

MYELOID SARCOMA OF THE KIDNEY PRECEDING ACUTE MYELOID LEUKEMIA

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ABSTRACT

Myeloid Sarcoma is a rare extramedullary tumor, consisting of primitive granulocytic precursor cells. We report the case of a 50-year-old man, who presented with a renal mass. After nephrectomy, histological examination revealed a myeloid sarcoma in association with a renal cell carcinoma. Seven weeks after nephrectomy the patient developed acute myeloid leukemia.

Key Words: Myeloid sarcoma, Chloroma, Granulocytic sarcoma, Kidney, Acute myeloid leukemia

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Introduction

Myeloid Sarcoma (synonyms include granulocytic sarcoma, chloroma and myelosarcoma) is a rare malignant solid tumor composed of granulocyte precursor cells occurring in extramedullary sites or in bone.⁽¹⁾ King named the lesion chloroma in 1853 because of the green color that sometimes characterizes this tumor, due to the enzymatic action of myeloperoxidase within the cells.⁽²⁾

This tumor may be associated with acute or chronic myeloid leukemia, or may occur with other types of myeloproliferative disorders or with myelodysplastic syndromes. Rarely, myeloid sarcoma (MS) may precede peripheral blood or bone marrow manifestations of acute leukemia by up to two years.⁽¹⁻⁴⁾ Although it can occur anywhere throughout the body, MS most commonly occurs in the bone, periosteum, soft tissues, lymph nodes, epidural structures, and the skin.^(1,3-6) Involvement of various other organs have also been reported in the literature including the breast, prostate, urinary bladder, pericardium, ovary, pancreas, and the uterus.^(3,5,7-10)

Involvement of the kidneys has been reported in many autopsy studies, and less frequently in living patients.^(2,4) Our case report describes the diagnosis of myeloid sarcoma preceding the onset of acute

myeloid leukemia (AML), in a patient with concurrent renal cell carcinoma.

Case Report

A 50-year-old man presented to Queen Alia Military Hospital in late September 2004, with right loin pain of few weeks duration. Abdominal ultrasound revealed a right renal mass and computerized tomography showed a renal tumor, suggestive of renal carcinoma. His pre-operative investigations showed a hematocrit value of 0.19 (normal for adult males 0.40- 0.55), a white blood cell count (WBC) of $8 \times 10^9/L$ (normal is $4-11 \times 10^9/L$), and a platelet count of $195 \times 10^9/L$ (normal range is $150-400 \times 10^9/L$). His peripheral blood smear revealed normochromic normocytic anemia. The differential count of WBCs was unremarkable. The patient received two units of red blood cells (RBCs), and nephrectomy was performed on 04/10/2004.

The histopathological examination of the nephrectomy specimen showed a renal cell carcinoma (RCC) of chromophobe type. There were also multiple foci of undifferentiated mononuclear cell infiltrate within the RCC and the normal renal tissue (Fig. 1). Immunostaining of these cells was positive for myeloperoxidase (MPO) and CD43 markers (Fig. 2).

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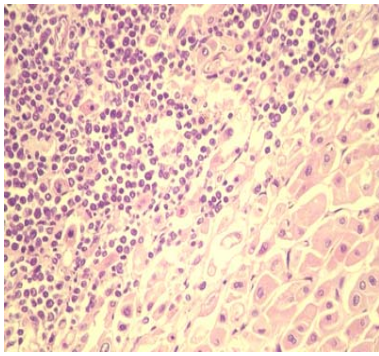


Fig. 1. Renal cell carcinoma, coexisting with immature cells having round-oval nuclei, fine chromatin, and scanty cytoplasm (H&E stain, x20)

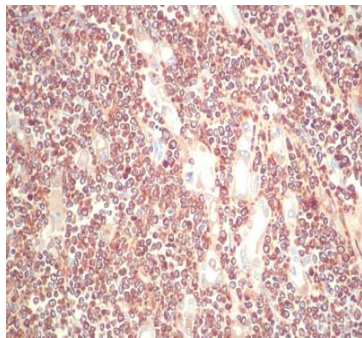


Fig. 2. Immunostaining of myeloid sarcoma cells with myeloperoxidase

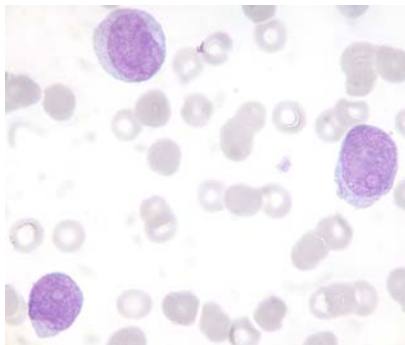


Fig. 3. Peripheral blood smear: myeloblasts with Auer rods

It was negative for leukocyte common antigen (LCA), CD45Ro, CD20 and CD79a. The differential WBC count and the results of the bone marrow aspiration were normal. These features were diagnostic of isolated myeloid sarcoma of the kidney.

No radiotherapy or chemotherapy was initiated at this time. Seven weeks after nephrectomy, the patient presented with few days history of generalized weakness and no other complaints. On physical examination, the patient was afebrile, but looked generally unwell. His abdomen was soft and

lax. The spleen was enlarged (3 centimeters below costal margin), and so was the liver (2 centimeters below costal margin). The rest of his clinical examination was normal. Laboratory investigations at this time were as follows: Blood urea nitrogen, creatinine, liver function tests, urinalysis, and chest x-ray were all normal. Hematocrit value was 0.22, WBC $58 \times 10^9/L$, and platelets $27 \times 10^9/L$. The peripheral blood morphology showed 75% of WBCs as blast cells, with abundant Auer rods (Fig. 3).

This picture was consistent with the diagnosis of AML. Flow cytometry on peripheral blood and bone marrow was done, and revealed that the blast cells seen on peripheral blood smear were of myeloid origin. This was further proved by immune cell markers, including CD13, CD33, CD117, and MPO. These findings were consistent with a diagnosis of AML, subtype M2 according to the French-American-British classification.

Subsequently, the patient was transferred to the care of the oncologists at King Hussein Medical Center (KHMC) for further management.

Discussion

Myeloid sarcoma (MS) is an extramedullary tumor composed of immature cells of the granulocytic series (myeloid cells). The tumor mass may arise in four situations: 1) associated with acute myeloid leukemia; 2) in chronic myeloid leukemia or myelodysplastic disorders; 3) preceding acute myeloid leukemia; and 4) an isolated lesion.^(1,5)

Myeloid sarcoma is a rare disease and most of the reports in the literature are descriptions of single cases.⁽⁵⁾ These tumors may occur concurrently with clinical evidence of leukemia.^(3,5) They are most frequently associated with AML, particularly subtype M2.⁽⁶⁾ The reported incidence of MS in acute or chronic myeloid leukemia is 3-8%,^(3,5) preceding the development of acute leukemia in 0.6-2% of cases only.

Microscopically, there are three major types of MS,⁽¹⁾ based on the degree of maturation: 1) blastic (composed mainly of myeloblasts); 2) immature (composed of myeloblasts and promyelocytes); and 3) differentiated (composed of promyelocytes and more mature neutrophils). The presence of eosinophilic myelocytes (seen in 30-50% of cases) is an important clue to the diagnosis of MS.^(2,3) Isolated cases of MS are often misdiagnosed as high-grade lymphomas or other small round cell tumors.⁽²⁾

Immunohistochemical stains are always necessary to confirm the diagnosis of MS.⁽¹⁾ Generally, markers are employed initially to establish the myeloid origin of the tumor. These include MPO, lysozyme, CD68 and chloroacetate esterase (CAE). Since diagnostic confusion surrounds MS and other high-grade Non-Hodgkin's Lymphomas, stains to include B and T cell lineage neoplasms must be used as well. Most cases of MS will express CD43. It has been suggested that a panel including CD20, CD43, CD68, and MPO, can successfully identify the majority of MS cases.⁽²⁾

The occurrence of myeloid sarcoma in the kidney is relatively rare, and can present before the onset of acute leukemia.⁽⁴⁾ It usually presents with diffuse enlargement of the affected kidney, and a high index of suspicion is needed to differentiate it from other renal tumors. Our case is of particular interest because of its unusual presentation of renal MS in association with a renal cell carcinoma. It is also unusual in that MS was diagnosed before producing a mass effect, unlike most published cases of MS involving the kidneys.^(2,4)

Most cases of MS that occur in non-leukemic patients will progress to AML within 1-2 years (average 10.5 months),^(3,5) with a median survival of 22 months.⁽¹¹⁾ In patients with history of leukemia, the discovery of MS heralds an imminent downturn in clinical course,⁽⁶⁾ and may be considered as relapse. Treatment of MS in these patients is centered on treatment of the underlying leukemia. Most reports of 'isolated' MS describe progression to acute leukemia,^(3-5,8,9) and several authors recommend induction chemotherapy at diagnosis.^(3,11) Imrie and colleagues⁽¹¹⁾ showed a significantly lower rate of progression to leukemia and longer survival among patients who received any form of chemotherapy as soon as the diagnosis of MS is made. Occult involvement of the bone marrow may be present without clinical evidence of systemic leukemia.⁽¹²⁾ Therefore, systemic chemotherapy regimens may be necessary in these cases, which may have delayed progression to overt acute leukemia after local therapy for MS.^(5,11)

In our case, the treating physicians did not refer the patient for further management after surgery. In retrospect, the patient should have been referred to receive AML induction chemotherapy, as neither surgery nor localized radiotherapy have an effect on survival.⁽²⁾

Conclusion

The discovery of 'isolated' MS may herald the onset of acute leukemia. Therefore, the evaluation of complete blood count and peripheral smear in the workup of these tumors is very important. Early treatment of 'isolated' MS is recommended in the hope of delaying the progression to acute leukemia.

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