FIRST EXPERIENCE IN TREATING MULTIPLE MYELOMA USING CAR-T CELL THERAPY

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INTRODUCTION

The use of BCMA-targeted CAR T cells in therapy for patients with refractory/relapsed multiple myeloma (R/RMM) has prolonged survival and improved quality of life.

AIM

To evaluate the efficacy of clinical use of anti-BCMA CAR-T cells in patients with R/RMM (response to therapy, increased survival, dynamics of minimal residual disease and persistence of BCMA CAR-T cells).

METHOD

The study was conducted with the participation of 3 centers in Belarus. Experimental CAR-T cell samples were produced from patient-derived T lymphocytes obtained by apheresis, according to laboratory protocol.

The results of treatment of 5 patients with R/RMM, with a fairly significant degree of pretreatment, who received CAR T-cell therapy at the RRCRM&HE in Gomel are presented. The observation period ranged from 2 to 10 months. The age of patients ranged from 58 to 66 years.

BCMA CAR-T cells were detected by flow cytometry in peripheral blood on days 3, 7, 10, 14, and 28.

CONCLUSIONS

Chimeric antigen receptor CAR-T cell therapy targeting BCMA has demonstrated high efficacy in treatment, with overall response rates of 100% and complete remission rates of 100%, confirming its significant potential in the treatment.

RESULTS

Deep cytopenia developed in 1 patient after lymphodepletion. Laboratory tests showed no increase in C-reactive protein, procalcitonin, ferritin, or liver enzymes after CAR T-cell infusion in all patients for 7 days.

Between day 7 and day 14, all patients experienced grade 1 cytokine release syndrome (CRS), characterized by fever lasting from 3 to 4 days with a single rise in temperature to febrile levels once a day, relieved by intravenous paracetamol and NSAIDs.

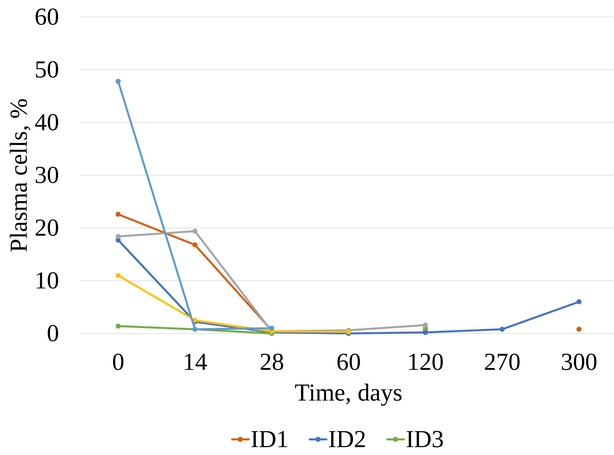
Grade 3–4 hematologic toxicity developed after infusion and included profound neutropenia (patients 1, 3), leukopenia, thrombocytopenia not requiring replacement therapy, and lymphopenia in all patients, but most of these changes returned to baseline during follow-up.

The peak percentage of BCMA CAR-T cells was reached at approximately days 7-14. The time of peak CAR-T cell expansion correlated with the maximum antitumor response, followed by complete tumor resolution. After the peak CAR-T cell expansion, CAR-T cell levels declined over time but remained detectable in all treatment groups by the end of the study.

One patient showed no response within 14 days, although some tumor cell growth was observed. CRS (cytokine release syndrome) was observed on days 23-25. On day 28, complete disappearance of tumor plasma cells was observed.

Currently, all patients are in complete clinical and hematological remission.

Characteristic		Patient ID 1	Patient ID 2	Patient ID3	Patient ID 4	Patient ID5
Age		58	57	61	66	62
Gender		f	m	m	f	f
Date of diagnosis		2018	2023	2021	2024	2016
Length of illness		7	2	4	1	9
Stage of disease (ISS)		II	II	II	III	II
Extramedullary plasmacytomas		-	-	-	+	-
Cytogenetic risk (Not determined)		-	-	-	-	-
Number of lines of therapy		5	3	4	3	4
Number of chemotherapy courses		24	13	17	11	16
Previous regimens						
Refractoriness	Bortezomib	+	+	+	+	+
	Lenalidomide	+	+	+	+	+
	Ixazomib	+	-	+	-	+
	Cyclophosphamide	+	-	+	+	+
	Pomalidomide	+	-	-	-	-
Previous autologous HSCT		1	2	2	1	1
ECOG		1	1	1	1	
Number of PCs in BM		22.6 %	17.4 %	33.6%	12.2%	13.8%
Number of clonal PCs in BM		18.2 %	15%	23.4%	11%	11.3%
M-spike in serum		24.86%	9.89%	6.9%	10.04%	0
M-spike in urine		0	0	0	0	0
κ/λ		56.4	0.39	6.68	0.37	1.25
Lesions of the skeletal bones		-	+	+	+	-
Asociated diseases		-	hypertension	Coronary heart disease, bronchial asthma, nuclear medicine, stroke 2024, polyneuropathy.	Coronary heart disease, hypertension, chronic renal failure	hypertension



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