3 % (nl=12.0-15.5), RDW standard deviation 56.5 fL (nl=35.1-46.3), platelet count =39 K/μL (nl=159-353), mean platelet volume =12.9 FL (nl=4.0-10.4), total cell count 100%, neutrophil percent = 58.0 (nl=48.0-85.0), lymphocyte percent =18.0 (nl=7.0-33.0), monocyte percent =8.0 (nl=2.0-7.0), metamyelocyte percent =8.0 (nl=0.0-0.0), blast percent = 7.0 (nl=0.0-0.0), abnormal lymphocyte percent =1.0 (nl=0.0-0.0), neutrophil absolute count = 15.39 K/uL (nl=1.70-7.30), lymphocyte absolute count = 4.78 K/μL (nl=1.00-4.80), monocyte absolute count = 2.12 K/μL (nl=0.08-0.70), anisocytosis present, schistocytes not seen, spherocytes not seen, and giant platelets present. The automated Reticulocyte count = 0.5 % (nl=0.8-2.2), reticulocyte Hgb equivalent = 35.1 pg (nl=23.2-37.5), immature reticulocyte fraction = 15.2 % (nl=2.6-16.7). Protime (PT) = 13.5 sec (nl=12.7-15.0), international normalized ratio (INR) =1.01 (nl=0.90-1.20), D-dimer = 2.46 mcg/mL (nl=0.00-0.40), fibrinogen = 287 mg/KL (nl=202-450), Electrolytes: sodium =139 mEq/L (nl=135-147), potassium = 3.9 mEq/L (nl=3.5-5.0), chloride = 104 mEq/L (102-112), carbon dioxide = 24mEq/L (nl=23-30), magnesium = 2.0 MG/DL (nl=1.8-2.9), phosphorus was 5.1 mg/dL (nl=2.8-4.6), calcium was 9.2 MG/DL (nl=8.4-10.2), Glucose =90 mg/dL (nl=70-110), Blood urea nitrogen = 9 MG/DL (nl= 8-20), creatinine = 0.58 mg/dL (nl=0.60-1.00), albumin = 3.7 g/dL (nl=3.7-5.6), Bilirubin total = 0.3 MG/DL (nl=0.0-1.0), bilirubin direct = 0.2 MG/DL (nl=0.0-0.4), bilirubin indirect =0.1 MG/DL, Aspartate aminotransferase = 29 IU/L (nl=15-46), alanine aminotransferase =19 IU/L (nl=10-40), alkaline phosphatase= 69 IU/L (nl=58-237), lactate dehydrogenase = 1136 IU/L (nl=313-618), and uric acid = 5.2 MG/DL (nl=2.6-7.1). Lactic acid =1.1 mmol/L (nl=0.7-2.1), Beta Human chorionic Gonadotropin (BhCG) Quantitative = 23872.6 mIU/ML (nl=0.0-1.0), erythropoietin=>750 mIU/mL (nl=2.6-18.5), Hepatitis A total AB, S negative; HIV, HCVAb, HCcAb, HBsAg were non-reactive, B-type natriuretic peptide = 31 (nl=0-100), thyroid stimulating hormone = 3.41 μIU/mL (nl=0.27-4.20), serum folate = 13.8 ng/mL (7.3-26.1), Vitamin B12 = 1272 PG/ML (nl=211-946), and ferritin = 258 (nl=13-150). Microscopic and macroscopic Urinalyses = PH of 7.0, specific gravity =1.011 with rest = unremarkable.

The cytogenetic bone marrow (BM) revealed CYTO BM referring diagnosis of AML/MDS, CB banding technique GTL with a summary: abnormal result for the presence of a clone (q13q22) (20) with 6 metaphases photographed/karyotyped. The Interpretation (BM) revealed: Twenty abnormal female metaphases were analyzed. The chromosomally abnormal metaphases described are consistent with the presence of a pseudodiploid cline of neoplastic cells. Del (9q) has been associated with AML and MDS.

Cytogenetic Add on FISH (BM) summary revealed a negative result for the presence of a cloned with a MYC gene rearrangement. The bone marrow cultures Fluorescence in situ hybridization (FISH) nuc ish (MYCx2) (200) interpretation did not reveal any split signal in any of the interphases. This finding indicated that 100% of the cells studied are negative for a MYC gene rearrangement.

Cytogenetic Add on FISH (BM) summary revealed a negative result for the presence of a clone with a BCR/ABL1 rearrangement. The bone marrow smear Fluorescence in situ hybridization (FISH) nuc ish(ABL1,BCR)x2(500) interpretation did not reveal any single nuclear fusion signal (major) and no double nuclear fusion signals (one major, one minor) in any of the interphases. This finding indicated that 100% of the cells studied were PH-. The minor fusion signal results from the region of chromosome 22 between m (minor) –bcr and M (major) –bcr that is translocated to chromosome 9 and joined with the extra red signal on the same chromosome 9.

The Acute screen panel BM of the right bone marrow revealed C-Kit CD117 of 32.1%, and progenitor antigen CD34 of 3.9%. The interpretation was that aberrant myeloblasts and immature monocytes were detected (totally 16% of total cells).

Per the Leukemia and Obstetric teams, the patient was transferred to the X-Women and Children's hospital for induced delivery of the baby prior to initiating chemotherapy. A premature baby was delivered vaginally without complication and was admitted to the Neonatal Intensive care unit. Upon return to X-Cancer Center she was treated with chemotherapy including Clofarabine, Idarubicin and Cytarabine intravenously without complication as well asprophylactic antibiotic, antivirals and antifungals. She was discharged on day 6 post-chemotherapy and on day 27 she was found to be pancytopenic. On day 43 she was in remission, had vaginal bleeding and unfortunately the baby was succumbed to complications of meningitis.

After several additional cycles of chemotherapy she was found to have 25% blasts on BM biopsy and chemotherapy was again initiated. BM biopsythen revealed 1% blasts and a stem cell transplant (SCT) donor search was initiated. Subsequently, she became septic with *E. Coli* from her central line and was admitted to the Intensive care unit. She then had a matched unrelated allogeneic SCT on Busulfan and flutarabine. This was complicated by subsequent BK virus cystitis and positive CMV titers.

Discussion

Cancer in pregnancy is rare, occurring in one in 1000 pregnancies [1]. Most commonly occurring are breast and cervical cancer followed by melanoma, leukemia, and lymphomas. Acute leukemia during pregnancy affects about 1 in 75,000 pregnancies [2] and approximately 28% are acutelymphocytic leukemia (ALL) while acute myeloid leukemia (AML) and chronic myeloid leukemia (CML) represents the remainder [2]. Acute leukemias in pregnancy are 66% myeloid and 33% lymphoblastic [3].

Diagnosis is more common during the 2nd and 3rd trimester due to the nonspecific nature of the symptoms early in pregnancy. Thus, unlike our case where the baby was delivered prior to initiation of chemotherapy, the literature suggests that chemotherapy is usually initiated during and throughout most of these pregnancies mainly during the second and third trimester [4] until the delivery in the 3rd trimester. Regimens of chemotherapy vary to include anthracyclines, vincristine and steroids, and the outcomes vary from achieving remission in half of the cases to either relapse or death from progression of the disease [4]. Furthermore, some infants born to these mothers may have adverse outcomes due to the disease and/or the chemotherapy including transient pancytopenia, respiratory distress and preterm delivery [4]. Several studies reported that children exposed to chemotherapy in utero developed reactive airway disease and recurrent otitis media [5-8].When chemotherapy is initiated in the 1st trimester, the result can include congenital malformations or abortion.

Delivery of the baby can be performed after the 1st chemotherapy course [9,10], though the goal is to deliver after 34 weeks gestation [11]. When the diagnosis is made in the 3rd trimester, delivery may be indicated before beginning chemotherapy [11]. In our case presented, labor was induced before chemotherapy was initiated in order to prevent complications that chemotherapy could have caused to the baby. The baby was born premature and well though unfortunately contracted meningitis and did not survive.

This case report brings to light this important though infrequent disease during pregnancy. Despite the non-specific nature of the symptoms, emergency physicians must be aware of the possible concurrent diagnosis of leukemia in patients that are pregnant who present to the ED. Prompt management of the cancer and appropriate timely delivery of the baby requires a multidisciplinary approach including oncology, obstetrics, and pediatric specialists so as to maximize the most favorable maternal and fetal outcomes.

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