A CASE OF GRANULOCYTIC SARCOMA OF THE BREAST AND REVIEW OF THE LITERATURE

E T Chua

ABSTRACT

This article discusses a case of granulocytic sarcoma of the breast, presenting prior to the onset of acute myeloid leukaemia. There has only been six reported cases of such a presentation in the breast. In view of the rarity of the tumour, it is often misdiagnosed as a high grade non-Hodgkin's lymphoma. Its treatment is still controversial and includes a proposal to use anti-leukaemic drug combinations for all cases.

Key Words: Breast, acute myeloid leukemia

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INTRODUCTION

Granulocytic sarcoma is defined as a localized mass of immature cells of the granulocytic series (1). There have been many individual case reports of the varying presentations of this rare tumour, but the articles that best summarise its clinical presentation come from the MD Anderson Hospital (2) and the Eastern Cooperative Oncology Group (ECOG) (1) studies. The three different clinical settings are:

1. In association with myelodysplastic disorders, with leukaemic transformation, or with chronic myeloid leukaemia, with impending blast crisis.
2. In association with acute myeloid leukaemia.
3. In non-leukaemic patients who may eventually transform to acute myeloid leukaemia.

It is with the third clinical presentation that this case manifested. It is recognised that it is rare to present as a tumour prior to transformation to acute myeloid leukaemia. It has only been recently recognised that it may be a preleukaemic stage (1-4). However, some cases have been reported without transformation after many months and these may have been cured (2, 5). Alternatively, they may be a different tumour with a natural history not progressing to acute myeloid leukaemia. Two of the largest series of granulocytic sarcoma in non-leukaemic patients have been recently reported. They consisted of 15 and 16 patients from the ECOG (1) and MD Anderson Hospital (2) studies, respectively. Of these 31 cases, only one case presented primarily in the breast. Besides these two large series, there are many reports of single cases of granulocytic sarcoma presenting in various unusual sites without any leukaemia at the time of diagnosis (5-11). These sites include the meninges, the hard palate and the uterine cervix. The commonest sites of presentation are the skin, the lymph nodes, and the bone (1). There have been only six reported cases of primary breast involvement (12).

Department of Therapeutic Radiology
Singapore General Hospital
Outram Road
Singapore 0316

E T Chua, MBBS, DMRT, FRCR, Registrar

CASE REPORT

The patient is a 23 year-old Malay girl who first presented with a lump in the left breast in September 1985. She had removal of the lump and remained well till April 1986, when there was a recurrence of the lump in the same breast. It was removed and the histology was reported to be similar to the first tumour. It was described as a greenish solid tumour with a translucent appearance. Myeloid differentiation was evident with a positive Leder esterase stain. The operative finding showed a large 10 x 12 cm lobulated firm to hard mass at the superior aspect of the left breast.

The haematological findings at that time were reported as normal. The peripheral blood firm, haemoglobin, total white and platelet counts were normal. The differential white cell count was normal. A bone marrow aspiration revealed normochromic, normocytic RBCs. The white cell series were reported as normal, with a slight increase in eosinophils and occasional atypical mononuclear cells.

She was then referred to the Radiotherapy Department in May 1986, and it was decided to give her a radical course of irradiation to the breast and to the lymphatic drainage system consisting of the internal mammary, axillary and supraclavicular regions. A total dose of 4000 cGy in 20 fractions over 29 days was given to the lymphatic drainage areas using the Cobalt treatment machine. A dose of 4400 cGy was given to the whole breast in 28 fractions over 37 days. A boost of 1800 cGy incident dose in 6 fractions over 10 days was given to the tumour area.

She remained well on follow up, till August 1987, 23 months after the first presentation. She returned with marked anaemia with a Hb of 5.7g%. Peripheral blood films and bone marrow examination confirmed acute myeloid leukaemia (AML), and she was started on anti-leukaemic treatment. At the time of the transformation to AML, she had multiple lumps in both breasts and biopsies of these lumps revealed further evidence of granulocytic sarcoma. She died in March 1988, from acute myeloid leukaemia.

DISCUSSION

This case is reported with the aim of discussing the rarity of the disease, the diagnostic problems, the treatment

and the prognosis. This is perhaps the first locally reported case of granulocytic sarcoma in the breast presenting prior to leukaemic transformation. A literature review in an article in 1985 (12) examined all reported cases from 1912 to 1985, of granulocytic sarcoma presenting prior to transformation to leukaemia. The number of cases was 47. In this series of cases, 83% of them developed leukaemia within an average of a year of the first clinical manifestation of the disease, and 73% died of leukaemia within an average of 16.5 months. Another 15% died of unrelated causes without evidence of leukaemia. There were only 4 long-term survivors with 2.5 to 12 years follow-up and 3 remained aleukaemic. However, the diagnosis of two of these cases has been challenged, which highlights the problem of diagnosis.

So far, there has only been 16 reported cases of breast involvement (12). However, only 6 cases in the literature presented prior to leukaemic transformation. Of these 16 cases, 11 (69%) had bilateral involvement suggesting a unique trophism of leukaemic cells for the breast. In this reported case, the bilateral involvement occurred metachronously and the subsequent recurrence in the left breast occurred after leukaemic transformation.

Granulocytic sarcoma of the breast unassociated with leukaemia could be confused with large cell lymphoma (2, 12) or a poorly differentiated carcinoma (2, 12, 13). The misdiagnosis rate in the MD Anderson study (2) was 75%, reflecting the rarity of the tumour, the difficulty in diagnosis, and the lack of awareness of its existence.

Confirmation of the cells requires identification of chloroacetate esterase in the cytoplasm of malignant cells (14). The intensity of the naphthol-ASD-chloroacetate esterase (NASD) stain and the number of positive staining cells generally increase with increasing maturity (2). The pattern of organ involvement in granulocytic sarcoma is also distinctly different from that in large cell lymphoma with which it is frequently confused histologically. Large cell lymphoma is often associated with tissue destruction and coagulation necrosis within the tumour. Granulocytic sarcoma infiltrates tracts and tissue planes.

The significance of granulocytic sarcoma depends on the clinical setting. In patients with AML, it does not affect prognosis. However, presenting in non-leukaemic patients and in chronic myeloid leukaemia, it portends an ominous prognosis. In chronic myeloid leukaemia or other myeloproliferative disease, the tumour is an initial manifestation of blast transformation or a harbinger of acute myeloid leukaemia (1, 2). Some cases have, however, survived without transformation in the MD Anderson study (2).

At the present time, there has been no relationship of survival with the treatment modalities. Patients have had incisional biopsies, excision of tumour, irradiation and chemotherapy. The general policy is to treat patients as if they had AML right from the beginning. However, it is not known whether long-term survivors (1, 2) were due to this policy of treatment or they had inherent localized disease, as the treatment modalities varied in these survivors. Some had irradiation and chemotherapy of various types, ranging from regimes for lymphoma to those for acute myeloid leukaemia. Nevertheless, at the present moment, in view of the likelihood of transformation, these patients should be treated as for acute myeloid leukaemia until prognostic factors have been worked out.

Almost all the patients developed AML within a month to 13 months of diagnosis in spite of AML treatment (1, 2, 12). The degree of differentiation of the tumour or the mitotic rate did not correlate with the development of AML.

CONCLUSION

It is currently impossible to predict the outcome of the disease. Cytogenetic studies (2) have been done on the bone marrow of a few cases. The two patients who had no AML to date had normal results while the two who had AML had chromosomal aberrations. The studies were done after the onset of acute myeloid leukaemia in these two patients and they had different chromosomal defects. Perhaps, granulocytic sarcoma is a heterogenous disease with very different outcomes. DNA/RNA flow cytometry of the bone marrow aspirate, at the present moment, reflects the current status of the bone marrow rather than predict the biological behaviour of the disease, unlike other haematologic neoplasms. The need to be aware of the tumour and its biological behaviour is the cornerstone to the proper management of granulocytic sarcoma.

REFERENCES

1. Neiman RS, Barcos M, Berard C, et al: Granulocytic Sarcoma: A clinicopathologic study of 61 biopsied cases. Cancer 1981; 48: 1426-37.
2. Meis JM, Butler JJ, Osborne BM, et al: Granulocytic Sarcoma in Nonleukaemic Patients. Cancer 1986; 58: 2697-709.
3. Krause JR: Granulocytic Sarcoma preceding acute leukaemia: A report of six cases. Cancer 1979; 44: 1017-21.
4. Long JC, Mihm MC: Multiple granulocytic tumours of the skin: Report of six cases of myelogenous leukaemia with initial manifestations in the skin. Cancer 1977; 39: 2004-16.
5. Beck TM, Day JC, Smith CE, et al: Granulocytic sarcoma treated as an acute leukaemia: Report of a case. Cancer 1984; 53: 1764-6.
6. Seo IN, Hull MT, Pak HY: Granulocytic sarcoma of the cervix as a primary manifestation: Case without overt leukaemic features for 26 months. Cancer 1977; 40: 3030-7.
7. Brugo EA, Marshall RB, Riberi AM, et al: Preleukaemic granulocytic sarcomas of the gastrointestinal tract: Report of two cases. Am J Clin Pathol 1977; 68: 616-21.
8. Kubonishi I, Ohtsuki Y, Machida K, et al: Granulocytic sarcoma presenting as a mediastinal tumour: Report of a case and cytological and cytochemical studies of tumour cells in vivo and in vitro. Am J Clin Pathol 1984; 82: 730-4.
9. Fayemi AO, Gerber MA, Cohen I, et al: Myeloid sarcoma: Review of the literature and report of a case. Cancer 1973; 32: 253-8.
10. Sears HF, Reid J: Granulocytic sarcoma: Local presentation of a systemic disease. Cancer 1976; 37: 1808-13.
11. Comings DE, Fayen AW, Carter P: Myeloblastoma preceding blood and marrow evidence of acute leukaemia. Cancer 1965; 18: 253-8.
12. Gartenhaus WS, Mir R, Pliskin A, et al: Granulocytic sarcoma of breast: A leukaemic bilateral metachronous presentation and literature review. Med Paediatr Oncol 1985; 13: 22-9.
13. Singh T, Jayaram G, Gupta AK: Cytologic diagnosis of myeloid sarcoma. Am J Ophthalmol 1985; 99: 496-7.
14. Bancroft JD. Enzyme histochemistry. In: Bancroft JD, Stevens A. eds. Theory And Practice of Histological Techniques. 1986; 379-405.