

# Myeloid Sarcoma presenting as orbital mass: a diagnostic Challenge

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### Abstract

Myeloid sarcomas are extramedullary myeloid neoplasm and can present as solitary tumor without bone marrow and blood involvement. The rarity of the condition, its atypical presentation & difficulty to diagnose it in routine histopathological sections pose a diagnostic challenge to both pathologists and clinicians which prompted us to present this case.

A case of myeloid sarcoma occurring as orbital mass in a 60 year old is presented here. The finding as seen on a cytological smear, histological features and immunohistochemistry is discussed.

Strong clinical suspicion is prerequisite. The pathologist should examine the slide carefully so that the diagnosis is not missed. Presence of eosinophilic myelocyte provides a diagnostic clue.

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## 1. Introduction

Myeloid sarcoma (MS) is a rare tumor consisting of myeloid blasts with or without maturation, occurring outside bone marrow, causing effacement of architecture of the involved tissue. The tumor is usually associated with acute myeloid leukemia but may precede the condition for many months to years, thereby occurring as the first presenting symptom.<sup>[1]</sup>

The rarity of the condition, its atypical presentation and difficulty to diagnose it in routine histopathological sections pose a diagnostic challenge to both pathologists and clinicians. It has been aptly described as a 'diagnostic enigma' by hematologists.

We hereby state a case report of MS without blood or bone marrow involvement presenting to us as orbital mass.

## 2. Case report

A 60-year-old Muslim lady came to Medicine outpatient department with fever and malaise. On examination she had a mass in the region of right eye causing downward proptosis of the globe. A CT scan showed an orbital mass with ethmoid sinus destruction & pushing the eye from the rear (Figure

1). The patient was referred to Fine needle aspiration (FNA) clinic for cytological diagnosis from the orbital mass.



Figure 1 - CT scan showing an orbital mass with ethmoid sinus destruction

Fine needle aspiration cytology (FNAC) showed large ovoid cells with high nuclear-cytoplasmic ratio some with moderate to small amount of granular basophilic cytoplasm, mostly scattered singly (Figure 2).

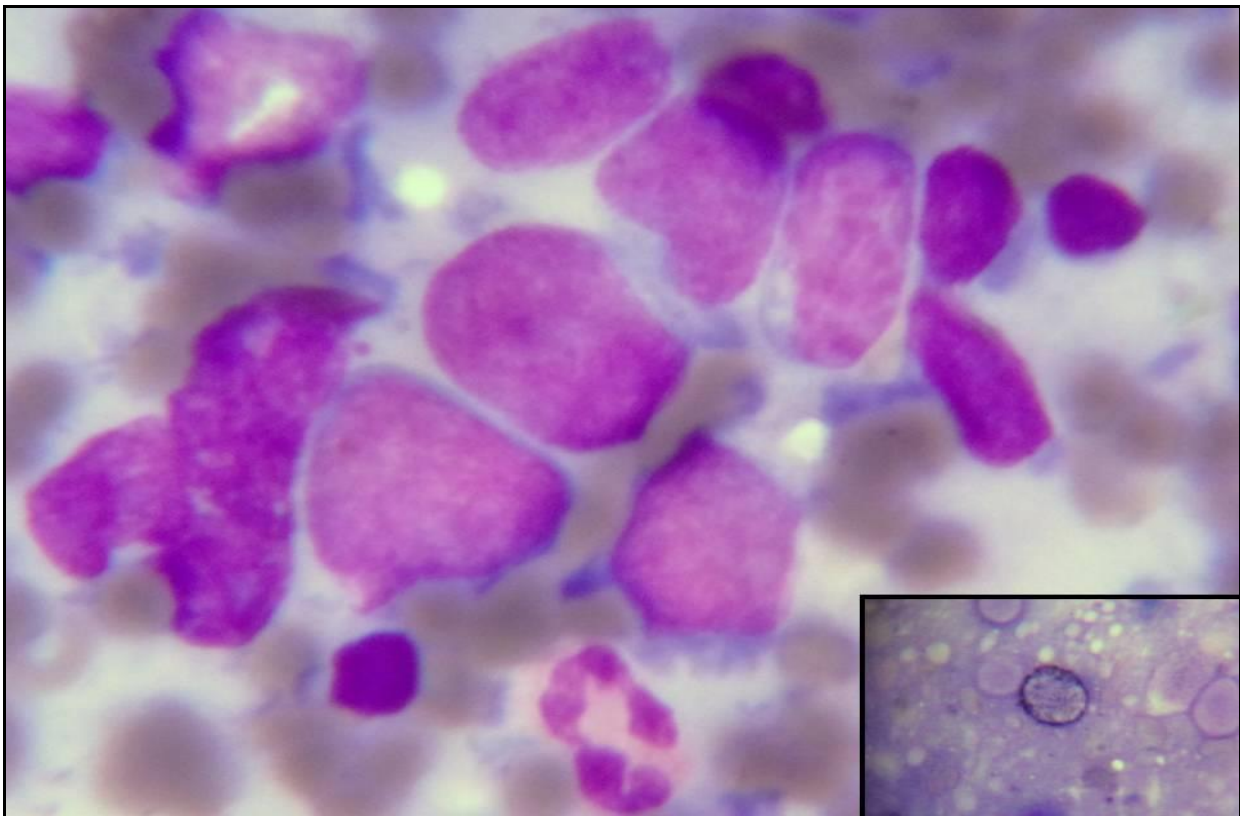


Figure 2 - FNAC showing large ovoid cells with high nuclear-cytoplasmic ratio with moderate to small amount of granular basophilic cytoplasm, mostly scattered singly (MGG, x1000), Inset shows that cell cytoplasm is positive for Sudan black (SB, x400)

Some cells had reniform nuclei. Few cells showed cytoplasmic granulations too. Based on these findings, the cytological differential diagnoses were undifferentiated carcinoma, melanoma and myeloid sarcoma. A peripheral smear followed by a sternal puncture was done. Peripheral blood smear was negative for blast. Bone marrow blast count was within normal limits.

In the meantime the patient underwent endoscopic trans-nasal biopsy of the mass which was sent to us for histopathological (HP) examination. HP sections showed similar cells as in FNAC, but on close inspection of the slides some myeloid precursors like myelocytes and metamyelocytes were found, occasional eosinophilic myelocyte was detected (Figure 3A). An imprint smear prepared from the specimen was positive for Sudan-black (Figure 2 inset). Immunohistochemistry (IHC) showed occasional positivity with MPO, positive for CD99 (Figure 3B), CD117 (Figure 3C) and negative for Cytokeratin and S-100. Ki-67 index was 80% (Figure 3D). These findings were consistent with the diagnosis of MS and the

patient was referred to Hematology department for definitive treatment. However the patient could not afford the treatment and died within one month of diagnosis.

### 3. Discussion

MS, reported in 2-8% cases of AML either as a solitary or multifocal tumor, is most often found either concurrently or following a previously recognized AML. They may also occur as an isolated leukemic tumor or herald the appearance of blood or bone marrow (BM) disease.<sup>[2]</sup> Myeloid sarcomas are also known as chloromas owing to green coloration attributed to enzyme myeloperoxidase.<sup>[2]</sup> They are a rare condition and are also termed extramedullary acute myeloid leukemia, extramedullary myeloid tumor, granulocytic sarcoma or chloromas.<sup>[3]</sup> Their multifaceted manifestation and varied histopathologic characteristics is diagnostically challenging.<sup>[3]</sup> Rarely they may also manifest as the first sign of relapse in a treated AML patient in remission.<sup>[4]</sup>

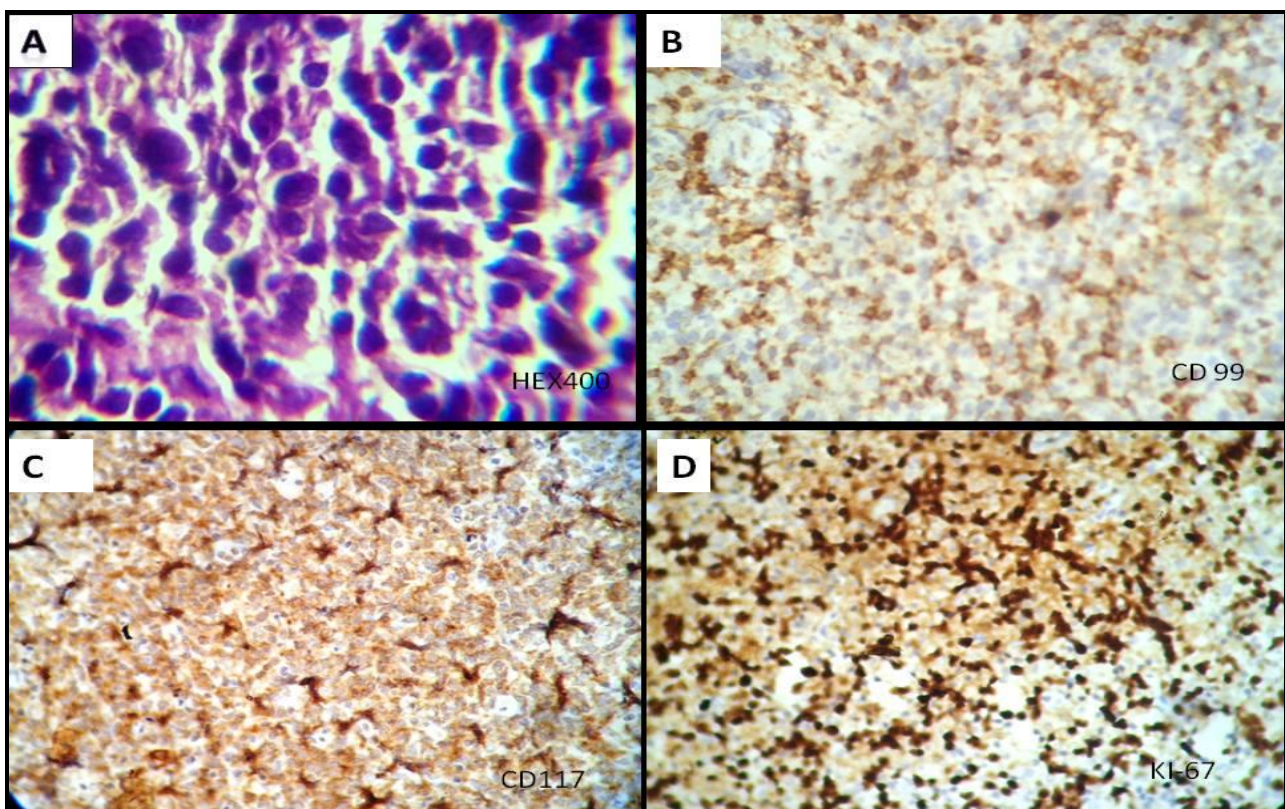


Figure 3 - A) H&E stained picture showing undifferentiated cells with round to indented nucleus; B,C,D) Immunohistochemistry with CD 99, CD117, KI-67 respectively (X400)



Age distribution of MS is extremely wide, it may occur in a neonate to 80 year old person.<sup>[4]</sup> Most common sites are skin, bone and lymph nodes.<sup>[5]</sup> However sites as CNS, nasal mucosa, orbit, gastrointestinal tract, breast, chest wall, pleura and retro-peritoneum may also be affected.<sup>[2]</sup> Our case was sixty year old female and the mass was located in orbit. Size may range from 2cm to 20cm. Clinical features depend on size and site of the lesion. Patients usually present with pain, swelling, compression symptoms or bleeding.<sup>[6]</sup>

The peripheral blood and bone marrow findings were normal in our case. In a study done on 25 cases by Cristina Campidelli et al, seven cases had de-novo occurrence without evidence of pathologic involvement of the BM and peripheral blood.<sup>[7]</sup>

Morphologically MS may be of blastic type, (with myeloblasts showing little differentiation), immature type (an intermediate grade and consists of myeloblasts, promyelocytes, and eosinophilic myelocytes), mature type consisting of more mature cells including eosinophils. Our case fits into intermediate grade. However, instead of morphologic subclassification, immunophenotype is considered to be of utmost importance for the diagnosis.

In particular, CD68/KP1 is the most commonly expressed marker, followed with decreasing frequency by MPO, CD117, CD99, CD68/PG-M1, Lysozyme, CD34, TdT, CD56, CD61/LAT/FVIIIIRAg, CD30, Glycophorin A, and CD4.<sup>[8]</sup>

Due to the fact that MS gets misdiagnosed as anaplastic carcinoma or melanoma (due to the cytoplasmic granules of granulocyte precursors), IHC and special stains are of extreme help. Our case was negative for cytokeratin and S100 protein thus excluding the diagnosis of carcinoma and melanoma respectively. Moreover, positive cytochemistry with Sudan black and IHC positivity with MPO, CD117 and CD99 established the diagnosis.

Pathogenesis of MS is still largely unknown. Some aberrant homing signals must be responsible to drive the blasts from their normal bone marrow habitats to abnormal extramedullary niches. Ab-normal response to chemokine receptors like CXCR-4, CXCR-7, and CCR-5 & CX3CR-1 may be responsible for this homing and retention of the blasts to extramedullary sites and skin.<sup>[9]</sup> Some

other authors believe that blasts produce several metallo-proteinases, proteases, collagenases, to metastasize to these abnormal sites. However the actual picture is still largely unknown.<sup>[10]</sup>

Prognostic factors are difficult to assess as rarity of these patients do not permit large studies to be done. However it has been documented in standard literature that factor like age, sex, anatomical site, size of the tumor, patients' gender, clinical presentation and history has little to do with long-term prognosis.<sup>[3]</sup> Traditionally, MS at diagnosis in a patient of leukemia indicates aggressive disease with shorter event free survival.<sup>[11]</sup> MS is generally treated with an AML like chemotherapy where cytosine arabinoside as the main drug. Some studies have shown Imatinibmesylate to be of help.<sup>[10]</sup> Role of Radio-therapy is not clear.<sup>[12]</sup>

#### 4. Conclusion

Though MS is a very well-known entity, much of its secrets, are yet to be revealed. What is the triggering signal for the blasts to settle down at extramedullary site, why it occurs in a small proportion of AML/CML patients, why the different time lags with respect to disease still remain an enigma? Complications of the disease are also difficult to foretell and role of SCT is yet to be established completely. Due to the fact that these patients are seldom encountered, and no large published series are available, multicentric trials seem to be our only resort. The MS has to be treated with a completely different treatment regime than carcinomas and melanomas. Therefore, early correct diagnosis of the condition is not only rewarding but also life-saving for the patient.

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#### Competing Interests

None declared.

#### References

1. Paydas S, Zorludemir S, Ergin M. Granulocytic sarcoma: 32 cases & review of literature. *Leuk Lymphoma*. 2006;47:2527-41. PMID: 17169797.

2. Avni B, Koren-Michowitz M. Myeloid sarcoma: current approach and therapeutic options. *TherAdvHematol*. 2011;2:309-16. doi: 10.1177/2040620711410774.PMID: 23556098.
3. Pileri SA, Orazi A, Falini B. Myeloid sarcoma. In Swerdlow SH, Campo E, Harris NL, Jaffe ES, Pileri SA, Stein H, Thiele J, Vardiman JW (Eds): WHO classification of tumors of Hematopoietic & Lymphoid tissues. 4<sup>th</sup> ed. Lyon, IARC press, 2008, pp 140-41.
4. Bloomfield CD, Lawrence D, Byrd JC, Carroll A, Pettenati MJ, Tantravahi R et al. Frequency of prolonged remission duration after high dose cytarabine intensification in acute myeloid leukemia varies by cytogenetic subtype. *Cancer Res*. 1998;58:4173-9. PMID: 9751631.
5. Cunningham I. Extramedullary sites of leukemia relapse after transplant. *Leuk Lymphoma*. 2006;47:1754-67. PMID: 17064985.
6. Neiman RS, Barcos M, Berard C, Bonner H, Mann R, Rydell RE et al. Granulocytic sarcoma: a clinicopathologic study of 61 biopsied cases. *Cancer*. 1981;48:1426-37. PMID: 7023656.
7. Campidelli C, Agostinelli C, Stitson R, Pileri SA. Myeloid sarcoma: Extramedullary Manifestation of Myeloid Disorders. *Am J ClinPathol* 2009;132:426-37 .
8. 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;21:350-60.PMID: 17170724
9. Faaij CM, Willemze AJ, Révész T, Balzarolo M, Tensen CP, Hoogeboom M. et al. Chemokine receptor interactions in extramedullary leukemia of skin in childhood AML: Differential role for CCR2, CCR5, CXCR4, CXCR7. *Pediatr Blood Cancer*. 2010;55:344-8. doi: 10.1002/pbc.22500 PMID: 20582977.
10. Stefanidakis M, Karjalainen K, Jaalouk DE, Gahmberg CG, O'Brien S, Pasqualini R. et al. Role of leukemia cell invadosome in extramedullary infiltration. *Blood*. 2009;114:3008-17. doi: 10.1182/blood-2008-04-148643. Epub 2009 Jul 27. PMID: 19636064.
11. Tsimberidou AM, Kantarjian HM, Estey E, Cortes JE, Verstovsek S, Faderl S, et al. Outcome of patients with nonleukemic granulocytic sarcoma with chemotherapy with or without radiotherapy. *Leukemia*. 2003;17:1100-3. PMID: 12764375.
12. Imrie KR, Kovacs MJ, Selby D, Lipton J, Patterson BJ, Pantalony D, et al. Isolated chloroma: the effect of early anti-leukemic therapy. *Ann Intern Med*. 1995;123:351-3. PMID: 7625623.

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