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A case of hand mirror cell variant of acute lymphoblastic leukemia.

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Abstract

A 30 year old female patient diagnosed as acute lymphoblastic leukemia (ALL) with hand mirror like configuration of lymphoblastic-lymphocytic cells is reported. Although the leukemia was resistant to conventional chemotherapeutic regimens, the patient always looked well and survived for more than 20 months. Surface marker analysis showed that the cell was non-T, non-B, and not reactive to antiserum against common ALL antigen. A cytogenetic study of all the analyzable metaphases of the direct bone marrow preparation had a normal female karyotype. The clinical and hematological course is described. The immunological significance and the influence of hand mirror cell on chemosensitivity and prognosis are discussed.

KEYWORDS: acute lymphoblastic leukemia, hand mirror cell leukemia.

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— BRIEF NOTE —

**A CASE OF HAND MIRROR CELL VARIANT OF
ACUTE LYMPHOBLASTIC LEUKEMIA**

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Abstract. A 30 year old female patient diagnosed as acute lymphoblastic leukemia (ALL) with hand mirror like configuration of lymphoblastic-lymphocytic cells is reported. Although the leukemia was resistant to conventional chemotherapeutic regimens, the patient always looked well and survived for more than 20 months. Surface marker analysis showed that the cell was non-T, non-B, and not reactive to antiserum against common ALL antigen. A cytogenetic study of all the analyzable metaphases of the direct bone marrow preparation had a normal female karyotype. The clinical and hematological course is described. The immunological significance and the influence of hand mirror cell on chemosensitivity and prognosis are discussed.

Key words: acute lymphoblastic leukemia, hand mirror cell leukemia.

In 1977 Schumacher *et al.* reported a case of acute lymphoblastic leukemia characterized by marked increase of hand mirror type lymphoblastic-lymphocytic cells in the bone marrow (1). In spite of marked resistance to conventional chemotherapeutic regimens, the patient showed a prolonged clinical course. They used the term "Hand mirror cell variant of acute lymphoblastic leukemia" Since then, several papers concerning this type of leukemia have appeared in which the specificity of the cells and the clinical characteristics were discussed (2, 3). Recently we managed a case of hand mirror cell (HMC) leukemia and in this paper we described its clinical and hematological course.

Case Report. From the beginning of April 1978, the patient, a 30 year old female, developed general malaise, bilateral knee joint pain and headaches. She visited a hospital and acute lymphoblastic leukemia (ALL) was diagnosed. She was transferred to our hospital on the 14th April for further examination and treatment.

Physical examination on admission revealed pale conjunctivae and skin, slight hepatosplenomegaly and tenderness over both knee joints. There was no superficial lymph node enlargement.

Hematological findings on admission were: RBC $241 \times 10^4/\text{mm}^3$, Hb 8.1 g/dl, Ht 23.8%, platelets $15.9 \times 10^4/\mu\text{l}$, WBC $6,800/\text{mm}^3$. A peripheral blood smear showed 1% myelocyte, 4% band, 9% segment, 25% lymphocyte, and 60% lymphoblast, but no hand mirror cell was noted. Nucleated cells in the bone marrow could not be counted because of dry tap. The smear from the marrow aspirate in the tip of the aspiration needle showed 3.8% of erythroblast, 0.4% of promyelocyte, 0.8% of myelocyte, 0.8% of metamyelocyte, 0.6% of band and 0.6% of segmented neutrophil. Lymphoblast and lymphocyte were 76.8% and 16.2%, respectively. Hand mirror cells were found as 15% of the lymphoblastic-lymphocytic cells. (Fig. 1). A cytogenetic study of all the analyzable metaphases of the direct bone marrow preparation showed a normal female karyotype, 46XX.

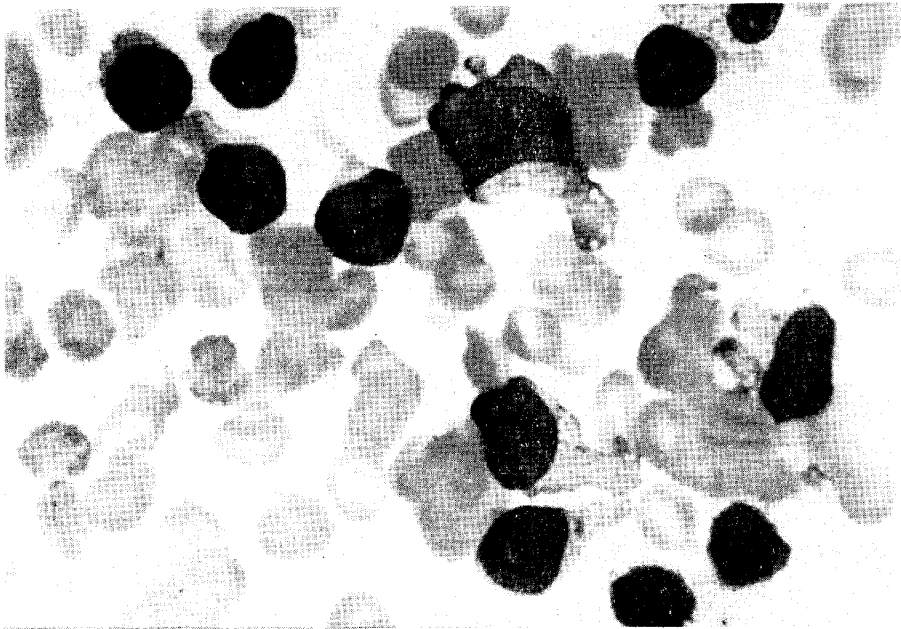


Fig. 1. Bone marrow smear. The lymphoblastic-lymphocytic cells show hand mirror like configuration. Vacuoles are present in the cytoplasm including the uropod in some of the cells.

ESR on admission were 128 mm/1h and 153 mm/2 h. Other laboratory data including serum electrolytes, liver function tests, serum protein and electrophoresis, serum uric acid, serum Fe and Cu revealed no remarkable change.

A surface marker study on lymphocyte separated by Ficoll-conray revealed 11.9% of E-rosette positive cells, 4.1% of S-Ig positive cells, 3.9% of cells reacted with anti-NALL-1 serum (4). The value of terminal deoxynucleotidyl transferase (TdT) was $10.13\text{u}/10^8$ cells/h. Therefore, immunologically, this case was thought to be null cell type acute lymphoblastic leukemia, but the lymphoblast was not reactive with the antiserum (anti-NALL-1) specific to common ALL antigen (Table 1).

TABLE 1. IMMUNOLOGICAL DISTINCTION OF THE PATIENT FROM TYPICAL LYMPHOBLASTIC LEUKEMIA BY SURFACE MARKER ANALYSIS

Patient	Antigens on						Common ALL Ag
	E-rosette	sIg	Thymus-leukemia	T-LCLs	B-LCLs	TdT	
HMC-ALL	—	—	—	—	+	High	—
Null-ALL	—	—	—	—	+	High	+
T-ALL	+	—	+	+	—	High	— or +
B-CLL	—	+	—	—	+	Low	—

T-LCLs: T lymphoblastoid cell lines, B-LCLs: B lymphoblastoid cell lines, TdT: terminal deoxynucleotidyl transferase, HMC-ALL: the patient with hand mirror cell variant of acute lymphoblastic leukemia. Common ALL Ag was tested using rabbit anti-NALL-1 serum.

From the 15th April, the patient was treated with vincristine and prednisolone. (Fig. 2). Lymphoblasts in the peripheral blood disappeared soon. In the bone marrow, lymphoblasts decreased to 12.4%, however, complete remission could not be obtained. Then, methotrexate, neocarzinostatin, cytosine arabinoside, 6-mercaptopurine, and L-asparaginase were given alone or in combination but she still remained in partial remission. In August, the patient was discharged.

Partial remission was maintained for 7 months, and she was treated with an immunopotentiator, OK-432, from September to November.

Bone marrow aspiration in December 1978 showed hypercellularity, NCC was $112.2 \times 10^4/\text{mm}^3$ with 86.6% of lymphoblast. The patient was treated again with the combination of vincristine, prednisolone, methotrexate and 6-mercaptopurine, but this was ineffective. She always looked well in spite of no response to chemotherapy and HMCs were always present at 15% to 55% of all the lymphoblastic-lymphocytic cells in the bone marrow.

Discussion. In 1931 Lewis, after observing the locomotion of rat lymphocytes in tissue culture, advocated the name of HMC to lymphocyte with hand mirror like configuration (5, 6). Although the significance of HMC is not completely understood yet, the uropod was said to be a morphologic structure which

relates to the activation and motility of lymphocytes (7-9).

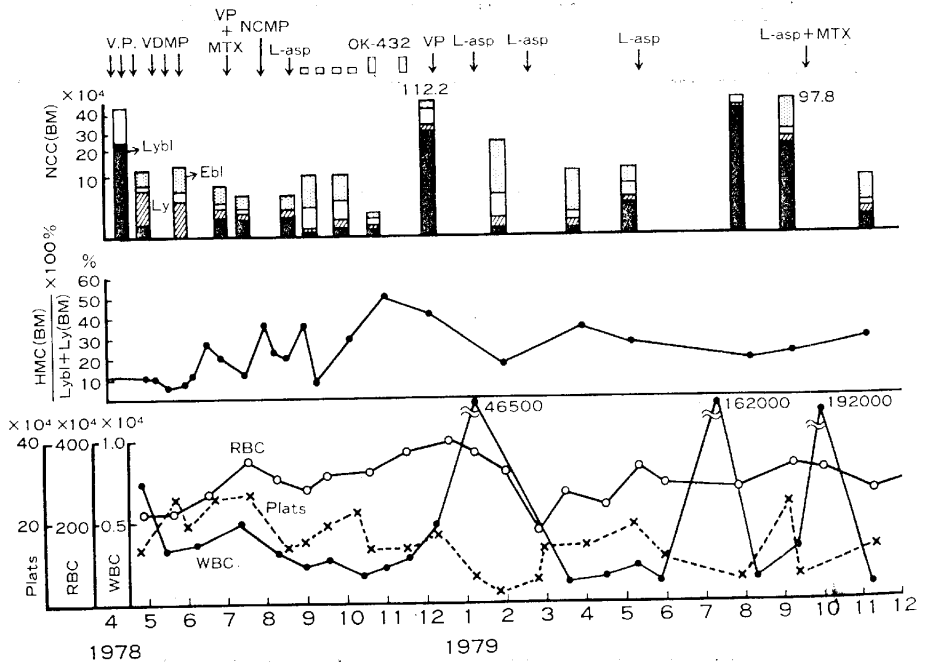


Fig. 2. Summary of hematological course of the patient with hand mirror cell leukemia. V: vincristine, P: prednisolone, D: daunomycin, M: 6-mercaptopurine, MTX: methotrexate, N: neocarnizostatine, L-asparaginase, NCC: nucleated cell count, BM: bone marrow, HMC: hand mirror cell, Lybl: lymphoblast, Ly: lymphocyte, Ebl: erythroblast, Plats: platelets.

In general, the presence of significant number of hand mirror cells in leukemic patient bone marrow is rare (10). Sjögren *et al.* reported that acute myelocytic leukemia (AML) with a high percentage of HMC in the marrow survived longer than without HMC, and they suggested that the increase of HMC was some manifestation of an immunological reaction between lymphocytes and cancer cells (11). The patient reported by Schumacher, although resistant to powerful chemotherapy, survived more than 22 months (1, 2). In spite of massive infiltration of leukemic cells in the marrow and less sensitivity to conventional chemotherapy, the patient presented survived more than 20 months. These reports suggest the increase of HMC might be a favorable manifestation in patients with acute leukemia. Both Schumacher's and our cases were less sensitive to conventional chemotherapy. But several other cases of Schumacher's showed considerable response (2). We managed another case of ALL with a high percentage of HMC, in whom complete remission was ob-

tained by conventional chemotherapy. Therefore, accumulation of more cases and further research including cell kinetics and immunological studies are necessary for the characterization of chemotherapy in HMC leukemia.

The surface marker study revealed that the HMCs were non-T, non-B and common ALL antigen negative. This finding indicates that the case is distinct from a common form of ALL (12). Although cytoplasmic IgM in the cells were not tested, a possibility of the patient having pre-B cell (13) may be ruled out because of absence of common ALL antigen.

REFERENCES

1. Schumacher, H. R., Perlin, E., Miller, W. M. and Stass, S. A.: Hand mirror cell leukemia (HMCL). *Lancet* **1**, 655-656, 1977.
2. Stass, S. A., Perlin, E., Jaffe, E. S., Simon, D. R., Creengan, W. J., Robinson, J. J., Holloway, M. L. and Schumacher, H. R.: Acute lymphoblastic leukemia-hand mirror cell variant. *Am. J. Hematol.* **4**, 67-77, 1978.
3. Stern, R., Wirstky, S. T., Doris, H., Wurster, H., Robert, D. A., Smith, K. A., Cornwell III, G. G. and Cornll, C. J. Jr.: Hand mirror leukemia associated with mental retardation. *Blood* **54**, 703-713, 1979.
4. Tsubota, T., Miyoshi, I., Uno, J., Hiraki, S. and Kimura, I.: Rabbit antiserum specific to null-cell leukemia-lymphoma associated antigen. In *Fourth meeting Asian-Pacific Division, International Society of Hematology-abstracts-June 25-29, Seoul*, P. 60, 1979.
5. Lewis, W. H.: Locomotion of lymphocytes. *Bull. Johns Hopkins Hosp.* **49**, 29, 1931.
6. Schumacher, H. R. and Stass, S. A.: Commentary: significance of hand mirror cells. *J. Pediatr.* **93**, 335-336, 1978.
7. McFarland, W.: Microspikes on the lymphocyte uropod. *Science* **163**, 818-819, 1969.
8. McFarland, W. and Schechter, G. P.: The lymphocyte in immunological reactions *in vitro*. *Blood* **32**, 832, 1969.
9. McFarland, W. and Heilman, D. H.: Lymphocyte foot appendage: its role in lymphocyte function and its immunological reactions. *Nature* **205**, 887, 1965.
10. Schumacher, H. R., Perlin, E., Klos, J. R., Holloway, M. R., Miller, W. M. and Stass, S. A.: Hand mirror cell leukemia: a new clinical and morphological variant. *Am. J. Clin. Pathol.* **68**, 531-534, 1977.
11. Sjogren, U., Norberg, H. and Rydgren, L.: Amoeboid movement configuration in tumor cells of bone marrow smears from patients with leukemia. *Acta Med. Scand.* **201**, 381, 1977.
12. Chessells, J. M., Hardisty, R. M., Rapson, N. T. and Greaves, M. F.: Acute lymphoblastic leukemia in children: classification and prognosis. *Lancet* **2**, 1307-1309, 1977.
13. Brouet, J. C., Preudhomme, J. L., Penit, C., Valensi, F., Rouget, V. P. and Seligmann, M.: Acute lymphoblastic leukemia with pre-B-cell characteristics. *Blood* **54**, 269-273, 1979.