The achievement of complete molecular remission after autologous stem cell transplantation for T-cell lymphoma with associated hypereosinophilia, rare aberration t(6;11) and elevated IL-4 and IgE

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Clonal T-cells can produce a large amount of Th2-type cytokines, causing chronic hypereosinophilia.[1,2] Abnormal T-cell clones often bear CD3-CD4+ phenotype, less frequent CD3+CD4-CD8-.[3] T-cell clones with normal T-cell phenotype CD3+CD4+ (or CD8+) were also identified.[4]

We report on a patient with peripheral T-cell lymphoma, unspecified (PTCL-U) presenting with CD3+CD4+ lymphocytosis, clonal TCRαβ rearrangement, high levels of serum IL-4 and IgE together with the presence of a very rare cytogenetic aberration-t(6;11)(q21;q23).

A 45-year old female with a 6-year history of hypereosinophilia has been investigated. In 2000, patient was referred to the hospital due to skin thickening localized on the right breast. Physical examination was normal except of the described skin abnormality. On admission, haematology revealed increased white blood cell (WBC) count (15.7×10^9/L) with hypereosinophilia (5.0×10^9/L) and lymphocytosis (7.6×10^9/L). Polyclonal hypergammaglobulinemia (χ globulins: 19,4% of 8.3 g/dL of total serum protein) was present. The reactive causes of eosinophiia were ruled out. A histologic examination of the skin showed fibroma. One year later, an enlarged lymph node of the right axilla was detected. There were no additional enlarged lymph nodes present. Computed tomography (CT) chest scan showed enlarged lymph node in mediastinum (size 2.5×1.0 cm), CT scan of the abdomen revealed hepatomegaly (18 cm), splenomegaly (15x9cm) and small periaortal lymph nodes (1.5 cm). The lymp node biopsy revealed high grade B-cell non-Hodgkin lymphoma. Bone marrow was infiltrated by lymphocytes in 47%. An increased eosinophilia was also observed (13.5%). The six cycles of CHOP regimen (Cyclophosphamide 1300 mg day 1, Doxorubicin 80mg day 1, Oncovin 2 mg day 1 and Prednisone 100 mg days 1-5) was resulted in partial response.

Three years later, the patient was admitted to our Centre with lymphoma progression. The physical examination revealed general lymphadenopathy and hepatosplenomegaly. Haematology showed increased WBC count (21×10^9/l) with hypereosinophilia (3.5×10^9/L) and lymphocytosis (13×10^9/L). Increased polyclonal IgG, IgA and normal IgM were present. IgE level was 13966 IU/ml (range <100). Blood immunophenotyping results were abnormal and showed the predominance of T-cell population (CD3+), which represented 98% of total lymphocytes whereas lymphocytes B and NK comprised only 1.5% and 0.5%, respectively. CD3+ cells were composed of 97% helper T cells (CD4+) and 3% suppressor T-cells (CD8+). CD4/CD8 ratio was markedly increased-32:1. These CD3+ cells expressed also other pan-T-cell markers CD2+, CD5+ and CD7+.

The final diagnosis of PTCL-U was established on pathologic examination of the lymph node. Multiplex PCR with heteroduplex analysis performed on peripheral blood and bone marrow cells revealed clonal TCR·, rearrangement.[5] On bone marrow exam there was 40% infiltration with T-cells. Eosinophils were also present. The cytogenetic analysis of these lymphocytes showed t(6;11)(q21;q23) in 10 metaphases, while 46,XX was observed in 3 metaphases (Figure 1). Patient was administered 6 cycles of CHOP with lymphadenopathy resolution. WBC count and lymphocytosis dropped to the normal range, while hypereosinophilia ranged from 3.65×10^9/L to 6.0×10^6/L. FIP1L1-PDGFRA and BCR-ABL fusion transcripts were ruled out by reverse transcription-polymerase chain reaction (RT-PCR)[6,7] Karyotype was normal. Patient received imatinib at dose of 100 mg daily for 4 weeks but therapy failed. Due to persistent splenomegaly, patient underwent radiotherapy of the spleen at dose 11 Gy in 11 fractions. Stem cells for ASCT were collected on Fenwall CS 3000, after mobilisation using regimen IVE (ifosfamide 12000 mg, etoposide 900 mg, farmorubicin 50 mg) with subsequent G-CSF at dose 0,3 mg sc. On haematology performed before ASCT, eosinophilia count was 3.64×10^9/L. IgE level was as high as 9853 IU/mL with IL-4 level of 15.2 pg/mL (median IL-4 level for healthy controls was <0.01pg/mL) while serum IL-5 level was very low-0.82 pg/mL (median level for healthy controls was 9.06 pg/mL). Conditioning regimen consisting of CBV regimen (cyclophosphamide 4800 mg, BCNU 600 mg, etoposide 2400 mg) was followed by autologous stem cell transplantation. Patient was transplanted with 4.15×10^9/kg of mononuclear cells, including 4.96×10^6/kg CD34+ cells. She engrafted ANC $>0.5\times10^9$/L and PLT $>50\times10^9$/L on days +12 and +17 respectively. Posttransplant molecular assay did not reveal TCR rearrangement. Eosinophilia is within normal limit (0.4×10^9 /L) Serum IL-5 and IL-4 levels are below detection (<0.01pg/mL). Postransplant follow-up is 5 months.

Detection of clonal T-cell population in a patient with hypereosinophilia may precede the development of overt lymphoma and in some cases CD3-CD4+ cells were detected before the diagnosis of lymphoma was established.[8] A partial deletions on chromosome 6 in CD3-CD4+ T-cell clones were observed in 2 patients with lymphocytic variant of hypereosinophilic syndrome (LV-HES) and this finding may represent a cytogenetic marker of lymphoma development.[9]

We assume that our case represented LV-HES, but the study for T-cell clonality and immunophenotyping were not performed at first disease manifestation. Hypereosinophilia had already been observed one year before the lymphadenopathy appeared and subsequent erroneous diagnosis of B-cell non-Hodgkin lymphoma was established.

The final and detailed diagnosis of peripheral T-cell lymphoma was made at disease progression. The cytogenetic study identified t(6;11)(q21;q23) which has already been reported in the literature, but in a patient with T-prolymphocytic leukemia (T-PLL). This aberration seems to play a role in leukemia pathogenesis, since ataxia-telangiectasia mutated (ATM) gene located at 11q23 is deleted in T-PLL.[10] A rare case of t(6;11) was also documented in a patient with chronic eosinophilic leukemia, but it involved (q27;q23).[11]

Serum IL-4 and IL-5 were measured twice in our patient, the first assessment was made before ASCT when eosinophilia count was 3.64×10^9/L and the second one, 3 months after ASCT by eosinophilia of 0.4×10^9/L.

It was documented that T-cells secrete cytokines (not only IL-5), but IL-4 and IL-13 which are responsible for IgE production and hypereosinophilia (12). In contrast, hypereosinophilic syndrome with CD3-CD4+ population overproducing IL-5, but not IL-4 was also observed.[13] It worth to be emphasized that cytokines produced by clonal T-cells may differ from those produced by normal Th1/Th2 population and this dissociation was reported in patients with asthma.[14] In conclusion, to our knowledge this is the first

report of a PTCL-U associated with eosinophilia, elevated IL-4 and IgE and rare cytogenetic aberration t(6;11).

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