

Content available at: <https://www.ipinnovative.com/open-access-journals>

IP Archives of Cytology and Histopathology Research

Journal homepage: <https://www.achr.co.in/>

Case Report

Extra medullary infiltration of lymph node in acute myeloid leukemia – A case report

Johnsy Merla^{1*}, Deepika I¹, Sindhuja R¹, Gomu S Priya¹, Swaminathan K¹

¹Dept. of Pathology, Tirunelveli Medical College, Tirunelveli, Tamil Nadu, India



ARTICLE INFO

Article history:

Received 15-11-2024

Accepted 09-12-2024

Available online 27-12-2024

Keywords:

Extra medullary infiltration

FNAC

AML

ABSTRACT

Extra medullary infiltration [EMI] occurs more in myelomonoblastic subtypes of AML. Leukemic blasts infiltrates various organs, tissues, liver, spleen, gums, CNS and lymph node. Extra medullary infiltration occurs in 12% cases of AML. We report a case of lymph nodal mass in a 48 year female patient diagnosed on fine needle aspiration cytology (FNAC) as extra medullary infiltration.

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](#), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

In leukemia, infiltration of lymph nodes by leukemia cells can occur at any stage of the disease, i.e. during the course of leukemia, prior to onset of marrow leukemia or during relapse.¹ Extramedullary hematopoiesis (EMH) occurs when the function of bone marrow is insufficient or destroyed. Most commonly it occurs secondarily to a variety of hematological disorders such as myelofibrosis, thalassemia and infiltrative disorders including lymphomas.² Extramedullary infiltration [EMI] of AML is a rare form of presentation. We report a case of lymph nodal mass in a 48 year female patient diagnosed on fine needle aspiration, cytology (FNAC) as extra medullary infiltration.

2. Case Report

A 48 year old female patient presented with complaints of fever, breathlessness, abdominal pain for past 3 weeks. O/E she was febrile, pale, enlargement of multiple cervical nodes which were firm, discrete, mobile each measuring 2x 2 cm in size.

FNAC of cervical lymph node was done which revealed medium to large sized cells with scant eosinophilic cytoplasm, large irregular nucleus, few showing prominent nucleoli in a background of scattered mature lymphocytes [Figure 1]. Also seen were occasional megakaryocytes. Special stain Myeloperoxidase was positive.

On suspicion of leukemic infiltration, peripheral smear followed by bone marrow aspiration was done which revealed following findings: peripheral smear- white blood cells increased in count with following differentials- lymphocyte- 6%, mature neutrophils-5%, band form-2%, metamyelocyte- 16%, myelocyte-28%, promyelocyte-5%, Blasts-38% suggestive of acute leukemia probably Acute Myeloid Leukemia. MPO staining was positive in peripheral blood smear [Figure 2]. Bone marrow aspiration smear [Figures 3 and 4]. studied showed - M:E ratio: 5:1, Individual blasts cells were large having moderate cytoplasm, round to oval nuclei, 2-4 prominent nucleoli and opened vesicular chromatin which is suggestive of Acute Myeloid Leukemia.

3. Discussion

Extra medullary infiltration [EMI] occurs more in myelomonoblastic subtypes of AML. Leukemic blasts

* Corresponding author.

E-mail address: drjohnsymerla@gmail.com (J. Merla).

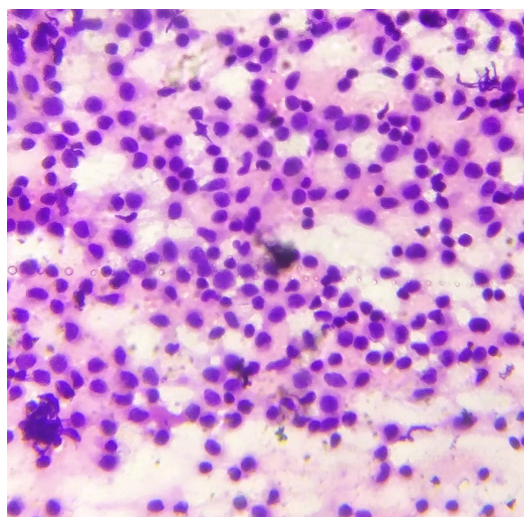


Figure 1: Fine needle aspiration cytology of cervical lymph node showing medium to large sized cells with scant eosinophilic cytoplasm, large irregular nucleus (H and E, x10)

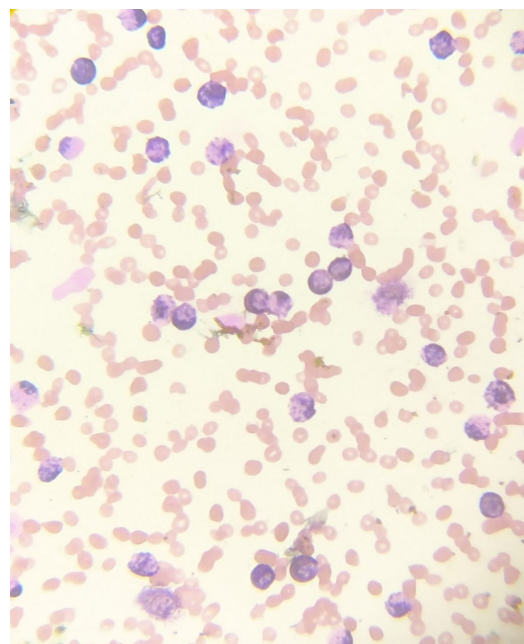


Figure 2: Peripheral smear study showing Myeloperoxidase positivity

infiltrates various organs, tissues, liver, spleen, gums, CNS and lymph node. Extra medullary infiltration occurs in 12% cases of AML.³ Localized or Generalized lymphadenopathy preceding or developing in association with leukemia is not very common. Isolated EMI of lymph node is often misdiagnosed as large cell lymphoma or other lymph proliferative disorders.

Diagnosis of leukemic lymphadenopathy is necessary for planning treatment. Diagnosis by FNAC is straightforward

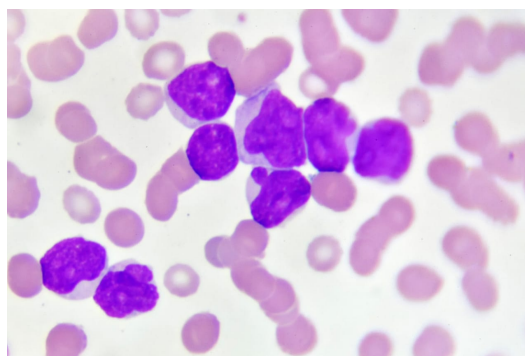


Figure 3: Bone marrow aspiration study suggestive of acute myeloid leukemia (Leishman Stain, x 40)

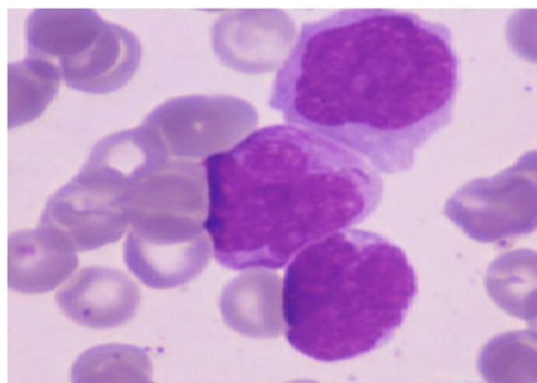


Figure 4: Bone marrow aspiration study suggestive of acute myeloid leukemia (Leishman Stain, x 100)

in patients with prior diagnosis of leukemia. In suspected cases of lymphoproliferative disorders, during FNAC of lymph nodes, it is advisable to make a peripheral smear to rule out leukemic infiltration. It is necessary because most often FNAC is the first investigation and no information is usually available on hematological status. Without relevant hematological investigations, differential diagnosis on FNAC smears is non-Hodgkin's lymphoma (NHL) and metastatic carcinoma.

In a study by Kumar et al.¹ FNAC smears from lymph nodes of 14 cases of ALL were diagnosed during the initial screening as NHL. In four cases of ALL-L1, smears showed a monomorphic population of large lymphocytes with inconspicuous cytoplasm. The nucleus was large, occupied the entire cell and showed smooth chromatin. These cases were diagnosed as NHL, large cell, noncleaved type. On histopathological examination also, a diagnosis of NHL was made. After considering the clinical history and Bone marrow diagnosis, all of them were re-diagnosed as leukemic infiltration. The precise nature of these cells were identified more accurately with Wright-Giemsa stain and the cell morphology was preserved better in FNAC smears than in biopsy material.

Thus, clinical and hematological findings are essential for the differentiation of leukaemic smears from lymphoma.

In the interpretation of the axillary lymph node aspirate smears in cases of acute lymphoblastic leukemia (ALL), the two main difficulties that were encountered in a case reported by Niti Singhal et al³ were recognition of lymphoblasts as leukemia cells and recognition of the giant cells as megakaryocytes. Since lymphoblasts are present in a reactive lymph node, it was difficult to distinguish whether the lymphoblasts were part of the reactive process of lymph node or leukaemic blasts infiltration. The smear showed monomorphic population of lymphoblasts with hand mirror cells, teat cells with lymphoglandular bodies and very few interspersed mature lymphocytes. Lymphohistiocytic clusters, centroblasts and centrocytes were absent. These features were in favour of the diagnosis of lymphoma–leukemia rather than a reactive process, analogous to non-Hodgkin's lymphoma. However, with the occurrence of pancytopenia and lymphoid blasts in the peripheral smear, first possibility of acute leukemia may be thought of. This was confirmed on the bone marrow study, which revealed acute leukemia. Recognition of the giant cells as megakaryocytes: A number of differential diagnoses are for large cells with multilobated nuclei in lymph node aspirate smears, which includes variants of Reed–Sternberg (RS) cells, syncytial giant cells due to viral infection, megakaryocytes and cells from metastatic carcinomas.

In cases of CML, sometimes the first manifestation of blast crisis is at an extramedullary site, such as the lymph node, and it is challenging to differentiate CML from malignant lymphoma on lymph node biopsy.² In such circumstances, FNAC of the lymph node aid in rapid diagnosis because of the morphological detail of blasts and other granulocytic cells.

EMH occurs when normal bone marrow is destroyed or bone marrow function is insufficient. It often involves the lymph nodes ,spleen, liver and less frequently other organs such as the lungs, kidney, retroperitoneum etc.² On FNAC, Romanowsky stains are especially helpful in recognition of different hematopoietic cells like granulocytic precursors, eosinophils, and megakaryocytes.

Leukemic infiltration, which represents the proliferation of primitive cells, should be distinguished from NHL. Examination of peripheral blood smears and morphologic assessment using oil immersion lens is useful in this respect.⁴ Megakaryocytes can resemble multinucleated RS cells as they can have a large, bilobed, or multilobated nucleus with abundant, pale, and fragile cytoplasm. However, the smears in Hodgkin's disease reveal a background of lymphocytes, plasma cells, histiocytes, and eosinophils and the RS cells have huge prominent nucleoli.⁵ EMH is usually a microscopic finding. However, it may present as a mass-forming lesion making it amenable to fine-needle aspiration biopsy (FNAB). When mass-forming

EMH occurs, it can simulate a neoplasm clinically and radiologically. Additionally, the megakaryocytes can mimic malignant neoplastic cells, particularly if EMH is not a considered diagnosis.⁶

In the current case, the patient was referred to cytology clinic for FNAC and initial diagnostic work-up. Clinically, both an infectious etiology and neoplastic pathology were suspected. FNAC of cervical lymph node was done which revealed medium to large sized cells with scant eosinophilic cytoplasm, large irregular nucleus, few showing prominent nucleoli in a background of scattered mature lymphocytes. Special stain Myeloperoxidase was positive. On suspicion of leukemic infiltration, peripheral smear followed by bone marrow aspiration was done which revealed Acute Myeloid Leukemia.

Chen et al.,⁴ studied the diagnostic accuracy of FNAC in assessing extramedullary leukemic infiltration. Out of the 65 cases studied, 24 cases of ALL, 25 cases of acute myelogenous leukemia (AML), 6 cases of chronic lymphocytic leukemia (CLL) and 10 cases of chronic granulocytic leukemia (CML) were reported. The commonest site of infiltration was lymph node, which constituted 73.8% of all cases. Accurate cytological diagnosis of extramedullary leukemic infiltration relies on detailed morphologic assessment and correlation with clinical examination, relevant laboratory findings, especially in the patients whose initial symptom was lymphadenopathy.

Many theories regarding the pathogenesis of these lesions have been proposed, including the extrusion of the bone marrow cells consequent to marrow fibrosis or replacement by other cells.³ Others suggest reactivation of hematopoiesis in organs where it occurred in embryonic and fetal life, and increased number of circulating hematopoietic stem cells which embolise to different organs. Hence in case of nodal infiltration by immature myeloid cells in FNAC.⁵ Extra medullary infiltration [EMI] should be thought of.^{7,8}

4. Conclusion

Extramedullary infiltration [EMI] of lymph nodes is a rare cause of lymphadenopathy in AML, it should not be misdiagnosed as large cell lymphoma or other lymphoproliferative disorders.

5. Source of Funding

None.

6. Conflict of Interest

There are no conflicts of interest.

References

1. Kumar PV, Karimi M, Monabati A, Sadeghipour AR, Tavangar SM, Moosavi A, et al. Cytology of leukemic lymphadenopathy. *Acta Cytol.*

- 2002;46(5):801–7.
2. Raab SS, Silverman JF, McLeod DL, Geisinger KR. Fine-needle aspiration cytology of extramedullary hematopoiesis (myeloid metaplasia). *Diagn Cytopathol*. 1993;9(5):522–6.
3. Singhal N, Tahlan A, Bansal C, Handa U, Cruz SD. Coexistence of leukemic infiltration and extramedullary hematopoiesis in a lymph node: A cytological diagnosis. *J Cytol*. 2011;28(3):138–40.
4. Chen WX, Zhang W, Xu Y, Liu J, Fan LH. Fine needle aspiration cytology diagnosis of extramedullary leukemic infiltration. *Zhonghua Bing Li Xue Za Zhi*. 2004;33(6):527–31.
5. Heerde PV, Miliauskas J. Lymph nodes. In: Orell SR, Sterett GF, Whitaker D, editors. *Fine needle aspiration cytology*. New York: Churchill Livingstone; 2005. p. 83–124.
6. Policarpio-Nicolas ML, Bregman SG, Ihsan M, Atkins KA. Mass-forming extramedullary hematopoiesis diagnosed by fine-needle aspiration cytology. *Diagn Cytopathol*. 2006;34(12):807–11.
7. Kim EH, Im SA, Lee JW, Kim S, Cho B. Extramedullary Infiltration in Pediatric Acute Myeloid Leukemia on Surveillance Magnetic Resonance Imaging and its Relationship With Established Risk Factors. *J Pediatr Hematol Oncol*. 2022;44(3):713–8.
8. Magdy M, Karim NA, Eldessouki I, Gaber O, Rahouma M, Ghareeb M, et al. Myeloid sarcoma. *Oncol Res Treat*. 2019;42(4):224–9.

Author's biography

Johnsy Merla, Associate Professor  <https://orcid.org/0000-0002-7846-920X>

Deepika I, Post Graduate Resident

Sindhuja R, Assistant Professor

Gomu S Priya, Assistant Professor

Swaminathan K, Professor

Cite this article: Merla J, Deepika I, Sindhuja R, Priya GS, Swaminathan K. Extra medullary infiltration of lymph node in acute myeloid leukemia – A case report. *IP Arch Cytol Histopathology Res* 2024;9(4):192-195.