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Efficacy and Safety of Ciltacabtagene Autoleucel and Idecabtagene Vicleucel in Multiple Myeloma Patients

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Background

- Ciltacabtagene autoleucel (cilta-cel) and idecabtagene vicleucel (ide-cel) are chimeric antigen receptor (CAR) T-cell therapies used to treat adult patients with relapsed or refractory multiple myeloma (rrMM) after at least four lines of therapy.
- No head-to-head clinicalN trials to compare them have been conducted.

Objective

To compare between CARTITUDE-1 and KarMMa clinical trials in terms of efficacy, safety, and patient characteristics.

Methods

- Overall response rate (ORR) and safety signals were compared using reporting odds ratios (RORs) with 95% confidence intervals (CIs) at $p < 0.05$.
- Overall survival (OS) and progression-free survival (PFS) were compared using the Kaplan–Meier method with a log-rank test.
- Patient characteristics were compared using the chi-square test.
- Statistical analyses were conducted using Microsoft Excel and R version 4.0.5.

Results

Table 1. Comparison of patient characteristics.

Variable	CARTITUDE-1 (cilta-cel) n (%)	KarMMa (ide-cel) n (%)	p-value*
Sex			0.93
• **Male**	57 (59%)	76 (59%)	
• **Female**	40 (41%)	52 (41%)	
ECOG performance status			0.65
• **0**	39 (40%)	57 (45%)	
• **1**	54 (56%)	68 (53%)	
• **2**	4 (4%)	3 (2%)	
ISS stage			0.63
• **I /II**	83 (86%)	104 (81%)	
• **III**	14 (14%)	21 (16%)	
• **Unknown**	0	3 (2%)	
High-risk cytogenetic profile	24 (25%)	45 (%35)	0.09
Tumour BCMA expression ≥50%	57/62 (92%)	109 (85%)	0.19
Triple-class refractory	85 (88%)	108 (84%)	0.49
Penta-drug refractory	41 (42%)	33 (26%)	0.01

*chi-square test at $p < 0.05$.
Cilta-cel: ciltacabtagene autoleucel; ide-cel: idecabtagene vicleucel; n: number; ECOG: Eastern Cooperative Oncology Group; ISS: International Staging System; BCMA: B-cell maturation antigen.

Table 2. Comparison of safety signals.

AE	CARTITUDE-1 (cilta-cel) n (%)	KarMMa (ide-cel) n (%)	ROR (95% CI)	p-value*
Any Grade ≥ 3 AE	91 (94%)	127 (99%)	0.12 (0.01-1.01)	0.02
Hematological				
• **Neutropenia**	92 (95%)	114 (89%)	2.26 (0.78-6.51)	0.12
• **Anemia**	66 (68%)	77 (60%)	1.41 (0.81-2.45)	0.22
• **Thrombocytopenia**	58 (60%)	67 (52%)	1.35 (0.79-2.31)	0.27
• **Leukopenia**	59 (61%)	50 (39%)	2.42 (1.41-4.16)	0.00
• **Lymphopenia**	48 (50%)	34 (27%)	2.71 (1.55-4.74)	0.00
• **Febrile neutropenia**	0	20 (16%)	0.00 (0.00-NaN)	0.00
Metabolism and nutrition disorders				
• **Hypophosphatemia**	7 (7%)	20 (16%)	0.42 (0.17-1.04)	0.05
• **Hypocalcemia**	3 (3%)	10 (8%)	0.38 (0.10-1.41)	0.13
• **Hyponatremia**	4 (4%)	7 (5%)	0.74 (0.21-2.62)	0.64
Infection	19 (20%)	28 (22%)	0.87 (0.45-1.67)	0.68
Other				
• **Fatigue**	5 (5%)	2 (2%)	3.42 (0.65-18.04)	0.12
• **Aspartate aminotransferase increased**	5 (5%)	2 (2%)	3.42 (0.65-18.04)	0.12
CRS Grade 1 & 2	92 (95%)	107 (84%)	3.61 (1.31-9.96)	0.01
CRS Grade ≥3	4 (4%)	7 (5%)	0.74 (0.21-2.62)	0.64
Neurotoxicities Grade 1 & 2	20 (21%)	23 (18%)	1.19 (0.61-2.31)	0.62
Neurotoxicities Grade ≥3	9 (9%)	4 (3%)	3.17 (0.95-10.62)	0.05

*p-value was calculated using the RORs with cilta-cel as the reference.
Cilta-cel: ciltacabtagene autoleucel; ide-cel: idecabtagene vicleucel; n: number; AE: adverse event; ROR: Reporting Odds Ratio; CI: confidence interval; CRS: cytokine release syndrome.

Table 3. Comparison of efficacy endpoints.

Variable	CARTITUDE-1 (cilta-cel)	KarMMa (ide-cel)	ROR (95% CI)	p-value*
Primary efficacy endpoints				
Overall response rate (ORR)	97%	74%	11.36 (3.31-38.97)	0.00
• **Complete response (CR)**	67%	33%	4.12 (2.29-7.43)	0.00
• **Partial response (PR)**	30%	41%	0.62 (0.34-1.11)	0.10
Secondary efficacy endpoints				
	Number of patients in CARTITUDE-1 (cilta-cel)	Number of patients inKarMMa (ide-cel)	Time (months)	p-value**
Overall survival (OS)	97	128	21	0.00
Progression-free survival (PFS)	97	128	21	0.00

* p-value was calculated using the RORs with cilta-cel as the reference.
** p-value was calculated using the Kaplan–Meier method with log-rank test over the indicated period.
Cilta-cel: ciltacabtagene autoleucel; ide-cel: idecabtagene vicleucel; ROR: reporting odds ratio; CI: confidence interval.

Conclusions

- This study found that cilta-cel is a superior treatment over ide-cel with better efficacy and less incidence of serious adverse events.