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Case Report

Incidental association: Acute myeloid leukemia and filariasis - A case report

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ABSTRACT

Acute myeloid leukemia (AML) is a hematological malignancy characterized by the abnormal proliferation of myeloid cells in the bone marrow. Symptoms include fatigue, frequent infections, easy bruising or bleeding, and shortness of breath. Filariasis is a parasitic infection caused by filarial worms (a nematode) transmitted through mosquito bites from infected individuals, leading to chronic lymphatic dysfunction, lymphedema, hydrocele, and elephantiasis. Here, we present the case of a 38-year-old male who was diagnosed with acute myeloid leukemia without maturation (M1) and an incidental finding of microfilariae in a peripheral blood smear. Interestingly, there was no accompanying eosinophilia in this case. This coexistence of filariasis and AML poses diagnostic challenges, as eosinophilia may not be a reliable indicator. Treatment options include Diethylcarbamazine, Ivermectin, Albendazole and Doxycycline for filarial and chemotherapy and stem cell transplantation for AML (M1). The prognosis for the patient is poor.

1. Introduction

According to WHO, the baseline estimate of lymphatic filariasis cases is estimated to be 25 million males worldwide with hydrocele, and more than 15 million people have lymphoedema.[1] Whereas AML accounts for 23.1 percent for of the total leukemia cases worldwide.[2] In India, filariasis is endemic in 20 States/UTs that can manifest with symptoms such as fever, lymphadenopathy, or elephantiasis. The incidental discovery of microfilariae has been documented in cytological preparations from various anatomical sites, including bone marrow aspirates.[3–6] However, the occurrence of microfilariae in peripheral smears or bone marrow aspirates in association with a hematological malignancy has rarely been reported in the literature.[7] In this case, we present a 38-year-old male who has been diagnosed with acute myeloid leukemia without maturation (M1), and notably, the presence of microfilariae in peripheral blood smears was identified.

2. Case Report

A 38-year-old male from Kawada (Talasari), originally from Varanasi, presented at Vedantaa Institute of Medical Sciences, Dahanu, four years ago with bleeding per rectum, itching and irritation around the anal canal, fullness in the abdomen and painless swelling in both testicles. He was diagnosed with hydrocele and hemorrhoids and treated for the same. He presented again with symptoms of fever, weakness, and postural hypotension that have persisted for the past 10 days. On examination, pallor and hepatosplenomegaly were appreciated. However,

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Table 1: Peripheral blood morphology smears showed 90 % blasts with few showing nuclear cupping an Auer rods. Cytochemical stain show MPO positivity. In conjuction with morphology immunophenotypic findings are consistent with acute myeloid leukemia without maturation and negative expression of CD34 and HLA-DR

Immunophenotyping analysis are as follows:					
CD 45	Neg-Dim	CD 10	Negative	CD 19	Negative
CD 20	Negative	CD 22	Negative	CD 34	Negative
CD 38	Variable	CD 123	Neg-Dim	CD 86	Negative
CD 25	Negative	CD 73	Negative	CD 304	Negative
CD 11b	Negative	CD 13	Neg-Dim	CD 14	Negative
CD 15	Negative	CD 16	Negative	CD 33	Moderate
CD 36	Negative	CD 64	Negative	CD 117	Variable
HLA-DR	Negative	CD 11c	Negative	CD 163	Negative
CD 1a	Negative	sCD 3	Negative	CD 4	Negative
CD 5	Negative	CD 7	Neg-Dim	CD 8	Negative
CD 56	Dim-Neg	TCR GD	Negative	CD 2	Negative
AMPO	Positive	cCD 79a	Negative	Cyto CD3	Negative

lymphadenopathy and pedal edema were not seen. CBC findings showed, RBC of 2.1 million/cumm, Hb of 6.7 g/dL, TLC of 25,200/cumm with absolute eosinophil count of 0.04/cumm, and platelet count of 39,000/cumm. Peripheral smear examination showed 50 percent blast cells (Figure 1 a,b) along with a sheathed microfilariae with a somatic nucleus not reaching up to the tail end, suggesting it to be Wuchereria bancrofti microfilariae (Figure 2a,b). After residing in Kawada (Talasari), he moved back to Varanasi (Uttar Pradesh) in 2023 for further treatment. During his treatment in Varanasi, his peripheral blood smear showed a morphology of 90 percent blast cells, of which some showed nuclear cupping and auer rods. Immunophenotyping findings done by flow cytometry on peripheral blood smear samples were consistent with acute myeloid leukemia without maturation (M1) and MPO positive and negative expressions of CD34 and HLA-DR (Table 1). A final diagnosis of acute myeloid leukemia (M1) with microfilariae was put forth.

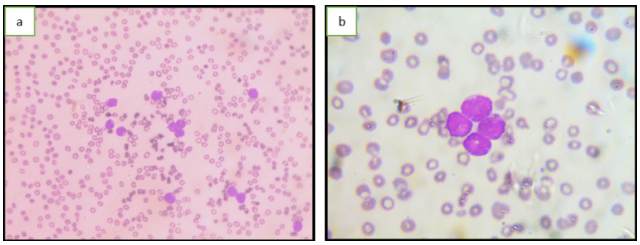

Figure 1: a: Blast cells on Peripheral smear (100x); **b:** Blast cells on Peripheral smear showed scanty agranular cytoplasm with intended regular to irregular nuclei and prominent nucleoli (400x)

3. Discussion

Since its initial description by,[7] only a few reports have mentioned the presence of microfilariae in bone marrow aspirates.[5,6] Moreover, the co-occurrence of microfilariae

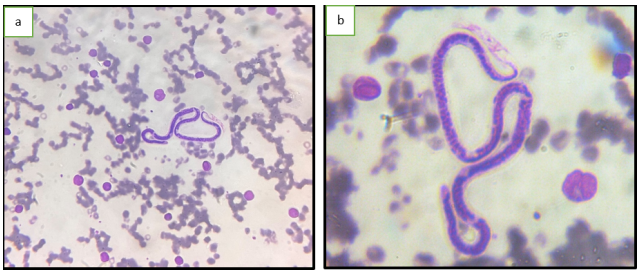

Figure 2: a: Wuchereria Bancrofti microfilaria (100x); **b:** Wuchereria Bancrofti microfilaria with blast (400x)

with leukemia is quite rare. According to our knowledge, there have been only five documented cases to date. The first case, reported by[8] in 2010, involved a patient with AML-M4 and eosinophilia, while the next three cases, described by Jain S[9] in 2011, featured a patient with B-ALL and the fifth case, reported by Khaliqur Rahman's[10] in 2013, presented a patient with microfilaria in bone marrow findings. In this particular instance, the detection of microfilariae was fortuitous, as there were no apparent symptoms linked to this parasitic infestation, mirroring the five previously documented cases. The findings of this current case rely on examining a peripheral blood smear, as opposed to a bone marrow aspirate, due to financial constraints faced by the patient. Unlike Sharma P's,[8] eosinophilia was not observed in our case. While an immunocompromised state in leukemia patients has been proposed as a predisposing factor for parasitic infections, in countries like ours where filariasis is endemic in certain areas, such findings may simply be incidental.[10]

With the exception of Jain S's study in 2011,[9] most cases associated with filariasis and AML did not exhibit eosinophilia, including our own case. This begs the question of whether eosinophilia serves as a reliable indicator for diagnosing filariasis cases associated with AML. Despite the existence of six reported cases where filariasis is

accompanied by AML, the unique aspect of our case lies in the association of filariasis with AML without maturation (M1). Myeloperoxidase (MPO) serves as the defining enzyme characteristic of the myeloid lineage and is detectable through techniques like cytochemical staining, immunohistochemistry, or flow cytometry. The diagnosis of acute myeloid leukemia (AML) is greatly facilitated when more than 3 percent of blast cells exhibit confirmed cytochemical MPO positivity.[11] In non-APL AML cases with CD34-negative and HLA-DR-negative profiles, there's a strong association with NPM1 and FLT3-ITD mutations, typically occurring in older patients. This subgroup often presents with DIC, higher total leukocyte counts, increased blast counts, and a normal karyotype, distinguishing them from CD34-positive, HLA-DR-negative AML cases.[12]

Treatment options include orally administered Diethylcarbamazine (DEC) at 6 mg/kg OD for 12 days for acute lymphatic filariasis, which has both macro- and microfilaricidal properties; however, microfilaria associated with hydrocoele are not affected by DEC; albendazole (400mg BD for 21 days) orally has also been effective; others include doxycycline and ivermectin. Treatment for AML is usually divided into two phases: induction and postremission management. The Induction phase involves intensive chemotherapy, which usually includes a combination of cytarabine and an anthracycline drug like daunorubicin or idarubicin. Stem cell transplantation may also be considered in certain cases, particularly for younger patients or those with high-risk features.

In summary, this occurrence emphasizes the potential correlation between the presence of microfilariae and acute myeloid leukemia (AML). This coexistence poses diagnostic challenges and prompts further investigation into the relationship between these two entities. Therefore, hematopathologists should always consider this possibility to avoid overlooking a benign and easily treatable condition overshadowed by a more prominent neoplasm.[10]

4. Source of Funding

None.

5. Conflict of Interest

None.

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