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On-line Case Report

Granulocytic sarcoma – a rare presentation of a breast lump

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ABSTRACT

This report describes a woman who presented with a breast lump, which was initially misdiagnosed as lymphoma, but later turned out to be granulocytic sarcoma of the breast.

Keywords: Granulocytic sarcoma – Acute myeloid leukaemia – Breast lump

Acute myeloid leukaemia (AML) is a neoplastic proliferation of immature cells of the haemopoietic system. The diagnosis of AML is established by finding more than 20% blasts in the blood and/or the bone marrow.[1] Patients with AML usually present with symptoms related to low blood counts such as fatigue, fever or bleeding. Very rarely, they may present with granulocytic sarcoma, which is a proliferation of immature myeloid cells producing a clinically evident tumour.

Case report

A 26-year-old woman presented with a painless, right-breast mass discovered on self-examination. She had no other symptoms, was otherwise in good health and had no relevant past medical or family history. On clinical examination, the lump was in the upper outer quadrant, well defined and fixed and measured 2 cm by 2 cm. There was no associated lymphadenopathy. A clinical diagnosis of fibroadenoma was made.

Ultrasound scan of the breast showed a hypo-echoic area measuring approximately 3 cm in diameter in the outer half adjacent to the areola. The ultrasound appearance was suggested to represent an area of fibrocystic change rather than fibroadenoma. There were no other focal lesions noted on the scan. A fine needle aspiration (FNA) was then performed which showed a large number of degenerate cells with multiple small cells, which had the appearance of lymphocytes. Due to the disparity between the investigations, excision biopsy was undertaken which was initially reported as a large cell lymphoma though the immunocytochemistry was not typical. Review of the biopsy specimen from the breast tissue at multidisciplinary meeting reclassified the diagnosis as granulocytic sarcoma. Bone marrow aspirate confirmed this diagnosis with evidence of myeloblasts and excess of eosinophils compatible with a diagnosis of acute myeloid leukaemia (AML) M4 type. Cytogenetics confirmed the presence of the characteristic pericentric inversion of chromosome 16. She was treated according to the current UK AML 15 protocol and achieved good remission after the first course of chemotherapy. The patient had also undergone a computerised tomography scan initially to stage the 'lymphoma' which revealed a

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Table 1 Summary of reported cases of granulocytic sarcoma occurring in the breast

	Year	Patient age (years)	Presentation	Diagnosis
1	1970	40	Right-breast mass	AML
2	1979	23	Unilateral breast mass side not stated	Primary granulocytic sarcoma
3	1983	24	Breast mass	AML
4	1984	42	Right-breast mass	Primary granulocytic sarcoma
5	1986	45	Right-breast mass	Primary granulocytic sarcoma
6	1988	56	Left-breast mass	Primary granulocytic sarcoma
7	1993	70	Left-breast mass	AML
8	1996	25	Right-breast mass	AML
9	1998	–	Left-breast mass	Primary granulocytic sarcoma
10	1999	52	Left-breast mass	AML
11	2000	41	Breast mass (side not stated)	AML
12	2000	–	Left-breast mass	Primary granulocytic sarcoma
13	2000	42	Left-breast mass	AML
14	2001	40	Bilateral breast masses	CML
15	2002	16	Left-breast mass	AML
16	2003	28	Unilateral	Primary granulocytic sarcoma
17	2003	16	Right-breast mass	Primary granulocytic sarcoma
18	2003	35	Right-breast mass	Primary granulocytic sarcoma
19	2003	31	Right-breast mass	Primary granulocytic sarcoma
20	2004	35	Bilateral breast masses	CML
21	2004	–	Right-breast mass	Primary granulocytic sarcoma
22	2004	72	Left-breast mass	Primary granulocytic sarcoma
23	2004	55	Bilateral breast masses	Primary granulocytic sarcoma
24	2006	53	Bilateral breast masses	AML

References for the table are available on request from the corresponding author.

mesenteric lymph node mass. This also later regressed with treatment.

Discussion

Granulocytic sarcomas or chloromas are uncommon extramedullary, solid tumours composed of granulocytic precursor cell. The condition was first described by the British physician A. Burns in 1811,[2] although the term chloroma did not appear until 1853. This name was derived from the Greek word *chloros* (green) due to the presence of myeloperoxidase which gives these tumours a green tint. The link between chloroma and acute leukaemia was first recognised in 1902 by Dock and Warthin. The most common sites for granulocytic sarcoma, as highlighted in large clinical reviews, are skin, bone, soft tissue and lymph nodes. Its presentation in the breast tissue is rare. A review of all Medline case reports (no date limit) revealed only 24 cases of breast involvement by granulocytic sarcoma (Table 1). The ages of the patients ranged from 16–72 years.

Clinically, granulocytic sarcoma involving the breast can present as a unilateral or bilateral mass. The patient often has no other associated symptoms, such as, nipple inversion or discharge.[3] The majority of the patients in the case reports presented with unilateral breast mass as did our case, with only four patients having bilateral involvement.

Only few of the reports of granulocytic sarcoma of breast have been reported with mammography. Pettinato *et al*.[4] described the mammogram appearance of granulocytic sarcoma as a 'large, non-calcified irregular mass'. On ultrasound, breast granulocytic sarcoma typically shows homogeneous areas of marked low attenuation, with well- or ill-defined margins. Such varied radiological appearance makes it difficult to differentiate granulocytic sarcoma from other diagnostic possibilities. Magnetic resonance imaging using T2-weighted coronal images may show granulocytic sarcoma as multiple, ill-defined, heterogeneous, hyperintense masses relative to breast parenchyma.

A frequent problem of granulocytic sarcoma of the breast is misdiagnosis mainly due to its rarity. The most common misdiagnoses are as lymphoma, sarcoma or breast carcinoma. In particular, one study reviewed a series 61 patients with extramedullary myeloid cell tumours, in whom the majority were originally diagnosed as lymphoma.[5] Analysis of the biopsies displayed a morphological range from well differentiated, including all stages of myeloid differentiation and easily recognisable eosinophilic myelocytes, to those tumours that displayed virtually no evidence of differentiation when conventional microscopy was used. These undifferentiated cells can closely resemble cells of other neoplasms, particularly lymphomas.

Conclusions

As highlighted, the presentation of granulocytic sarcoma in breast tissue is rare. As in our case, many patients have no systemic signs of the disease. Imaging produces varied appearances, making it difficult to distinguish granulocytic sarcoma from other common diagnoses like carcinoma or lymphoma. Although histology plays an important role in the diagnosis, this can also be confusing, particularly in poorly differentiated tumours which closely mimic other neoplasms. It is, therefore, paramount to consider granulocytic sarcoma of the breast in the differential diagnosis of breast masses to avoid incorrect treatment of a curable condition.

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