Diagnosis of Leukaemia: Value of an Easily Available Marker

Historically, the ancient Greeks are credited for being the first to recognize cancer sometime in the fourth or fifth century BC. Leukaemia was not officially diagnosed until 1945. In 19th century, European physicians observed their patients who had abnormally high levels of white blood cells and they called the disease "Weisses blut" meaning "white blood". In 1913, leukaemia was classified into four groups: chronic lymphocytic, chronic myelogenous, acute lymphocytic and erythroleukaemic.

Though the exact cause of leukaemia is not known it is thought that leukaemias are caused by prolonged exposure to chemicals, radiation and exposure to retroviruses. Scientists in Nevada, USA, have concluded that the presence of high tungsten and arsenic levels warrant further investigation as a causative factor in patients with acute lymphoblastic leukaemia. We know that arsenic level is high in the ground water of many parts of Bangladesh, which may result in increased incidence of acute lymphoblastic leukaemia in those parts of this country.

The incidence of all types of leukaemias in the population is approximately 10/100,000 per annum, of which under half are acute leukaemias. The incidence of leukaemia in Bangladesh is not exactly known, but it is reported to be one of the five most common malignancies in the children in our country.

In times gone by, one of the most common treatments of leukaemia was arsenic .This therapeutic approach was mentioned by ancient Ramayana of India and was used by Hippocrates. Until after World War II there was no adequate treatment of leukaemia. One of the important treatments of cancer, chemotherapy, actually developed from an agent of chemical warfare used by the Germans during World War I, the mustered gas, which attacks rapidly dividing white blood cells. Since then, there has been remarkable development in the treatment of leukaemia and the relative five-year survival rate has more than tripled over the past five decades. In 1970, it was first confirmed that leukaemia is curable at least in some cases, and by the 1980s and 1990s the cure rate was found around 70%. During 1996 to 2003 the survival rate for acute lymphoblastic leukaemia was 65.3% overall and 90.4% for children under five years of age.

The diagnosis of leukaemia is usually suspected from an abnormal blood count, often a raised white cell count. The diagnosis is made from examination of bone marrow. This includes the morphology of the abnormal cells, analysis of cell surface markers, clone- specific chromosome abnormalities and molecular changes. Not only does bone marrow examination allow an accurate diagnosis but also gives valuable prognostic information, allowing therapy to be tailored to the patients' need.

A study was carried out in the Paediatric Haematology and Oncology unit in Bangabandhu Shiekh Mujib Medical University which showed that serum lactate dehydrogenase (LDH) level was significantly raised in patients with acute lymphoblastic leukaemia and can be accepted as a good and reliable enzymatic diagnostic marker of childhood acute lymphoblastic leukaemia (please refer to the article by Hafiz MG et al published in the current issue of this journal). Similar observation was found in other studies done in India by Mani et al and other researchers. It has also been reported that LDH levels closely correlate with the tumour bulk and disease prognosis. Therefore, serum LDH can be used as an important biomarker in the diagnosis and prognosis of haematological malignancies such as acute lymphoblastic leukaemia.

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