Acute Myeloid Leukemia Revealed with Synchronous Granulocytic Sarcoma of the Breast and Spine: Case Report

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Abstract

Granulocytic sarcoma (GS) may occur in any anatomical site but simultaneous involvement of the breast and spine is rare. Here, we report a case of a 33-year-old woman who presented with acute paraplegia and urinary retention. The physical examination revealed a breast lump. A Magnetic Resonance Imaging of spinal cord showed a compressive mass in the lumbosacral junction. The diagnosis of a metastatic breast cancer was suspected. But a blood count showed a high number of white blood cells. Microscopic examination of a blood smear revealed peripheral blood blasts. Bone marrow aspirate and histology of the breast tissue confirmed the diagnosis of Acute Myeloid Leukemia with GS of the breast. Our patient received a radiation therapy for spinal cord compression than she was treated with chemotherapy but died five days after achieving it of a septic shock. This case report is a reminder of this peculiar sign of tumoral syndrome in acute myeloid leukemia. We also discuss treatment methods and analyze the disease course.

Résumé: Le sarcome granulocytique (SG) peut survenir dans n’importe quel territoire anatomique, cependant l’atteinte simultanée du sein et du rachis est rare.

Nous rapportons l’observation d’une patiente âgée de 33 ans qui s’est présentée pour paraplégie aigue avec une rétention d’urine, son examen physique a révélé un nodule mammaire.

L’imagerie par résonnance magnétique nucléaire rachidienne a objectivé une masse compressive au niveau de la jonction lombosacrée.

Le diagnostic de cancer du sein métastatique a été suspecté, mais l’héogramme a révélé une hyperleucocytose avec blastose sanguine. Le myélogramme et la biopsie du tissu mammaire ont confirmé le diagnostic de leucémie aigue myéloïde avec SG du sein.

La patiente a reçu une radiothérapie rachidienne pour la compression médullaire puis traité par chimiothérapie et décédé 05 jours après la fin de celle-ci par choc septique.

A travers cette observation nous discutons les modalités thérapeutiques et les particularités évolutives de cette forme clinique.

Introduction

Granulocytic sarcoma (GS), also known as one variant of myeloid sarcoma in the World Health Organization classification, is an extramedullary solid tumor composed of myeloid precursor cells. The World Health Organization
AML concurrent with GS of the breast and spine

Classification of hematopoietic tumors divides myeloid sarcoma into 2 major categories. The most common form is GS, composed mainly of myeloblasts, neutrophils and myeloid precursors. The less common form is monoblastic sarcoma. This tumor occurs commonly in patients with acute myeloid leukaemia (AML) and less commonly in those with myelodysplastic syndrome or chronic myeloid leukaemia. Incidence of GS varies from 3% to 9% in AML patients and most frequently occurs in AML with maturation (French-American-British (FAB), M2) [2, 12]. However, other subtypes including FABM4 or M5 and M7 have also been described.

The most common sites of involvement include bones, soft tissue, lymph nodes and skin [9, 11]. However Breast involvement by GS is rare [4, 9, 11]. Paraplegia due to epidural mass is an extremely rare presentation of undiagnosed leukemia [5, 10].

We present an unusual case of a 33 year old woman who presented with back pain, numbness in the legs and fatigue for two weeks; she was diagnosed as having synchronous granulocytic sarcoma of the breast and spinal cord compression. We also reviewed the literature about the clinical manifestations, diagnosis, treatment and prognosis of this condition.

Case presentation

A 33 year old woman with a sister history of invasive lobular breast cancer was admitted in neurosurgery department in July 2010 because of back pain, numbness in the legs, urine retention, and fatigue for 2 weeks. She was unable to stand or walk independently.

Physical examination revealed a 4 cm-sized, slightly fixed mass in the upper outer quadrant of the right breast. Enlarged axillary lymph nodes, skin-changes and nipple retraction were not found. Hypoesthesia was present under the fifth lumbar level. Tendon reflexes were absent in lower limbs with bilateral extension plantar response; cranial nerve examinations were normal.

Magnetic resonance imaging (MRI) showed extensive epidural lesion in the lumbosacral junction hypotense in T1, hypotense in T2, compressing the spinal cord in the lumbar region. (Fig1, Fig2).

With this clinical picture and investigations we consider the possibility of bone and/or bone marrow breast cancer metastasis.

Complete blood count showed a hemoglobin of 9 g/dl with 14,500 leukocytes/µl, neutrophils at 34 %, lymphocytes at 9 % with blasts at 54 % and 108 000 platelets/µl.

So, the patient was referred to haematology department. Bone marrow aspirate confirmed the diagnosis of acute myeloid leukemia (AML) M5-type (according to the FAB classification). (Fig 3 a).
Cytogenetic showed the presence of two pathological clones of hyperploidies 76,XXX,add (1)(q12)[4]/76-91,XXX, del(1)(q25)[3]/92,XXXX[8].
A fine needle aspiration (FNA) of the breast showed a massive infiltration of the breast tissue with big size cells with prominent nucleoli. The cytoplasm was scanty and basophilic. Immunohistochemically, the tumor cells were positive for myeloperoxidase (MPO) and anti cytokeratine negative. (Fig 3b, Fig 3c).
Lumbar cerebrospinal fluid (CSF) study showed: negativity for malignant cells. Considering the possibility of synchronous GS of the breast and possibility of GS as the cause of paraplegia in AML.
The patient received a local radiotherapy to the spinal axis and the tumor bed and induction chemotherapy according to MRC AML10 protocol consisting of idarubicin (12 mg/m² daily for 3 days) and cytosine arabinoside (200 mg/m² continuous infusion for 7 days). The patient died however, five days after achieving of chemotherapy with a septic chock.

**Discussion**

GS or chloroma are rare extramedullary tumors that consists of immature granulocytic cells [4, 9, 10, 11]. It is generally observed as a complication of AML, myelodysplastic syndroms, or myeloproliferative disorders, and it may be perceived as a de novo tumor without marrow involvement or as a tumor associated with leukemia in the marrow, and as a site of leukemia relapse [10, 11, 12]. GS has been associated with 3-9% of AML cases [9]. The incidence of granulocytic sarcomas is rising, due mostly to the longer survive of acute myelogenous leukemia patients [10]. GS involves any site but most commonly affects the skin, bone/spine and lymph nodes. All levels of the spine may be affected by myeloid sarcoma [2, 12].

GS of the breast is rare. It most often represents relapse or the initial presentation of AML; in that case GS is misdiagnosed most frequently as a lymphoma or sarcoma [3, 6, 9, 11].

Immunohistochemical studies especially staining of MPO are extremely helpful to make a correct diagnosis. The typical profile of myeloid neoplasm is immunoreactivity diffuse and intense for MPO and CD43, focal for CD34 and TdT, and absent for markers of lymphoma and carcinoma [1, 11]. The thoracic spine was most commonly involved followed by the lumbar, sacral, and cervical regions [7].
Paraplegia due to a spinal cord epidural mass is a very rare presentation of undiagnosed leukemia [2, 5].
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GS should be considered in the differential diagnosis of any epidural mass in patients with or without leukemia [5]. Differential diagnosis includes non-Hodgkin’s lymphoma, Ewing’s sarcoma, osteosarcoma, rhabdomyosarcoma and metastasis [5, 10].

In our case, although a histological examination was not conducted, the spinal tumor was clinically considered a spinal myeloid sarcoma based on tumoral characteristics as indicated by MRI images.

To our knowledge, only one case of synchronous location of GS in the breast and spine has been described in the literature [13]. GS are usually radiosensitive; they are often treated with local radiotherapy and chemotherapy. Surgery is generally preferred for cases of acute spinal cord compression [10]. AML chemotherapy regimens appear to be the treatment of choice. It remains to be determined whether chemoradiotherapy is superior to chemotherapy alone [6].

Due to the rarity of isolated GS and different treatments, the clinical outcome and the prognosis in this group of patients is hard to predict. Early diagnosis of cord compression is essential to a better outcome of paraplegia. In our patient the poor prognosis may be due to later diagnosis of cord compression, complex cytogenetic abnormalities, myelotoxicity of chemotherapy complicated with septic shock which contributed to her death.

Conclusion

GS should always be kept in mind when making the differential diagnosis in patients with signs of spinal compression or any tumoral mass. Early diagnosis with biopsy and early chemotherapy can improve survival outcome. Local radiation or surgery can improve symptoms but does not influence survival outcomes [8].

References


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Fig.1. MRI (sagittal) Solid intraspinal and extradural lesion located in the lumbosacral junction:
(a) T2-weighted  
(b) T1-weighted Fat Sat after contrast  
(c) T1-weighted before contrast
A solid intraspinal and extradural lesion hypotense in T1 and T2 without enhancement located in the lumbosacral junction.
Fig. 2. MRI (axial)
Epidural tumor infiltration in the sacral region
AML concurrent with GS of the breast and spine

Fig. 3. (a) Bone marrow showing blast cells s/o acute myeloid leukemia
(b) A specimen of breast mass showing immature myeloid blastic cell infiltration (HE, original magnification 400 xs)
(c) Positive staining myeloperoxidase in granulocytic sarcoma cells of the breast (original magnification 400 xs)
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