INCIDENCE OF PARKINSONISM AND NON-ICANS NEUROTOXICITY WITH BCMA-TARGETING BISPECIFIC ANTIBODIES VS CAR T-CELL THERAPY IN MULTIPLE MYELOMA

E. TAYAR, MD[1]; A. BITAR, MD[1]; R. KAMBLE, MD[2]; S. MASTER, MD[2]; D. KODALI, MD[2]

[1]University of Houston / HCA Healthcare Clear Lake, Webster, TX, USA | [2]Texas Oncology, Webster, TX, USA

BACKGROUND

BCMA-directed CAR T cells can produce delayed non-ICANS neurologic toxicities (NINTs), including movement and neurocognitive toxicity (MNT) resembling parkinsonism. BCMA bispecific antibodies (BsAbs) also redirect T cells to BCMA, but their class-specific parkinsonism risk is less defined.

OBJECTIVE

Compare the incidence and phenotype of parkinsonism/MNT and other NINTs across BCMA-targeted CAR T-cell and BsAb therapies in multiple myeloma.

METHODS

PRISMA-conformant search of PubMed/MEDLINE, EMBASE, ClinicalTrials.gov, FAERS, through January 2026. Included prospective trials and pharmacovigilance studies reporting neurologic events after BCMA CAR T or BsAbs. Outcomes: NINT, MNT/parkinsonism, cranial nerve palsy, and peripheral neuropathy. Random-effects pooling, class/agent subgroups, and FAERS signal detection (PRR/ROR) were performed.

CONCLUSION

- Parkinsonism/MNT is an established but uncommon complication of BCMA CAR T, concentrated with cilta-cel.
- No parkinsonism signal has emerged for BCMA BsAbs in trials or FAERS.
- Lower and shorter T-cell activation may contribute, but underreporting and limited follow-up preclude declaring zero risk. Standardized longitudinal neurologic monitoring is warranted.

RESULTS

CAR T: pooled NINT **0.81%** (95% CI, 0.37–1.77%; 55 cohorts, N=4,630).

- cilta-cel 4.6% vs ide-cel 0.5% (P=0.001);
- cilta-cel OR 4.5 for immune-related adverse events including parkinsonism.
- MNT/parkinsonism 12% of NINTs; cranial nerve palsy 32.3%.

FAERS BsAbs: 2,832 events included 41 non-ICANS and 46 peripheral neuropathy events; no parkinsonism signal.

Teclistamab: neurologic events 14.5%; ICANS 3.0%, all grade 1–2; no MNT/parkinsonism.

BsAb comparison: BCMA vs non-BCMA ICANS 2% vs 11% (P=0.01).

NO

PARKINSONISM SIGNAL IDENTIFIED

WITH BCMA BsAbs

Clinical trials + FAERS. 'No signal' does not establish zero risk; spontaneous reports cannot estimate incidence or causality.

Evidence	Source size	Neurologic outcome	Parkinsonism / MNT
BCMA CAR T	55 cohorts N=4,630	NINT 0.81% (95% CI 0.37–1.77)	12% of NINTs
Cilta-cel	CAR-T subgroup	NINT 4.6%	Higher risk OR 4.5
Ide-cel	CAR-T subgroup	NINT 0.5%	Lower rate
NINT phenotype	CAR-T cases	Cranial nerve palsy 32.3%	MNT 12%
BCMA BsAbs	Prospective trials	Lower ICANS than non-BCMA	None reported
Teclistamab	MajesTEC-1 N=165	Neurologic 14.5%; ICANS 3.0%	None reported
FAERS BsAbs*	2,832 events	41 non-ICANS; 46 peripheral neuropathy	No signal
BsAb comparator	BCMA vs non-BCMA	ICANS 2% vs 11%	—
Overall	**Trials + FAERS**	**Class difference persists**	**Detected with CAR T only**

ACKNOWLEDGMENTS

This research was supported by HCA Healthcare. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA healthcare or any of its affiliated entities

CONTACT INFORMATION

Elias Tayar, MD
University of Houston / HCA Healthcare Clear Lake
Webster, TX, USA
elias.tayar@hcahealthcare.com

REFERENCES

1. Cohen AD, et al. Blood Cancer J. 2022;12:32. PMID: 35210399.
2. Van Oekelen O, et al. Nat Med. 2021;27:2099–2103. PMID: 34893771.
3. Moreau P, et al. N Engl J Med. 2022;387:495–505. PMID: 35661166.
4. Munshi NC, et al. N Engl J Med. 2021;384:705–716. PMID: 33626253.
5. Page MJ, et al. BMJ. 2021;372:n71. PMID: 33782057.

*FAERS cohort included teclistamab, elranatamab, and talquetamab.