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Autologous Hematopoietic Stem Cell Transplantation in Multiple Myeloma: Experience of the P.A. Herzen Moscow Oncology Research Institute (2020–2025)

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BACKGROUND

High-dose melphalan treatment followed by autologous hematopoietic stem cell transplantation (auto-HSCT) remains the exemplary standard for patients younger than 65-70 years with newly diagnosed multiple myeloma (NDMM).

In 2024, 2.790 BMT/HSCT were performed in Russia, of which 1.702 (61%) were autologous and 1.088 (39%) were allogeneic. The increase in the number of transplants performed compared to 2020 was 46.3%. In 2020, 1.907 BMT/HSCT were performed, of which 1.149 (60.3%) were performed on adult patients. Currently, approximately 200 BMT/HSCT are performed in our country with an optimal need of 400-600 per million population per year. There are no precise data on the nosological structure of auto-HSCT performed in the available statistical reports.

OBJECTIVE: we analyzed our center's experience with high-dose therapy (HDT) and auto-HSCT for NDMM patients.

MATERIALS AND METHODS

This retrospective study included 127 NDMM patients who underwent auto-HSCT from January 2020 to October 2025. Data on patient characteristics, treatment protocols, and clinical outcomes were obtained from electronic and physical medical records. The study was conducted in accordance with STROBE guidelines [Von Elm E., et al. Ann Intern Med 2007;147(8):573–7].

The median age of patients was 59 (31–69) years (table 1). Notably, 63% (n=80) of the patients were transferred from other Russian regions for post-induction therapy. To visualize the extent of bone and extraosseous lesions, PET/CT with 18F-FDG was most often used in 92 (72.4%) cases; in the remaining cases, low-dose CT was used in 7 (5.5%) cases, or a combination of skeletal radiography and MRI of individual areas was used in 28 (22.1%) cases. FISH tests to identify high-risk chromosomal aberrations were performed in 43 (33.8%) patients. As a first-line induction regimen, VCD (bortezomib, cyclophosphamide, dexamethasone) was implemented in 114 (89.8%) patients, VRd (bortezomib, lenalidomide, dexamethasone) - in 7 (5.5%), DRd (daratumumab, lenalidomide, dexamethasone) - in 4 (3.1%) and DVRd (daratumumab, bortezomib, lenalidomide, dexamethasone) - in 2 (0.8%) patients. Change of induction therapy due to unsatisfactory response to the first line was required in 68 (53.5%) patients. Pre-auto-HSCT responses included CR/sCR in 9.5%, VGPR in 69.5%, and PR in 22% of the cases.

The data slice was prepared as of 24.02.2026.

Table 1. Characteristics of patients before auto-HSCT

Parameters	N=127
Median age (range), years	59 (31 – 69)
Gender, n (%) • Male • Female	 55 (43.3) 72 (56.5)
ECOG status, n (%) • 0 points • 1 points	 56 (44.1) 71 (55.9)
Median number of therapy lines before auto-HSCT, n (%)	2 (1 – 2)
Response before auto-HSCT, n (%) • sCR • CR • VGPR • PR	 2 (1.6) 10 (7.9) 87 (68.5) 28 (22.0)

RESULTS

Most patients required two leukocytepheresis procedures (range, 1–3) for successful HSC mobilization. The median number of CD34+ cells was 8.1×10^6/kg (range, 2.1–86.0×10^6/kg) – table 2. Conditioning before auto-HSCT was performed with melphalan at a standard dose of 200 mg/m² and 140 mg/m² in patients over 65 years of age (HD-MEL regimen). In cases of severe renal impairment (SCF <40 ml/min), the dose was reduced to 140 mg/m². Tandem auto-HSCT occurred in 12.6% (n=16) of the cases and no toxicity-caused deaths. The median duration of the agranulocytosis period was 9 (range 8-13) days.

After auto-HSCT, a significant increase in response was observed (table 3). The CR/sCR rate increased from 9.4% to 61.4% (p=0.003), ≥VGPR response rate increased from 78.0 to 91.3% (p=0.034). Maintenance therapy after auto-HSCT was received by 100 patients (78.7%), primarily lenalidomide – 96 (75.6%). With a median follow-up of 20.6 months, the 2-year PFS rate was 91.6 ± 3.1%, and the 2-year OS rate was 96.3 ± 2.1%.

Table 2. Parameters of mobilization and collection of autologous HSCs

Parameters	N=127
The number of HSC mobilization, n (%) • with stable hematopoiesis • after chemotherapy or immunochemotherapy	 75 (59.1) 52 (40.9)
Plerixafor use, n (%)	1 (3.2)
Median number of leukocytepheresis procedures performed (range)	2 (1 – 3)
Median CD34+ cell count collected (range), 10^6/kg	8,1 (2,8–86,1)

Table 3. Efficacy of HD-MEL/auto-HSCT

Parameters	N=127
Response as a result of HDCT/auto-HSCT, n (%) • sCR • CR • VGPR • PR	 6 (4.7) 72 (56.7) 38 (29.9) 11 (8.7)
Median follow-up (Q25; Q75), months	20.6 (11.1; 36.2)
Patient status at the current observation period, n (%): • alive with no signs of progression • relapse/progression • died of any cause	 109 (85.9) 12 (9.4) 6 (4.7)
Survival rates, %: • 2-year progression-free survival (PFS) • 2-year overall survival (OS)	 91.6 ± 3.1 96.3 ± 2.1

CONCLUSIONS

Real-world auto-HSCT demonstrates high efficacy in NDMM. The number of transplants performed at our institute has more than tripled over the past six years, which is consistent with the national trend of a 46.3% increase in the number of BMT/HSCT procedures over the same period. Besides, it is important to emphasize once again that the actual need for BMT/HSCT in Russia is two to three times lower than the current rate. However, in Russia, challenges persist, including limited access to anti-CD38 quadruplets, molecular diagnostics, and minimal residual disease testing.

CONTACTS

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