

## Ineffectiveness of Laetrile in the Treatment of Acute Lymphoblastic Leukemia

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**Much controversy remains over the use of laetrile in the treatment of leukemia. Public opinion has been responsible for several state legislatures enacting bills allowing the use of laetrile for patients with leukemia and other malignancies. We recently cared for a 3½-year-old child with acute lymphoblastic leukemia, who had low initial white blood cell count, limited organomegaly, and absence of T or B cell markers. A good prognosis was anticipated. Conventional therapy was interrupted for long periods of time with laetrile. Laetrile was ineffective in maintaining or inducing remission. Despite favorable prognosis, the child developed several relapses and died with widespread infiltration of leukemia in the central nervous system, bone marrow and viscera.**

*Editor's Note:* At the time of diagnosis of leukemia, this child had a better than 90% chance of surviving with a long-term remission and it is truly unfortunate that she was put on therapy that included laetrile, which has never been shown to have any value.

**U**SE of laetrile in the treatment of cancer continues to gain attention in lay as well as in medical journals. Despite the fact that laetrile has been shown to be neither safe nor effective in altering the natural history of disease, intense interest persists.<sup>1-4</sup> Indeed, public opinion has forced several state legislatures to enact bills allowing its use by cancer patients. Recently we encountered a child with acute lymphoblastic leukemia who had been treated with laetrile on multiple occasions. The course of this patient illustrates the ineffectiveness of such therapy.

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### Case Report

A 3½-year-old white girl was diagnosed as having acute lymphoblastic leukemia in January 1977. She had been well until one week prior to admission when she began having fever and leg pain. Physical examination revealed a thin child in no acute distress. Ear, nose and throat, chest and cardiac examinations were normal. The abdomen was protuberant with liver palpable 4 cm below the right costal margin and spleen palpable one centimeter below the left costal margin. Diffuse, shoddy lymphadenopathy was detected. There were no bruises or petechiae. Laboratory data showed hemoglobin 7.5 g/dl, hematocrit 23%, white blood cell count 27,000/ $\mu$ l with 69% blast cells, 6% neutrophils, 23% lymphocytes and 2% monocytes. Platelet count was 78,000/ $\mu$ l. Bone marrow aspiration showed complete replacement with lymphoblasts. The lymphoblasts were not of T or B cell origin.<sup>4</sup> There were no tumor cells in the cerebrospinal fluid. Social history revealed that the parents were not married or living together. The child was in the custody of the mother who was a devout naturalist and vegetarian.

The child received two units of packed red blood cells. Further treatment was refused by the mother who favored "natural therapy" consisting of carrot juices and green vegetables. Two weeks later the child was rehospitalized. At this time the

physical examination revealed liver palpable 6 cm below the right costal margin and spleen 5 cm below the left costal margin. Lymphadenopathy had increased. Many bruises and petechiae were now present. Complete blood count showed hemoglobin 8 g/dl, hematocrit 18%, white blood cell count 21,000/ $\mu$ l with 74% lymphoblasts and 26% neutrophils. Platelet count had declined to 27,000/ $\mu$ l. The child was begun on vincristine, prednisone and L-asparaginase. She did well and went into remission in February 1977. Prophylactic cranial irradiation and intrathecal methotrexate were administered. Maintenance therapy consisting of methotrexate and 6-mercaptopurine was begun which she took for the next 3 months without relapse of the disease. The patient was then lost to follow-up.

She returned in August 1977, in relapse. The mother had taken the child for laetrile treatment, which she received for 3 months. At this time she had severe pain in all extremities. Hepatomegaly and splenomegaly had increased. Total white blood cell count was 60,000/ $\mu$ l with 98% blast cells in the peripheral blood smear. Platelet count was 3000/ $\mu$ l. Bone marrow aspiration showed complete replacement with lymphoblasts. Cerebrospinal fluid was normal. X-rays of the skeletal system showed diffuse osteolytic lesions. The child was again given induction therapy with vincristine and prednisone. She went into remission in October 1977, and was again lost to follow-up.

She returned in March 1978, with extreme pain in both legs. History revealed that she had received laetrile since the previous hospitalization. For the third time she was induced into remission with vincristine and prednisone. Under threats of child abuse charges the mother agreed to continue therapy, which she did until September 1978. After this period, the mother took the child for laetrile treatment again. After 5 months of laetrile treatment (February, 1979) the child returned with headaches and bone pain. Hemoglobin was 5 g/dl, hematocrit 15%, white blood cell count 140,000/ $\mu$ l with 90% lymphoblasts. Cerebrospinal fluid was filled with lymphoblasts. The mother refused medical treatment for the child. Court intervention was attempted; however, the mother and daughter left the country to obtain further laetrile treatment abroad. The patient died three months later.

### Discussion

The present case illustrates the course of a child who received conventional chemotherapy interrupted with laetrile ingestion for acute lymphoblastic leukemia. The patient had a good prognosis based on her age, low initial white

blood cell count, absence of T or B cell markers, and relatively limited tumor load.<sup>5</sup> Long-term complete continuous remission was anticipated based on these criteria. The frequent relapses that this young girl had would not have been expected with conventional chemotherapy, and the increasing severity of each speaks against the effectiveness of laetrile in inducing or maintaining remission in acute lymphoblastic leukemia.

The deleterious effects of laetrile are emphasized in a recent study.<sup>7</sup> Given to rats in doses of 250, 500 and 750 mg/kg intraperitoneally for 5 days, it caused metastases of 31 per cent, 44 per cent, and 57 per cent respectively. The mode of death and the elevated serum cyanide levels in the dying animals suggested cyanide poisoning as the cause of death. In another study six of the ten dogs fed laetrile died of cyanide poisoning, secondary to hydrogen cyanide release from laetrile.<sup>8</sup> A similar mode of death, *i.e.*, cyanide poisoning, has also been reported in humans.<sup>9</sup> Because it has been difficult to determine the exact quantity of laetrile administered to the patients, the precise dose at which detrimental effects occur is not known.

The National Cancer Institute is presently investigating laetrile in the treatment of cancer. These studies will explore the effectiveness of laetrile in different dosages in various tumors. Until the final results are available, laetrile should be considered an unproven drug in the induction and/or maintenance of therapy in childhood acute lymphoblastic leukemia.

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