J Korean Med Sci 2000; 15: 457-9
ISSN 1011-8934

Granulocytic Sarcoma of the Breast Preceding Acute Myelogenous Leukemia
: A Case Report

We report a case of granulocytic sarcoma presented as a recurrent breast tumor in a 42-year-old woman with no history of leukemia. The case was initially diagnosed as malignant lymphoma on a previous biopsy specimen and she refused chemotherapy. At the time of recurrence of the breast tumor, the patient showed full-blown features of leukemia. This case of rare tumor suggests that differential diagnosis should be considered when malignant lymphoma of the breast is detected.

Key Words: *Granulocytic Sarcoma; Breast Neoplasms*

Mee Joo, Hye Kyung Lee, Yun Kyung Kang, Joon Hee Kim*

Departments of Pathology and Internal Medicine*, Inje University Seoul Paik Hospital, Seoul, Korea

Received: 17 December 1999
Accepted: 21 January 2000

Address for correspondence
Mee Joo, M.D.
Department of Pathology, Inje University Seoul Paik Hospital, 85, Jeo-dong 2-ga, Jung-gu, Seoul 100-032, Korea
Tel: +82.2-2270-0153, Fax: +82.2-2270-0131
E-mail: meeah@hitel.net

INTRODUCTION

Granulocytic sarcoma (GS) is a rare tumor composed of granulocytic precursor cells (1). The most common sites of involvement include bones, soft tissue, lymph nodes and the skin (1, 2). Breast involvement by GS is rare (2-6). Granulocytic sarcoma usually develops as a delayed manifestation of the disease process in patients with known acute myelogenous leukemia (1, 3). We hereby report a case of granulocytic sarcoma presenting as a recurrent breast tumor in a 42-year-old woman without a history of leukemia. The case was initially diagnosed as malignant lymphoma on a previous biopsy specimen.

CASE REPORT

A 42-year-old woman was admitted to our hospital because of a recurrent palpable mass in the left breast. Physical examination revealed a 3 cm-sized, slightly fixed, painless mass in the upper outer quadrant of the left breast. Enlarged axillary lymph nodes, skin changes and nipple retraction were not founded.

She had a past history of excisional biopsy of left breast mass 6 months ago at a local clinic and was diagnosed as diffuse large B cell lymphoma. At that time, there was no clinical and laboratory evidence of acute myeloid leukemia or chronic myeloproliferative disease, and she refused adjuvant chemotherapy.

She underwent surgical excision of the tumor. Multiple vague nodular lesions were present, measuring up to 3× 2.2 cm in maximal width, and they were greenish and solid (Fig. 1). Histologically, the tumor was composed of a uniform population of primitive cells showing a high nuclear-cytoplasmic ratio. They had a delicate nuclear chromatin pattern with thin, regular nuclear membrane, one or more small basophilic nucleoli, and scanty cyto-

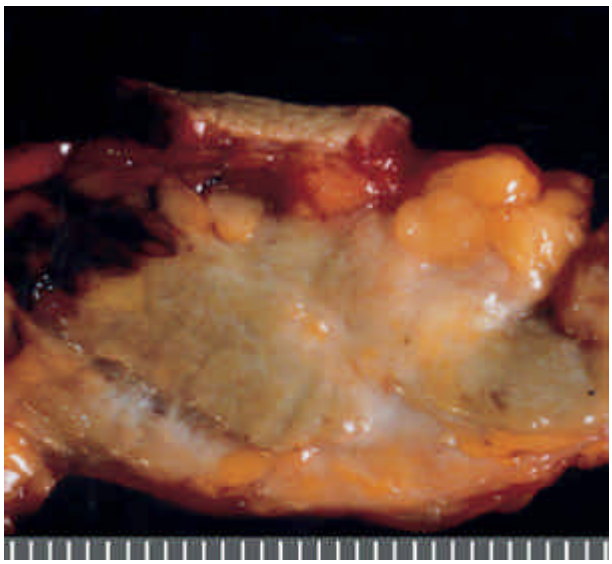

Fig. 1. The excised specimen contains multiple, vaguely nodular lesions, which are green in color, measuring up to 3×2.2 cm in width.

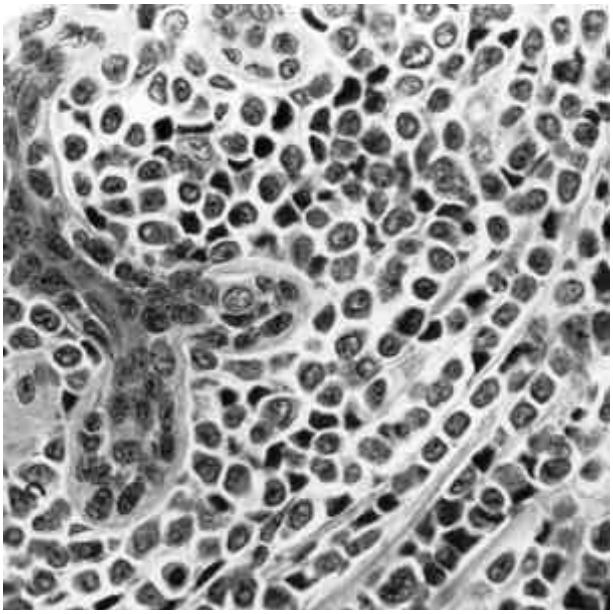

Fig. 2. The neoplastic cells forming broad sheets or cords infiltrate into and around normal mammary parenchymal structures, mimicking a pattern of infiltrating lobular carcinoma (H&E, ×200).

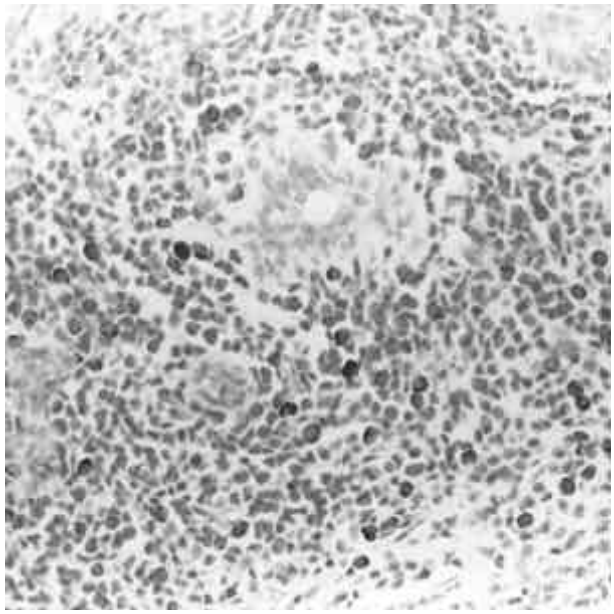

Fig. 3. Immunohistochemical staining for myeloperoxidase reveals diffuse cytoplasmic positivity (H&E, ×100).

plasm. The neoplastic cells tended to have an infiltrative pattern, occurring in sheets that peripherally coursed in tracts and tissue planes forming strands and cords (Fig. 2). These patterns were very similar to those of infiltrating lobular carcinoma, and the underlying tissue architectures were mainly preserved. There was no definite eosinophilic myelocytes. Immunohistochemical staining revealed diffuse cytoplasmic expression of myeloperoxidase, lysozyme, CD68, CD34 and leukocyte common antigen (Fig. 3). Laboratory data included a leukocyte count of 57.110 cell/μL with 98% blasts, and bone marrow biopsy showed hypercellularity with diffuse infiltrated blasts. She was diagnosed as acute myeloblastic leukemia (AML, M1) and treated with a regimen consisting of cytarabine, daunorubicine and mitoxantron for seven cycles. The follow-up peripheral blood smear and bone marrow biopsy showed no blastic cells.

DISCUSSION

Granulocytic sarcoma (GS) is a tumor composed of immature myelogenous cells (1). They occur in 3-9% of acute myelogenous leukemia cases and usually present concurrently with leukemic presentation (4, 8). In a review of 950 cases of acute myelogenous leukemia only 2.9% had GS, and only 0.6% of these precede the development of a leukemic blood picture (8). Common sites of involvement are bone, periosteum, lymph nodes, the skin and soft tissue (1, 2). The breast is an unusual site for GS and moreover breast involvement by GS in nonleukemic patients is very rare (2-6). Meis et al. (3) reported that 8 of 16 cases of GS in nonleukemic patients (75%) were initially misdiagnosed, most frequently as large cell lymphoma. The high misdiagnosis rate is probably a reflection of the rarity of this lesion and hence the low index of suspicion of it. This case was also initially misinterpreted as malignant lymphoma.

Histologically, GS of the breast can be confused with large cell lymphoma or poorly differentiated carcinoma (3, 9). "Single files" or targetoid patterns with sclerosis can mimic infiltrating lobular carcinoma, however other histologic features including lack of in situ carcinoma, frequent individual karyorrhetic debris and cellular discohesiveness are suggestive of hematopoietic neoplasm involving the breast. Large cell lymphoma is often associated with tissue destruction and coagulation necrosis within the tumor. In contrast, granulocytic sarcoma infiltrates in tracts and tissue planes, preserving the tissue architecture without extensive tissue destruction and tumor necrosis. Moreover, the nuclear configuration in GS did not correlate with any of the recognized cell types seen in malignant lymphoma: the chromatin of diffuse large B cell lymphomas is coarsely clumped with thick nuclear membrane, and the nucleoli are larger and more prominent than those seen in GS (9). We reviewed the previous biopsy slide and the histologic findings were basically the same as those of the present biopsy. Due to poor fixation and preparation, the histologic interpretation was somewhat difficult without immunohisto-

chemical stainings, nevertheless, the correct diagnosis was made possible in retrospect by a careful examination of cytological details. The presence of eosinophilic myelocytes has traditionally been one of the most reliable histologic findings in making a diagnosis of GS instead of a large cell lymphoma (1). However, in 50% of cases reported by Meis et al. (3), eosinophilic myelocytes were absent as with this case. Therefore, the diagnosis of GS in nonleukemic patients was extremely difficult without using immunohistochemical staining for myeloperoxidase, lysozyme, CD68 or CD43, etc. (3, 10).

In earlier literature, the term "chloroma" was used for this lesion because of the tinctorial characteristic and the green color of the tumor is due to the presence of peroxidase in the leukemic cells. However, it is not present in all tumors of GS (11). In this case, the typical green color of the tumor aided in making a diagnosis of GS.

According to most series in the literature, the majority of nonleukemic patients with granulocytic sarcoma go on to develop acute leukemia within a number of months (1-3). Therefore, differential diagnosis should be considered for this rare tumor characterized by rapid growing breast mass in patients without leukemic manifestation, because early diagnosis followed by appropriate combined chemotherapy may obviate surgical intervention and eventually prevent leukemic transformation.

REFERENCES

1. Neiman RS, Barcos M, Bernard C, Bonner H, Mann R, Rydell RE, Bennett JM. *Granulocytic sarcoma: a clinicopathologic study of 61 biopsied cases. Cancer 1981; 48: 1426-37.*
2. Gartenhaus WS, Mir R, Pliskin A, Grunwald H, Wise L, Papantoniou PA, Kahn LB. *Granulocytic sarcoma of breast: aleukemic bilateral metachronous presentation and literature review. Med Pediatr Oncol 1985; 13: 22-9.*
3. Meis JM, Butler JJ, Osborne BM, Manning JT. *Granulocytic sarcoma in nonleukemic patients. Cancer 1986; 58: 2697-709.*
4. Liu PI, Ishimaru T, McGregor DH, Okada H, Steer A. *Autopsy study of granulocytic sarcoma (Chloroma) in patients with myelogenous leukemia, Hiroshima-Nagasaki 1949-1969. Cancer 1973; 31: 948-55.*
5. Doval DC, Rao CR, Misra S, Devi L, Srinivas V, Chandrashekar M, Bapsy PP. *Isolated granulocytic sarcoma of the breast. Ann Oncol 1996; 7: 424-5.*
6. Jung SM, Kuo TT, Wu JH, Shih LY. *Granulocytic sarcoma presenting as a giant breast tumor in a pregnant woman: a case report [abstract]. Chang Keng I Hsueh Tsa Chih 1998; 21: 97-102.*
7. Krause JR. *Granulocytic sarcoma preceding acute leukemia: a report of six cases. Cancer 1979; 44: 1017-21.*
8. Eshghabadi M, Shojania AM, Carr I. *Isolated granulocytic sarcoma: report of a case and review of the literature. J Clin Oncol 1986; 4: 912-7.*
9. Lin Y, Govindan R, Hess JL. *Malignant hematopoietic breast tumors. Am J Clin Pathol 1997; 107: 177-86.*
10. Ferry JA, Srigley JR, Young RH. *Granulocytic sarcoma of the testis: a report of two cases of a neoplasm prone to misinterpretation. Mod Pathol 1997; 10: 320-5.*
11. Rosai J. *Bone marrow. In: Brunning RD, ed. Ackerman's surgical pathology. St. Louis: Mosby, 1996; 1821-8.*