Paediatric BCR-ABL1-positive Chronic Myelogenous Leukaemia in Latvia: 1994–2013

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Introduction. Chronic myelogenous leukaemia (CML) is a hematopoietic stem cell tumour associated with translocation t(9;22)(q34;q11) on Philadelphia chromosome (Ph) that causes BCR-ABL1 gene fusion and production of an abnormal tyrosine kinase. Radiation and chemical mutagens have been proven as risk factors. CML patients usually present with leukocytosis, anemia and hepatosplenomegaly; emergence of immature cells in blood or bone marrow indicates acceleration phase, blasts > 20% define blast crisis. CML treatment includes chemotherapy, specific tyrosine kinase inhibitors (Imatinib) that have raised 5-year survival to 90%, and allogeneic hematopoietic stem cell transplantation (aHSCT) as the final option. CML constitutes 20% of adult leukemias but is uncommon in children (only 2–3% of paediatric leukaemias). Paediatric CML incidence in Western Europe and the USA is 0.6–0.8 per 1mln children with a slight male predominance; most patients are above 10 years old. No data on paediatric CML in Latvia have been published.

Aim. The aim of the study is to analyse clinical and laboratory features, epidemiology, treatment and outcome of paediatric patients with CML since 1994, when reliable diagnostics became available in Latvia.

Material and methods. Archive data from the Children's Clinical University Hospital (the only medical institution in Latvia where paediatric CML have been treated), Oncohaematology Department and Ambulance were studied. Demographic statistics were assessed from Latvian Central Statistical Bureau database (www.csb.lv); Kaplan-Meier survival was calculated by IBM SPSS v2.1 software.

Results. 11 cases of paediatric CML have been diagnosed in 1994–2013. Patients' age varied between 1 and 17 years (median = 9); 9 cases were 0–14 years old, yearly incidence in this age group was 1.17 per 1mln children. 9 patients were boys (M : F = 4.5 : 1). 7 patients were diagnosed in chronic phase, 1 in acceleration and 3 in blast crisis (1 myeloid and 2 lymphoid). All patients had leukocytosis at presentation, in 7 cases WBC count was > 100 × 10E9/L; 4 patients had thrombocytosis and 2 had thrombocytopenia, 9 patients were anaemic. Splenomegaly was present in all cases and hepatomegaly in 7 cases. 9 patients were treated with Imatinib, 1 patient underwent aHSCT. 7 (64%) patients were alive in clinical and molecular remission in 2013, 1 patient died of the disease progression and 3 were lost to follow-up. Overall 5-year survival was 0.72 for the whole cohort and 0.88 for patients treated with Imatinib.

Conclusions. The study revealed an uncommonly high paediatric CML incidence in Latvia (almost double of that reported in Europe). Male prevalence was higher, and age notably lower. The number of cases is small, so further epidemiological monitoring is indicated, but the finding is noteworthy, particularly considering CML association with environmental risk factors. Initial presentation of paediatric CML was more aggressive than in adult patients, 64% cases had hyperleukocytosis at diagnosis, 36% were diagnosed in advanced stage, which is in agreement with the international data. Nevertheless, advanced treatment options available to Latvian children with CML since 2003 have assured high remission rate and survival comparable to the international data.