

Granulocytic Sarcomas in Acute Non-Lymphocytic Leukemia

**N.C. Prajapati
P. Choudhury
A.P. Dubey
T. Singh**

Granulocytic sarcoma is a localized tumor mass composed of immature cells of granulocytic series(1). These tumors are not uncommon in acute non-lymphocytic leukemias (ANLL), particularly in childhood(1-4). Though originally described as an ocular tumor, they have been detected in various organs of the body(5). Granulocytic sarcomas appear to show a considerable geographical variation, being rare in Western countries but not uncommon in Uganda, Egypt, Turkey and Japan(2,3,6-10). The paucity of data from our country prompted us to evaluate these cases.

Subjects and Methods

All cases of acute leukemia admitted in the pediatric ward of Maulana Azad Medical College and associated Lok Nayak hospital, New Delhi from October 1988 to January 1991 were included. Acute leukemia was diagnosed and classified using the FAB system of classification(11). Cytochemistry including peroxidase, periodic acid schiff, nonspecific esterase were carried out in all cases. In 3 cases,

From the Departments of Pediatrics and Pathology, Maulana Azad Medical College and Lok Nayak Hospital, New Delhi 110 002.

Reprint requests: Dr. N.C. Prajapati, Reader in Pediatrics, M.G. Institute of Medical Sciences, Sevagram, Wardha 442 102.

Received for publication: May 23, 1994;

Accepted: August 23, 1995

as cytochemistry could not clinch the diagnosis, immunophenotyping was done.

All the cases were entered in a specially designed proforma in which a detailed record of their clinical presentation, investigations, treatment, follow up and outcome was recorded. Granulocytic sarcoma when evident or suspected was confirmed by FNAC. CT scan of the head was done wherever feasible or required.

Results

Of 61 patients with acute leukemia, 35 were ALL and 26 had ANLL. Eleven patients of ANLL showed granulocytic sarcomas. Their clinical features are shown in *Table I*. Ocular involvement (*Fig. 1*) was seen in 10 patients. The clinical manifestations in the eye included unilateral or bilateral proptosis, chemosis, papilledema, keratomalacia and eyelid chloroma. The other sites involved included the vertebral bodies and the scalp in two patients each and the kidney and brain parenchyma (*Fig. 2*) in one patient each. FAB classification of the cases of ANLL with granulocytic sarcoma showed seven cases of M2, two of M5 and one each of M1 and M4 types.

Discussion

The overall prevalence of granulocytic sarcoma in our study was 18.0% of acute leukemia patients and 42.3% of children with ANLL. The actual prevalence, however, could be higher and cannot be commented upon as no autopsies were performed. The prevalence of granulocytic sarcoma ranges from 3% in Holland to 46% in Uganda(2-10). Nieman *et al.*(4) found granulocytic sarcoma in all biopsied cases of AML and suggested that the tumor was frequently unrecognized during life.

TABLE I—Characteristics of Patients with ANLL and Granulocytic Sarcoma

Case no.	Age (Yr)	Sex	FAB subtype	Site(s) of sarcoma
1	12	M	M 1	Ocular, brain, vertebrae
2	8	M	M 5	Ocular, kidney
3	6	M	M 2	Ocular
4	14	M	M 2	Ocular
5	2	F	M 5	Ocular
6	11	M	M 4	Ocular
7	3	M	M 2	Ocular, scalp
8	8	M	M 2	Ocular
9	9	M	M 2	Vertebral
10	4½	M	M 2	Ocular
11	12	M	M 2	Ocular



Fig. 1. Ocular Granulocytic Sarcoma in a 1 year old boy.

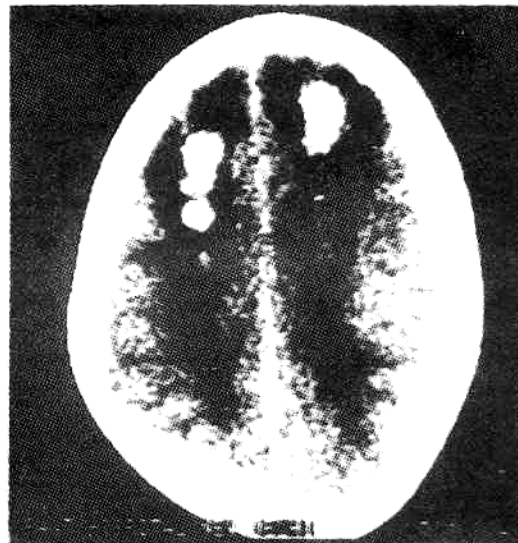


Fig. 2. Intracranial deposits of granulocytic sarcoma as seen in CT Scan in a 12 year old boy.

The male preponderance of granulocytic sarcoma as observed in the present study has also been reported by other authors(3,4). Although all our patients had leukemia at the time of n

diagnosis, it is known that the sarcomas may manifest in the preleukemic phase. Such cases invariably progress to ANLL within a few months. Such cases, therefore, demand a high index of suspicion and

close watch by clinicians and the pathologists(1,4).

REFERENCES

1. Meis JM, Butler JJ, Osborne BM, Manning JT. Granulocytic sarcoma in non-leukemic patients. *Cancer* 1981, 58: 2697-2709.
2. Saskia VV, Philip MK, Rab JWDK, Hanneki CK. Granulocytic sarcoma. *American J Clin Pathol* 1991, 95: 567-571.
3. Cavdar AO, Arcasoy A, Babacan E *et al.* Ocular granulocytic sarcoma (chloroma) with acute myelomonocytic leukemia in Turkish children. *Cancer* 1978, 41: 1606-1609.
4. Neiman RS, Barcos M, Berard C, *et al.* Granulocytic sarcoma: A clinicopathologic study of 61 biopsied cases. *Cancer* 1981,48:1426-1437.
5. Kubonishi I, Ohtsuki Y, Machine 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 Clinical Pathol* 1984, 82: 730-734.
6. Zimmeran LE, font RL. Ophthalmologic manifestations of granulocytic sarcoma. *Am J Ophthalmol* 1975, 8: 975-990.
7. Liu PL, Ishimaru T, McGregor DH, Okhada H, Steer A. Autopsy study of granulocytic sarcoma (chloroma) in patients with myelogenous leukemia Hiroshima Nagasaki 1949-1969. *Cancer* 1973, 31: 948-955.
8. Davis JPN, Owar R. Chloromatous tumours in African children in Uganda. *Br Med J* 1965, 2: 405-407.
9. Templeton AC. Orbital tumours in African children. *Br J Ophthal* 1971, 55: 254- 261.
10. Mortada A. Bilateral exophthalmos and lymphoblastic leukemia. *Br J Ophthal* 1968, 52: 68-69.
10. Bennet JM, Catovsky D, Danial MT, *et al* Proposals for the classification of the acute leukemias. *Br J Hematol* 1976, 33: 451-458.
11. Moir DJ, Ghosh AK, Abdulaziz Z, Knight PM, Mason DY. Immunoenzymatic staining of hematological samples with monoclonal antibodies. *Br J Hematol* 1963, 55: 395-410.