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Case Report

Genetics or Environmental Factor? Two Siblings with Myeloid Leukaemia: Case Report

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Abstract

We present two female siblings of ages 28 and 21 years who developed myeloid Leukaemia concurrently within a year. No family history of haematological malignancy but there was positive history of undue exposure to herbicides and pesticides.

Objective: To create more awareness on the need to observe bio safety measures when handling hazardous agents.

Keywords: Myeloid Leukaemia; Genetics; Environmental factors; Siblings

Introduction

Acute myelogenous leukaemia, chronic myeloid leukaemia, myeloproliferative diseases and myelodysplastic syndrome all originated from myeloid progenitor [1]. Reports based on epidemiological findings have shown some evidence of inherited factors role in aetiology of diseases [2,3]. However, the aetiology of most haematological malignancies remains very unclear [4-6]. Exposure to DNA damaging agents , association between Epstein - Barr virus, HIV, Human T-cell lymphotropic virus and Helicobacter pylori have been well documented with some haematological malignancies [4-6].

Risk of leukaemia has been found to increase by 3-5 folds in a first-degree relative with a family history of leukaemia [7,8]. Identical twins concordance for leukaemia is also found to be high [9-12].

Some syndromic illnesses like Down syndrome and X linked recessive wiskott - Aldrich syndrome are associated with increased risk of leukaemia [13].

It is therefore imperative to identify high-risk individuals for these haematological malignancies with familial tendencies and recognizable predisposing factors for regular evaluation and close monitoring. This will also help to clinically understand the genetic susceptibility and nature of the disease [14,15].

Case Presentation

Case 1: Chronic myelogenous leukaemia

The first case is that of a 21-year-old lady who was referred from a secondary health facility with abdominal swelling of four months duration associated with weight loss and early satiety. The abdominal swelling has been progressive and not associated with vomiting and diarrhea. Physical examination revealed severe palor without significant peripheral lymphadenopathy. Other significant findings were in the abdomen, which revealed grossly distended abdomen, massive splenomegaly of 20cm below left sub coastal margin and hepatomegaly of 16cm below right sub coastal margin. Full blood count done at presentation showed packed cell volume of 19%, white cell count of 421.0 x 10^9/L, Platelet count of 781.0 x 10^9/L.

Peripheral blood film and bone marrow aspiration done were consistent with chronic myeloid leukaemia in accelerated phase as evidenced by the percentage of promyelocyte and myeloblast of 18%. Increasing eosinphils and basophils of 15% in the marrow. A cytogenic study of the marrow tissue was also positive for Philadelphia chromosome. She was resuscitated with 2 units of packed cell and commenced on Glivec. Patient responded satisfactorily to Glivec and she's being followed up in Haematology clinic.

Case 2: Acute myelogenous leukaemia

The second case is that of a 28-year-old lady who presented with high-grade fever and abdominal swelling of one-month duration. There was associated weight loss, positive history of menorrhagia and bleeding from the gum. Physical examination at presentation revealed severe palor, wide spread petechea haemorrhages on the thigh and conjuctival suffusion.

The abdomen revealed hepatomegaly of 8cm below right sub coastal margin, the spleen was 4cm below the left sub coastal margin.

Full blood count done at presentation showed packed cell volume of 22%, white blood cell count of 180 x 10^9/L, platelet count was 32 x 10^9/ L.

Peripheral blood film and Bone marrow findings were consistent with Acute Myelogenous Leukaemia-M4 morphology.

She was resuscitated with platelet concentrate and fresh whole blood transfusion, also had broad-spectrum antibiotics and commenced on chemotherapy DAT combination. Response so far has not been clinically satisfactory and patient has been counselled on Bone marrow transplantation.

Discussion

Our patients are two female siblings of ages 28 and 21 years respectively. They are from a monogamous family of four children, the 21-year-old lady who happened to be the last child developed CML and presented first while the elder sister and the first child presented barely a year later with AML.

Acute myelogenous leukaemia and chronic myelogenous leukaemia are of myeloid progenitor in origin. The basis of the

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aetiology of most myeloid malignancies remains poorly understood even though some single gene syndromes like Down syndrome have been implicated [16]. Good knowledge and understanding of familial relative risk is paramount to discriminate risk between individuals [16-18]. Findings in a study carried out on familial risks of myeloid neoplasm by Amit sud et al. [19], showed that inherited and environmental aetiological factors most likely inter play for the development of myeloid malignancies.

Our patients do not have family history of leukaemia; however, they are actively involved in supporting their parents business of marketing and handling of herbicides, pesticides and insecticides without observing any bio safety measures. The risk of haematological neoplasm has also been documented with some of these hazardous compounds in herbicides and pesticides [20-22]. Likewise, influence of familial relative risk of myeloid malignancies has been well documented in Literature [23]. Hence the question: what is responsible for the expression of this myeloid leukaemia in our patients? Genetics or environmental? A call for further evaluation and investigation of the patients.

It is therefore very necessary to offer genetic counselling to every individual with known risk or predisposing factor to leukaemia, preferably before pregnancy to determine the risk in their offering.

There should be advocacy for counselling, surveillance and follow up for patients with history of leukaemia in first-degree relatives.

Conclusion

We have presented two siblings with myeloid neoplasm without family history of Leukaemia but significant exposure to herbicides and pesticides.

Efforts should be made to create more awareness on the need to observe bio safety measures when handling these hazardous agents.

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