Iranian Journal of Pathology (2014) 9 (1), 60- 65

Case Report

Myeloid Sarcoma Presenting with Lateral Cervical Mass and Eosinophilia; a Diagnostic and Therapeutic Dilemma: Case Report

Moeinadin Safavi[1], Vahid Moazed[2], Hamid Tabrizchi[1], Maryam Mohit[1], Jahanbanoo Shahryari[1]

1. Dept. of Pathology, School of Medicine, Kerman University Of Medical Sciences, Kerman, Iran
2. Dept. of Oncology, School of Medicine, Kerman University Of Medical Sciences, Kerman, Iran

ABSRACT

Myeloid sarcoma is a rare extramedullary tumor of immature myeloid cells. It has been very rarely reported as lateral cervical mass in English literature. Myeloid sarcoma has also been reported with marked eosinophilia. Here we present a 17 year old boy with lateral cervical mass and persistent eosinophilia. The mass was isointense in MRI and homogenously enhanced after contrast injection which were not specific. Then, microscopic findings revealed blastoid cells with positive reaction for CD68 and CD117 which were highly in favor of myeloid sarcoma rather than its great mimicker, high grade lymphoma.

Keywords: **Myeloid Sarcoma, Eosinophilia, Neck, Tumor, Case Report**

Introduction

Myeloid sarcoma is a rare extramedullary tumor of immature myeloid cells (1). Historically it was first described by Burns as chloroma due to its green color caused by high content of myeloperoxidase (2). It may develop de novo or in the context of acute myeloid leukemia (3), myeloproliferative neoplasm (4), or myelodysplastic syndrome (5). Myeloid sarcoma occurs in less than 1% of acute myelogenous leukemia cases (6). It can precede AML, coincide with AML or be the first manifestation of its relapse (7).

Correct diagnosis of myeloid sarcoma usually

Received: 30/June/2013
Accepted: 10/March/2013
Address Communications to : Dr. Jahanbanoo Shahryari, Kerman University Of Medical Sciences, 22 Bahman Blvd, Kerman Iran.
Email: Shahriari_J@Sums.Ac.Ir

requires clinical suspicion and a proper immunohistochemical panel on formalin fixed paraffin embedded tissue, as it can be easily misdiagnosed especially in the absence of antedescent myeloid neoplasms (8).

Radiologic features of head and neck myeloid sarcomas have been rarely described in medical literature and mainly confined to case reports (9, 10). In spite of previous efforts about radiologic findings of myeloid sarcoma, no specific characteristics have been described for it so far. Therefore, the more such cases are reported, the better their radiologic features are known. On the other hand, the first presentation of myeloproliferative neoplasm as lateral cervical mass preceding its hematologic manifestation has been very rarely reported in literature (11). Therefore we intended to evaluate radiopathologic characteristics of this rare phenomenon and discuss about its management.

Case Report

The patient was a 17 year old boy presented with lateral cervical mass for two month. He was also complaining generalized itching due to urticaria. He declared no previous medical history or drug use. Physical examination disclosed nothing more than non-tender lateral cervical mass measuring 6.5× 5cm and mild splenomegaly.

Primary Lab evaluation revealed mild leukocytosis (WBC=11500/µl) with marked eosinophilia (40%) (Fig.1). Further paraclinic investigations showed no underlying cause for the eosinophilia such as parasitic infection, asthma, Addison, churg strauss, etc. (chest x-ray, spirometry, serum electrolytes including potassium, and stool examination were normal).

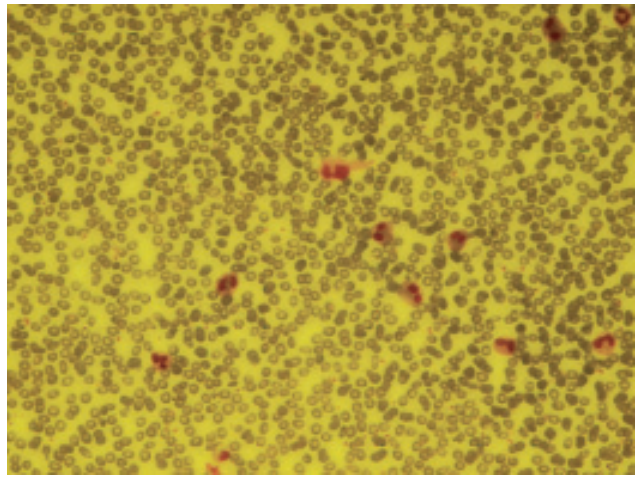

Fig.1: Peripheral blood smear. Leukocytosis with marked eosinophilia (Giemsa stain, ×400)

Imaging study with MRI revealed multiple ovoid mass with the same intensity as the cervical muscles in the right side of the neck. One of these lesions was hyper intense. Other lesions showed enhancement with contrast (Fig.2).

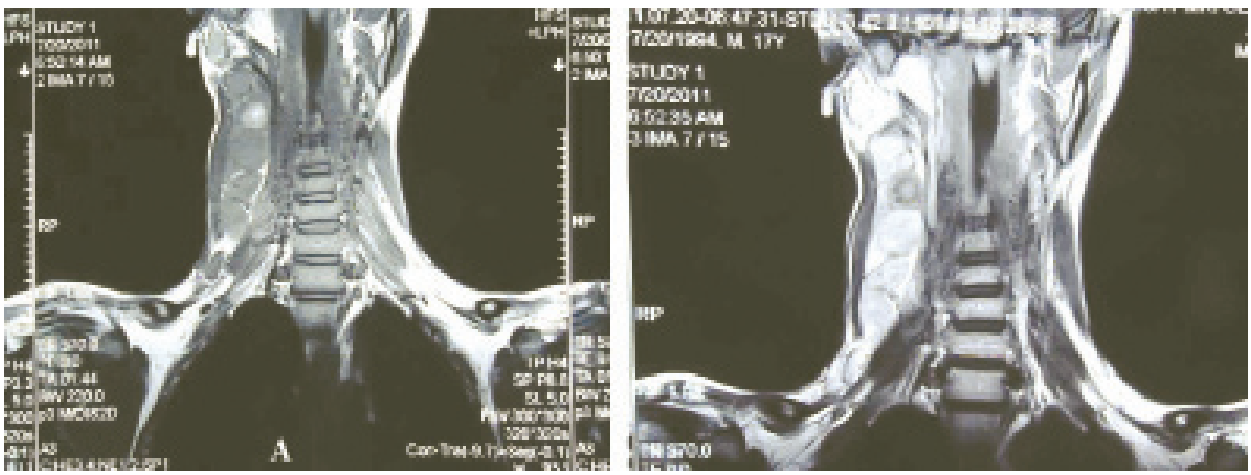

Fig. 2: A) MRI without contrast of the neck revealed an isointense lobulated mass in the right side and a hyperintense focus probably due to hemorrhage.B) MRI with contrast showed enhancement of the mass

In the next step neck mass excisional biopsy was fulfilled. The gross appearance of specimen was similar to enlarged nodes with smooth, greenish creamy glistening surface measuring 6×5×4cm. The microscopic findings showed an effaced lymph node which was diffusely infiltrated by large blastoid cells with irregular nuclei, fine chromatin, visible nucleoli and ample acidophilic cytoplasm. The intervening septa showed a population of eosinophils and mature lymphocytes (Fig. 3).

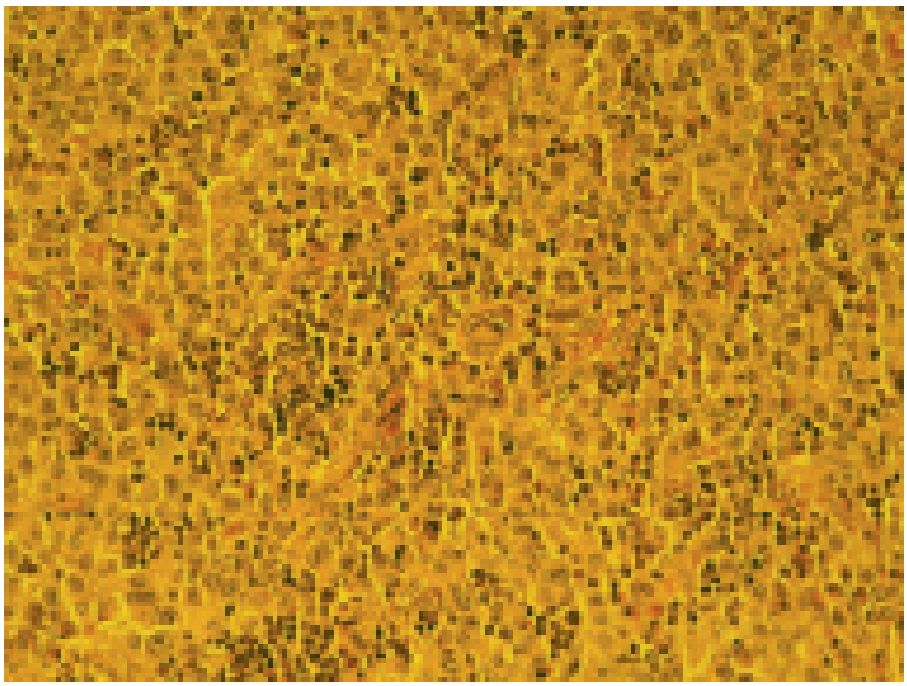

Fig. 3: Microscopic appearance of cervical mass biopsy. Large blastoid cells,irregular nuclei,fine chromatine and ample acidophilic cytoplasm with focal aggregates of eosinophils(Hematoxylin and Eosin stain, × 400)

On the basis of biopsy several differential diagnosis were suggested like myeloid sarcoma, histiocytic neoplasm and high grade lymphoma. Thus an IHC panel was also recommended which demonstrated positive reaction for CD68, CD117 and negative results for CD1a, S100, CD20, CD30 and all were strongly suggestive for myeloid sarcoma (Fig.4).

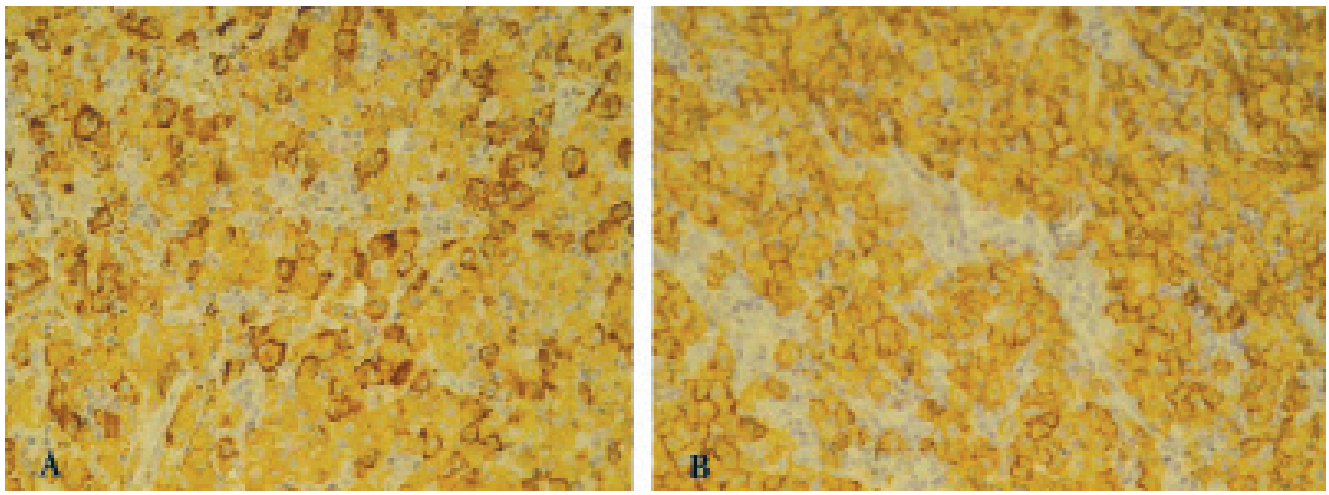

Fig. 4: Immunohistochemistry staining for CD68 and CD117.Strongly positive cytoplasmic and memberanous reaction for CD68 (a) and CD117 (b) in blastoid cells confirming myeloid sarcoma diagnosis.

According to oncology consultation bone marrow biopsy aspiration and biopsy was done. At first bone marrow biopsy and aspiration reported normal. After two months, the marrow aspiration revealed immature myeloid and eosinophilic precursors along with markedly increased megakaryocytes. Flow cytometric phenotyping of the aspirated cells demonstrated a significant expression of myelomonocytic markers such as CD13 (52%), CD33(38%) and CD14(53%).The blast gating by CD34 was positive only in 11% of the cells. Marrow biopsy demonstrated 90% cellularity with sheets of immature myeloid cells. Flow cytometry results, bone marrow aspiration and biopsy were in favor of unclassified MDS/ MPD concomitant with myeloid sarcoma. In addition to the mentioned diagnostic evaluations a cytogenetic study was fulfilled for t (8; 21) and inv (16) but they were reported negative.

Finally, the patient was treated with standard AML therapy (7+3 regimen).Then he was evaluated for therapy response after 14 and 28 days but no response to chemotherapy observed. Thus he underwent salvage therapy with high dose cytosar and mitoxantrone which were ineffective either. In the next step, he was candidate for tyrosine kinase inhibitor therapy. His response to imatinib was okay at the beginning but progressive splenomegaly occurred soon. At the last step, the regimen of fludarabin, cytosar and mitoxantrone was selected for the patient but he expired during prolonged neutropenia.

Discussion

In comparison with previous reports of myeloid sarcoma manifestation as lateral cervical mass, our case is the youngest case. The former cases had occurred in middle-aged adults. As in this case, sex predilection seems to be in favor of male rather than female. The tumor size ranges from 2 cm to 10 cm in former reports at the time of diagnosis, thus the size of mass in the presented case falls in the expected range (12, 13).

Myeloid sarcoma can be encountered in any part of the body such as skin, soft tissue, lymph node and gastrointestinal tract (14). When head and neck involvement occurs, the skull and bony orbit are the most common sites. English literature review shows rare case reports of myeloid sarcoma presenting as lateral cervical mass (11). This rare presentation of myeloid sarcoma can lead to misdiagnosis of lymphoma and metastatic poorly differentiated carcinoma which are far more common in cervical region. So this condition seems to be a diagnostic and therapeutic dilemma.

Usual MRI findings in myeloid sarcoma include an isointense mass with the same intensity as the adjacent muscle and its homogenous enhancement after gadolinium injection as contrast (15). Although these findings can be helpful in the context of acute myelogenous leukemia, they are not specific enough to clarify the definite diagnosis particularly in de novo myeloid sarcoma and cannot discriminate myeloid sarcoma from lymphoma (16). Therefore histopathologic evaluation including immunohistochemistry remains the best method for confirmation of diagnosis.

Morphologically, myeloid sarcomas are composed of immature myeloblasts, monoblasts promonocytes or less commonly promyelocytes that efface the tissue structure (17). Myeloid sarcomas were previously categorized by morphologic features into granulocytic sarcoma and monoblastic sarcomas. Granulocytic sarcomas were further subdivided according to the extent of maturation into blastic, immature, or differentiated variants. Myelomonocytic forms are also common in contrary to the myeloid sarcomas with erythroid and megakaryocytic differentiation (18).

Immunohistochemically, CD68 is the most commonly expressed marker in myeloid sarcoma followed by myeloperoxidase, CD117, CD99, CD68/PG-M1, Lysozyme, CD34, terminal deoxynucleotidyl transferase (TdT), CD56, CD61/linker of activated T lymphocytes/factor VIII-related antigen,CD30, glycophorin A, and CD4(19). Positivity for CD68 and CD117 in our

case was very helpful for the confirmation of myelomonocytic sarcoma .On the other hand negativity of markers such as CD20, CD3, S100, and CD1a could rule out non Hodgkin lymphoma, melanoma and histiocytic neoplasms, respectively.

Myeloid and lymphoid neoplasms can be associated with eosinophilia in the context PDGFR and FGFR1 abnormalities (20). Myeloid sarcoma also has been reported to be associated with FIL1P1-PDGFR rearrangement (21). PDGFR-related myeloid neoplasms show increased local and peripheral eosinophils similar to our case presentation. Suspicion to these disorders and close attention to their histological clues (local and peripheral eosinophils) have a great therapeutic importance as these neoplasms respond to imatinib very well (22). However in our case the response to imatinib was temporary and the disease recurred very soon.

Treatment of initial myeloid sarcoma depends on extent of involvement. In isolated forms intensive AML chemotherapy with consideration of radiotherapy as consolidation is recommended. If concurrent myeloid sarcoma and bone marrow involvement happens, intensive AML chemotherapy with consideration of hematopoietic stem cell transplantation is the choice (23). Response to therapy is independent on factors such as age, sex, anatomic site; de novo presentation or concurrent AML, MDS, or MPD; histiotype ; phenotype ; or cytogenetic findings. However, autologous or allogenic bone marrow transplantation can prolong survival and cure rate (24).

In conclusion, proper diagnosis of de novo myeloid sarcoma presenting with lateral cervical mass is difficult and requires radiopathologic investigation in addition to high clinical suspicion. Its discrimination from lymphoma and other mimicking neoplasms is also vital, as management and prognosis vary fundamentally. By the way, whenever myeloid sarcoma is accompanied by persistent eosinophilia, PDGFR rearrangements ought to be evaluated to see whether imatinib is an appropriate therapeutic choice or not.

Acknowledgment

Authors thank Mrs sheikhshoai, Mrs Javidi and Mrs Hajghani for their cooperation. The authors declare that there is no conflict of interests.

References

1. Jaffe ES, Harris NL, Stein H, Vardiman JW. Pathology and genetics of tumours of haematopoietic and lymphoid tissues. Lyon: Iarc Press; 2001.

2. Liu PI, Ishimaru T, McGregor DH, Okada H, Steer A. Autopsy study of granulocytic sarcoma (chloroma) in patients with myelogenous leukemia, Hiroshima-Nagasaki 1949-1969. Cancer 1973;31(4):948-55.

3. Szomor A, Baranyai F, Tornoczky T, Losonczy H. Penile chloroma in a patient with secondary acute myeloid leukemia. Eur J Haematol 2002;68(5):332.

4. Imamura T, Matsuo S, Yoshihara T, Chiyonobu T, Mori K, Ishida H, *et al*. Granulocytic sarcoma presenting with severe adenopathy (cervical lymph nodes ,tonsils, and adenoids) in a child with juvenile myelomonocytic leukemia and successful treatment with allogeneic bone marrow transplantation. Int J Hematol 2004;80(2):186-9.

5. Hancock JC, Prchal JT, Bennett JM, Listinsky CM. Trilineage extramedullary myeloid cell tumor in myelodysplastic syndrome. Arch Pathol Lab Med 1997;121(5):520-3.

6. McPherson RA, Pincus MR. Henry's clinical diagnosis and management by laboratory methods. 22nd ed. Saunders:New York;2011.

7. Maeng H, Cheong JW, Lee ST, Yang WI, Hahn JS, Ko YW, *et al.* Isolated extramedullary relapse of acute myelogenous leukemia as a uterine granulocytic sarcoma in an allogeneic hematopoietic stem cell transplantation recipient. Yonsei Med J 2004;45(2):330-3.

8.Menasce LP, Banerjee SS, Beckett E, Harris M. Extramedullary myeloid tumour (granulocytic sarcoma) is

often misdiagnosed: a study of 26 cases. Histopathology 1999;34(5):391-8.

9. Ooi GC, Chim CS, Khong PL, Au WY, Lie AK, Tsang KW, *et al.* Radiologic manifestations of granulocytic sarcoma in adult leukemia. AJR Am J Roentgenol 2001;176(6):1427-31.

10. Nayak DR, Balakrishnan R, Raj G, Pillai S, Rao L, Manohar C. Granulocytic sarcoma of the head and neck: a case report. Am J Otolaryngol 2001;22(1):80-3.

11. Lee YH, Lee NJ, Choi EJ, Kim JH. Granulocytic sarcoma (chloroma) presenting as a lateral neck mass: initial manifestation of leukemia: a case report. Eur Arch Otorhinolaryngol 2006;263(1):8-16.

12. Noh BW, Park SW, Chun JE, Kim JH, Kim HJ, Lim MK. Granulocytic sarcoma in the head and neck: CT and MR imaging findings. Clinical and experimental otorhinolaryngology 2009;2(2):66-71.

13. Hong S, Suh S, Seol HY, Cho J, Shin BK. Myeloid Sarcoma Presenting as Multiple Lymphadenopathy: A Case Report. J Korean Soc Radiol 2010;62(5):421-5.

14. Byrd JC, Edenfield WJ, Shields DJ, Dawson NA. Extramedullary myeloid cell tumors in acute nonlymphocytic leukemia: a clinical review. J Clin Oncol7)13;1995):1800-16.

15. Pui MH, Fletcher BD, Langston JW. Granulocytic sarcoma in childhood leukemia: imaging features. Radiology 1994;190(3):698-702.

16. Guermazi A, Feger C, Rousselot P, Merad M, Benchaib N, Bourrier P, *et al*. Granulocytic sarcoma (chloroma): imaging findings in adults and children. AJR Am J Roentgenol 2002;178(2):319-25.

17. Swerdlow S, Campo E, Harris N. WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues. Lyon: Iarc Press;2008.

18. Hirose Y, Masaki Y, Shimoyama K, Sugai S, Nojima T. Granulocytic sarcoma of megakaryoblastic differentiation in the lymph nodes terminating as acute megakaryoblastic leukemia in a case of chronic idiopathic myelofibrosis persisting for 16 years. Eur J Haematol 2001;67(3):194-8.

19. Campidelli C, Agostinelli C, Stitson R, Pileri SA. Myeloid sarcoma: extramedullary manifestation of myeloid disorders. Am J Clin Pathol 2009;132(3):426-37.

20. Bain BJ. Myeloid and lymphoid neoplasms with eosinophilia and abnormalities of PDGFRA, PDGFRB or FGFR1. Haematologica 2010;95(5):696-8.

21. Vedy D, Muehlematter D, Rausch T, Stalder M, Jotterand M, Spertini O. Acute myeloid leukemia with myeloid sarcoma and eosinophilia: prolonged remission and molecular response to imatinib. J Clin Oncol 2010;28(3):33-5.

22. Jovanovic JV, Score J, Waghorn K, Cilloni D, Gottardi E, Metzgeroth G, *et al.* Low-dose imatinib mesylate leads to rapid induction of major molecular responses and achievement of complete molecular remission in FIP1L1-PDGFRA-positive chronic eosinophilic leukemia. Blood 2007;109(11):4635-40.

23. Bakst RL, Tallman MS, Douer D, Yahalom J. How I treat extramedullary acute myeloid leukemia. Blood 2011;118(14):3785-93.

24. Pileri SA, Ascani S, Cox MC, Campidelli C, Bacci F, Piccioli M, *et al.* Myeloid sarcoma: clinico-pathologic, phenotypic and cytogenetic analysis of 92 adult patients. Leukemia 2007;21(2):340-50.