Case Report

Small-Sized Clone of T Cells in Multiple Myeloma Patient after Auto-SCT: T-LGL Leukemia Type or Clonal T-Cell Aberration?

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Second cancers and particularly postransplant lymphoproliferative disorders (PTLDs) are extremely rare in patients undergoing autologous peripheral blood stem cell transplantation (auto-SCT). We report the case of clonally rearranged T-cell expansion which occurred after auto-SCT for Multiple Myeloma (MM). Does asymptomatic clonal T-cell large granular lymphocytic proliferation, in our experience, represent either a secondary cancer after auto-SCT or clonal T cell aberration or derive from expansion of coexisting undetected small-sized clone of T cells?

1. Introduction

PTLDs were initially recognized in solid organ transplant recipients, and their incidence can range from 1% to 6%. Among patients undergoing haematopoietic cell transplantation, PTLDs occur almost exclusively in recipients of allogeneic grafts (allo-SCT) with an overall incidence rate from 1% to 2% and manifest early within the first year from transplantation [1–3]. Second cancers and particularly PTLDs are extremely rare in patients undergoing auto-SCT [4–7]. According to Fenk et al., the median time from diagnosis of MM to the occurrence of secondary malignancies is 56 months [7]. The majority of PTLDs are of B-cell origin but they may also originate from T cells [8], but very rarely from natural killer cells [9].

We report the case of clonally rearranged T-cell expansion mimicking T-cell large granular lymphocytic (T-LGL) leukemia which occurred after auto-SCT for MM. The diagnosis of T-LGL leukemia requires a multiparametric approach including peripheral blood examination, bone marrow aspirate and bone marrow trephine biopsy with immunohistochemistry, flow cytometric immunophenotyping, and molecular analysis for TCR gene rearrangements. According to the World Health Organization classification of lymphoid neoplasms, T-LGL leukemia is characterized by a persistent (>3 months) increase of large granular lymphocyte (2 × 10^9/L); cases with an LGL count of <2 × 10^9/L can be diagnosed as T-LGL leukemia only if clonal rearrangement of T-cell receptor (TCR) gene is demonstrated. T-LGL leukemia is distinguished from reactive polyclonal granular lymphocytes through both the aberrant coexpression of the natural killer cell-associated antigen CD57 and demonstration of T-cell clonality.

2. Case Report

A 70-year-old male patient, undergoing a first auto-SCT for stage IIIA MM IgAλ, manifested early an asymptomatic clinically lymphoproliferative disorder similar to T-LGL leukemia. He had been conditioned with melphalan 140 mg/m² after induction therapy with VTD regimen (Bortezomib 1.3 mg/m² on days 1, 4, 8, 11; Thalidomide 100 mg/d; Dexamethasone 40 mg once daily i.v. on days 1 → 2, 4 → 5, 8 → 9, 11 → 12, every 28 days) because of chronic obstructive bronchopneumonia and advanced age. On day 0, he received cryopreserved peripheral blood stem cell (4 × 10^6 CD34+ cells/kg). Engraftment was prompt, neutrophil recovery >0.5 × 10^9/L and platelets >20 × 10^9/L occurring on days +11 and +13, respectively. On day +30
Figure 1: Immunophenotypic features of T-cell clonal lymphoproliferative disorder (CD4−, CD8+, CD57+).

and +60 in serum and urine M protein was undetectable by immunofixation and on electrophoresis. Bone marrow aspirate with flow cytometric immunophenotyping and bone marrow trephine biopsy with immunohistochemistry confirmed the absence of clonal plasma cells. Surprisingly, on day +43 from auto-SCT, peripheral blood smear showed absolute lymphocytosis (WBC count $14.9 \times 10^9$ cells/L; absolute lymphocytic count $9.5 \times 10^9$ cells/L). The bone marrow aspirate and bone marrow trephine biopsy confirmed the presence of a population of large granular lymphocytes, mimicking a chronic lymphoproliferative disorder. Immunohistochemistry and flow cytometry immunophenotyping, performed on fresh cells obtained from both bone marrow and peripheral blood, showed T-cell-associated antigens (CD3+CD4−CD8+CD56−CD57+) (Figure 1). Serological tests for hepatitis C and B virus, CMV, EBV, Parovirus B19, Toxoplasma gondii, and HIV were negative. Monoclonal rearrangement of TCR-γ by PCR was detected in the peripheral blood and bone marrow (Figure 2); heavy immunoglobulin and light chain genes were not rearranged. On FDG-TC/PET, no lymphoadenopathy and splenomegaly were observed. On day +111 from auto-SCT, although there was a sharp reduction in the number of lymphocytes (WBC count $7.4 \times 10^9$ cells/L with 45% lymphocytes; absolute lymphocytic count $3.3 \times 10^9$ cells/L), immunophenotypic study was similar to the previous one. Therefore, laboratory results and long observation time suggested the diagnosis of T-cell clonal lymphoproliferative disorder similar to T-LGL leukemia. The patient remained in stringent complete remission from MM, according to the International Myeloma Working Group (IMWG) criteria, more than 6 months after auto-SCT. On day +243 from auto-SCT, the patient presented with weight loss, asthenia, diffuse bone pain, and slight persistent fever. Serum protein electrophoresis showed hypergammaglobulinemia with evidence of a monoclonal spike (1.5 gr/dL). In the bone marrow, an extensive infiltration of the immature plasma cells together with very small T-cell population CD3+CD4−CD8+CD56−CD57+, clonally rearranged, was observed. Salvage therapy with Bortezomib 1.3 mg/m$^2$ on days 1, 4, 8, and 11 and Dexamethasone 20 mg once daily on days 1 → 2, 4 → 5, 8 → 9, 11 → 12, every 21 days, was given. After two cycles, the patient developed severe deterioration of his clinical conditions. A significant increase of M-spike (3.4 gr/dL) was seen. A therapy with Bendamustine (80 mg/m$^2$ on days 1, 2) + Dexamethasone (20 mg once daily i.v. on days 1 → 4 and 15 → 18) and Lenalidomide
Does asymptomatic clonal LGL proliferation, in our experience, represent either a secondary cancer after auto-SCT or clonal T-cell aberration or derive from expansion of coexisting undetected small-sized clone of T cells? An evident expanded T-cell population is absent at diagnosis; the time interval of occurrence of expanded T-cell population from auto-SCT is very short, and all viral serological tests are negative. So, in our opinion, the identification of the event sequence appears of particular difficulty.

Conflict of Interests

Giuseppe Mele declares that there is no conflict of interests. In addition, he declares that this paper is an original research and has not been previously published.

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