CONCISE REPORT

Leukopheresis Therapy of Leukemic Reticuloendotheliosis (Hairy Cell Leukemia)

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Intensive leukopheresis has been valuable in the short-term palliation of chronic lymphocytic and granulocytic leukemias. A 47-yr-old man with refractory leukemic reticuloendotheliosis (hairy cell leukemia) manifested by anemia, thrombocytopenia, elevated peripheral leukemia cell counts, generalized lymph node enlargement, and leukemic infiltrative skin disease was treated with serial leukopheresis. Removal of approximately $7 \times 10^{11}$ peripheral leukemia cells resulted in marked clinical and hematologic improvement with resolution of enlarged lymph nodes and clearing of skin infiltrates. At the time of this reporting, more than 100 wk since the last leukopheresis, the patient continues to do well. The improvement in all blood counts, reduction in lymph node size, and clearing of skin lesions paralleled the reduction of peripheral leukemia cell load by leukopheresis, suggesting mobilization of leukemia cells from marrow, lymph nodes, and skin. Removal of large numbers of leukemia cells in hairy cell leukemia has the potential of achieving sustained clinical improvement and may be a useful alternative therapy for these patients.

LEUKOPHERESIS has been shown to be of value in the palliative management of chronic lymphocytic leukemia, chronic granulocytic leukemia, and the Sezary syndrome. Large numbers of abnormal leukocytes can be removed efficiently and safely with the use of continuous-flow leukopheresis, resulting in clinical and hematologic improvement in some patients.

This report describes the effect of intensive leukopheresis in a patient with refractory leukemic reticuloendotheliosis who presented with anemia, thrombocytopenia, lymph node enlargement, skin involvement, and a high peripheral blood leukemia cell count.

MATERIALS AND METHODS

Case Report

A 47-yr-old man was referred to the Durham Veterans Administration Hospital in March 1976, with a 6-mo history of hairy cell leukemia accompanied by anemia, thrombocytopenia, and a leukocyte count ranging from $11 \times 10^9$ /liter to $28 \times 10^9$ /liter with 60%–70% leukemia cells. The patient had experienced a 30-lb weight loss, malaise, night sweats, and one episode of bacterial pneumonia. A trial of androgens and corticosteroids was ineffective. Physical examination at the time of admission revealed an emaciated man with moderate splenomegaly, enlarged cervical and inguinal lymph nodes, and an erythematous indurated skin eruption involving the hands, forearms, and pretibial areas. The hemoglobin was 8.8 g/dl, the hematocrit 29%, and the leukocyte count $18.6 \times 10^9$ /liter with 92% hairy leukemia cells. Phase contrast and acid phosphatase histochemical studies of the peripheral leukemia...
cells were diagnostic of hairy cell leukemia. A bone marrow aspirate was unsuccessful (dry tap), and the biopsy showed diffuse infiltration with leukemia cells (90% cellularity with 90% leukemia cells). Several biopsies of the skin lesions revealed infiltration with leukemia cells. Splenectomy revealed a spleen weighing 920 g, and the splenic architecture was replaced by hairy leukemia cells. There was no clinical or hematologic improvement following splenectomy. Later, the leukocyte count gradually increased to 40–55 × 10^9/liter with 90%–95% hairy cells, the platelet count ranged from 20 to 40 × 10^9/liter, and the patient required red cell transfusions. Intensive leukopheresis was initiated at that time.

**Leukopheresis**

Leukopheresis was accomplished using the Celltrifuge (American Instrument Company, Silver Spring, Md.).Briefly, blood was removed via the antecubital veins, anticoagulated with heparin and acid-citrate dextrose, pumped at 40–60 ml/min through the centrifuge bowl spinning at 500-600 rpm, and returned to the patient's opposite arm. Leukocytes were removed from the buffy-coat interface by a peristaltic pump into 600-ml Fenwal bags. Seven to ten liters of blood were processed during each leukopheresis. Complete blood counts and white cell differentials were performed on the patient before and after each procedure. Leukocyte counts and differentials were done on each buffy-coat concentrate.

**RESULTS**

The clinical course of this patient is shown in Fig. 1. The patient had four episodes of infection (three urinary tract infections, one bronchitis) before leukopheresis and one episode since leukopheresis (bronchitis); all infections resolved with appropriate antimicrobial therapy. Time zero refers to the time of our first evaluation of this patient. Ten leukophereses were performed over a 35-day interval, resulting in the removal of approximately 7 × 10^11 leukemia cells. The leukocyte count declined progressively from 55 × 10^9/liter (90%–95% leukemia cells) to 8 × 10^9/liter (40%–50% leukemia cells) during this interval. A bone

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*Fig. 1. The clinical course of a patient with refractory leukemic reticuloendotheliosis (hairy cell leukemia) before and after intensive leukopheresis. Approximately 7 × 10^{11} leukemia cells were removed within a 35-day interval. Time is shown on the abscissa, and clinical features, blood counts, and blood component transfusion support are depicted on the ordinate.*
LEUKOPHERESIS IN HAIRY CELL LEUKEMIA

marrow biopsy, approximately 6 wk after the completion of leukopheresis, demonstrated decreased cellularity compared to the preleukopheresis marrow (90% versus 60%), and 40%–50% of the marrow elements were leukemic. There was a gradual but complete disappearance of skin lesions and lymph node enlargement within 10 wk subsequent to leukopheresis. Furthermore, within 35 wk after the procedure, the patient’s platelet count rose from 20–30 × 10^9/liter to over 100 × 10^9/liter without platelet transfusions, and the patient maintained a hematocrit in the low-normal range (40%) without red cell transfusion. Of interest was an increase in performance status, weight gain, and loss of night sweats during the leukopheresis interval. This patient continued to do well approximately 100 wk postleukopheresis. His most recent blood studies reveal a hemoglobin of 13.2 g/dl, leukocyte count 9.0 × 10^9/dl with 60% normal appearing lymphocytes, 35% neutrophils, and 5% monocytes, and a platelet count of 10 × 10^9/liter. A repeat bone marrow examination has not been performed.

DISCUSSION

The resolution of the skin eruptions, disappearance of lymph node enlargement, and the improvement in blood counts paralleled the leukopheresis-induced reduction of circulating hairy cell leukemia cells. Particularly dramatic was this patient’s overall clinical improvement during the leukopheresis interval. These observations suggest that mobilization of hairy cells from the skin, lymph nodes, and bone marrow resulted from removal of circulating leukemia cells in a manner analogous to the patient with Sezary syndrome, a neoplastic thymus-derived lymphocyte disorder, reported by Edelson et al.3 Several reports have indicated that the leukemic cells in hairy cell leukemia have extremely low incorporation of tritiated thymidine.4–6 This suggests that the proliferative capacity of leukemia cells in hairy cell leukemia is low. This may, in part, provide an explanation to the success seen in the management of our patient with hairy cell leukemia with serial leukopheresis. Leukopheresis may provide an alternative means of therapy in some patients with hairy cell leukemia.

ACKNOWLEDGMENT

We thank Anna Vaughn and De Peace for nursing care and technical assistance in leukopheresis of the patient, and Yvonne Baker for assistance in preparation of the manuscript.

REFERENCES

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