NEUROCOGNITIVE TESTING ALIGNMENT WITH ICANS POST-CAR T

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INTRODUCTION

Immune effector cell-associated neurotoxicity syndrome (ICANS) poses a potentially fatal risk in patients treated with chimeric antigen receptor T-cell therapy. Identifying patients at risk of having high grade ICANS is thus a priority. Scoring systems such as the EASIX scores have accounted for disease and comorbidity factors but have not addressed neurocognitive function in CAR T-cell therapy. The St. Louis University Mental Status (SLUMS) Exam and the Montreal Cognitive Assessment (MoCA) have not been examined for validity and reliability in this population.

AIM

To identify through a retrospective review of CAR T patients at the University of Kansas if there is a correlation between the incidence or severity of ICANS and neurocognitive testing performed in the pre-infusion period.

METHODS

Patients receiving CAR T targeting CD19 or BCMA between December 2017 and December 2023 were included. Neurocognitive testing was performed using the SLUMS and MOCA exams (both involve 11 questions scored on a 30-point scale to predict neurocognitive function). Incidence of ICANS and severity of ICANS were compared between patients who had any detected cognitive dysfunction and those who had none, as well as between the tiered result system unique to each test.

RESULTS

We included 360 patients in this analysis, (257 NHL, 84 MM and 19 ALL) leading to comparisons of 276 CD19-directed CAR T patients and 84 BCMA-directed CAR T patients.

In CD19-directed patients, there were no differences in ICANS incidence according to the SLUMS scores. There was a significant increase in ICANS incidence for patients who had a positive MoCA exam, $_{p}$=0.006. Additionally, ICANS incidence was correlated with more severe MoCA results, $_{p=}$ 0.01. No differences in ICANS severity were observed using any neurocognitive test. In BCMA-directed patients, no differences in ICANS were observed using the SLUMS or MoCA.

Table 1. CD19-directed CAR T Neurocognitive Testing and ICANS*

	ICANS (n=120)	No ICANS (n=147)	p-value
Positive SLUMS	48 (57)	46 (47)	0.233
SLUMS tiers			
None	36 (43)	51 (53)	
Mild Impairment	42 (50)	40 (41)	0.425
Dementia	6 (7)	6 (6)	
Positive MoCA	37 (58)	18 (32)	*0.0059*
MoCA Tiers			
None	27 (42)	39 (68)	
Mild	31 (48)	18 (32)	*0.01*
Moderate	5 (8)	0	
Severe	1 (2)	0	
Positive MoCA Blind	7 (33)	6 (22)	0.5161
	Low Grade ICANS (n=63)	**High Grade ICANS (n=57)**	**p-value**
Positive SLUMS	29 (60)	19 (53)	0.5116
SLUMS tiers			
None	19 (40)	17 (47)	
Mild Impairment	27 (56)	15 (42)	0.28
Dementia	2 (4)	4 (11)	
Positive MoCA	20 (57)	17 (59)	1.000
MoCA Tiers			
None	15 (43)	12 (41)	
Mild	18 (51)	13 (45)	0.616
Moderate	2 (6)	3 (10)	
Severe	0	1 (3)	
Positive MoCA Blind	2 (20)	5 (45)	0.3615

Table 2. BCMA-directed CAR T Neurocognitive Testing and ICANS*

	ICANS (n=14)	No ICANS (n=49)	p-value
Positive SLUMS	8 (57)	21 (43)	0.3781
SLUMS tiers			
None	6 (43)	28 (57)	
Mild Impairment	4 (29)	17 (35)	0.128
Dementia	4 (29)	4 (8)	
Positive MoCA	8 (89)	17 (55)	0.1166
MoCA Tiers			
None	1 (11)	14 (45)	
Mild	8 (89)	15 (48)	0.094
Moderate	0	2 (6)	
Severe	0	0	
Positive MoCA Blind	2 (40)	3 (18)	0.5481

**Percentages may not appear to be out of 100% as not all patients received all neurocognitive testing*

CONCLUSION

Our results suggest that while the SLUMS exam does not predict ICANS, the MoCA may independently predict incidence of ICANS. Patients with a higher score correlating with normal cognition are less likely to develop ICANS and may be appropriate for outpatient therapy.

For those with lower scores correlating with more severe neurocognitive disorders, inpatient monitoring and early intervention will continue to be important.

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