Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Figure 1. Progression-Free Survival: Renal Impairment vs no Renal Impairment

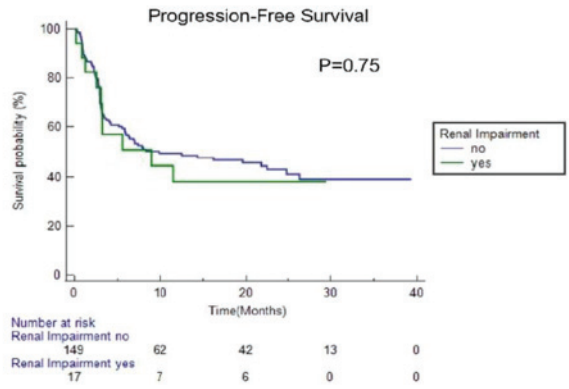

Figure 2. Progression-Free Survival: Fludarabine Dose Reduction vs Standard Dose

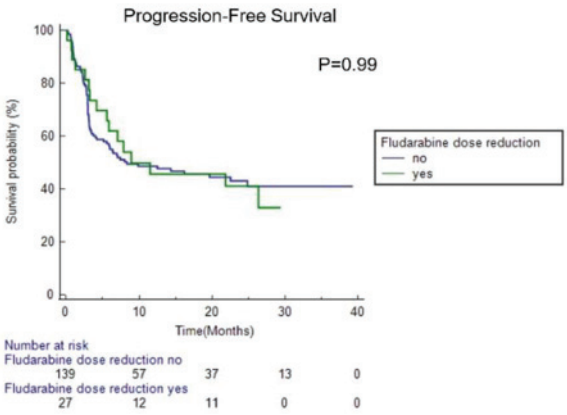

Table 1. Lymphodepletion strategy in a patient on chronic hemodialysis receiving tisa-cel. Cy/Flu: Saline 250 mL, Cyclophosphamide 500 mg/m2, Saline 250 mL, Fludarabine 12.5 mg/m2

Day	Hemodialysis	Drug
D-5	-	Cy/Flu (10 pm)
D-4	11 am	Cy/Flu (10 pm)
D-3	-	Cy/Flu (10 pm)
D-2	11 am	-
D-1	-	-
D0	11 am	Tisa-cel (3 pm)

therapy for R/R DLBCL. Survival outcomes were similar regardless of fludarabine dose reduction status. ESRD DLBCL patients require careful planning of lymphodepletion but may also receive CAR T-cell therapy.

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Response to COVID-19 Vaccination Post-CAR T Therapy in Patients with Non-Hodgkin Lymphoma and Multiple Myeloma

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Background: COVID-19 adversely affects individuals with cancer and seroconversion rates among hematologic malignancies may be suboptimal when compared to patients without cancer. Non-Hodgkin lymphoma (NHL) and multiple myeloma (MM) patients are have impaired humoral/cellular immunity and are prescribed immunosuppressive therapy.

		Range
Total (n)	104	
Gender (male, n)	75	
Age (avg)	58.4	19-79
Ethnicity		
White (n)	86	
Hispanic (n)	8	
AA (n)	4	
Asian (n)	1	
Pacific Islander (n)	1	
Indian (n)	1	
Other (n)	2	
Missing (n)	1	
BMI (avg)	27.9	17.6 - 53.8
Diagnosis		
NHL (n)	76	
MM (n)	26	
COVID-19 pre-CAR T (n)	7	
Days from COVID-19 to CAR T (avg)	132.3	30 - 265
ASCT Pre-CAR T (n)	38	
NHL (n)	18	
MM (n)	20	
Days ASCT to CAR T (avg)	1019.1	138 - 4009
Vaccinated pre-CAR T (n)	4	
COVID-19 post-CAR T (n)	19	
Days from CAR T to COVID-19 (avg)	343.5	7 - 1406
Days from CAR T to vaccine (avg)	250.2	32 - 881
Ab info for vaccinated (n)	17	
% Positive that had vaccine	76.4%	
% Negative that had vaccine	23.6%	
WBC^	4.6	0.2 - 28.2
ALC^	66.4	0.03- 870
CD4^	176.2	4 - 829
IgG^	687.3	< 300 - 3611
Received IVIG post-CAR T (n)	46	
Survival status		
Alive (n)	73	
Deceased (n)	31	
Disease status Post-CAR T		
Remission (n)	58	
Progression (n)	43	
Missing (n)	3	
Received Rx Post-CAR T (n)	41	

Chimeric antigen receptor T cell (CAR T) therapy is widely used for NHL and MM, but little is known about seroconversion rates after COVID-19 vaccination. National guidelines recommend COVID-19 vaccination for CAR T recipients as early as three months thereafter. We retrospectively evaluated SARS-CoV-2 spike-binding IgG antibody levels following COVID-19 vaccination among NHL and MM CAR T therapy recipients.

Methods: NHL and MM patients from three Mayo Clinic sites that received CAR T from Sept 2016 to June 2021 were evaluated. Baseline characteristics were ascertained from medical records. NHL and MM patients that received CAR T and were alive at the time that the COVID-19 vaccine first became available were eligible for inclusion for antibody response evaluation. Antibody spike values > 0.80 U/mL were considered positive.

Results: Out of 104 CAR T infusions, 73 patients are alive at the time of this submission. Seven patients had known COVID-19 pre-CAR T and all 7 were alive. Nineteen patients developed known COVID infection post-CAR T (13 alive and 6 deceased). The mortality of COVID post-CAR T in our sample was 31.5%. Of the 13 patients that survived COVID-19, they received CAR T an average of 416 days prior to COVID-19 infection (median = 337, range = 54 – 1406); 6 patients who died from COVID-19 received CAR T an average of 250 days prior to COVID-19 infection (median = 164, range = 7 – 846). All 6 deceased patients did not receive COVID-19 vaccination pre-CAR T. Out of 17 CAR T patients tested for antibody spike titers post COVID-19 vaccination, 76.4% were able to mount an antibody response. More patients with MM had a higher titer response to the vaccine (>250 U/mL) compared to the NHL counterparts (0.80-249 U/mL). All patients that received the vaccine, regardless of antibody response, were alive at the time of this submission.

Conclusions: Most CAR T recipients with NHL and MM were able to mount an antibody response following COVID-19 vaccination. These findings are limited by our small sample size and may be influenced by the timing of vaccination relative to CAR T. Almost half of our patients received IVIG post CAR T which could potentially cause false positive antibody results as pooled immunoglobulin preparations may contain COVID-19 antibodies from vaccinated healthy donors. To better understand the characteristics of the immunologic response against SARS-CoV-2 in patients post-CAR T, larger multicenter studies exploring both humoral and cellular immunity are needed.

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Corticosteroids, Tocilizumab or Filgrastim Do Not Impact the Efficacy of CAR T-Cell Therapy with 4- 1BB Costimulatory Domain

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Background: Chimeric antigen receptor (CAR) T-cell therapy has demonstrated dramatic potency in targeting hematological malignancies. However, the majority of patients do not experience a sustained response. The prognostic impact of corticosteroids has been described in patients receiving CAR T-cells with the CD28 co-stimulatory domain. However, the effects of corticosteroids, tocilizumab, and filgrastim, have not been well described in patients who receive T-cells engineered with a 4-1BB-costimulatory domain.

Methods: We examined patients who received CAR T-cell therapy at our institution from July 2016 to March 2021. We evaluated exposure to corticosteroids, tocilizumab, and filgrastim within the first 30 days of CAR T-cell infusion. The response at 30 days, best response, need for post-CAR therapy, and mortality, were evaluated as markers of efficacy.

Results: We examined 62 patients, averaging 65 years of age (range: 21 – 82 years) at the time of CAR T-cell infusion. Primary indications for CAR T-cell therapy were diffuse large B-cell lymphoma 42 (67.7%) and multiple myeloma 14 (22.6%), with mantle cell lymphoma and chronic lymphocytic leukemia accounting for 5 (8.1%) and 1 (1.6%) patients respectively. In this cohort, 20 (32.3%) patients received corticosteroids, 25 (40.3%) patients received tocilizumab, and 44 (71.0%) patients received filgrastim within 30 days of CAR T-cell infusion. Among the 44 (70.9%) patients who received CAR T-cell therapy with a 4-1BB co-stimulatory domain, 9 (20.4%) required corticosteroids. There were no statistically significant differences noted in the 4-1BB group based on the treatment response at day 30, best treatment response, need for post-CAR therapy, or death due to progressive disease in the patients who received steroids compared to those who did not (all P≥0.23). Tocilizumab was administered to 15 (34.0%) patients who received CAR T-cells with a 4-1BB-costimulatory domain. The use of tocilizumab was not associated with a significant difference in the efficacy outcomes listed above compared to patients who did not receive tocilizumab (all P≥0.43). Among patients receiving filgrastim after a 4-1BB CAR T-cell infusion, 50% died due to progressive disease compared to 18.8% who did not receive filgrastim (p=0.06).

Conclusion: In our study, the use of corticosteroids, tocilizumab and filgrastim did not impact the efficacy of CAR T-cell therapy with a 4-1BB-costimulatory domain. These findings

Table 1: Outcomes among patients receiving CAR T-cell therapy with 41BB (n=44) or CD28 (n=18) costimulatory domains, stratified by use of steroids, tocilizumab and filgrastim
Treatment response at 30 days defined as complete response or partial response per disease restaging at day 30.

Type of CAR T-cell therapy	4-1bb costimulatory domain			CD28 costimulatory domain		
Outcome	Steroids n=9	No steroids n=35	P	Steroids n=11	No steroids n=7	P
Treatment response at 30 days						
Complete response	3 (33.3)	14 (40.0)	1.00	4 (36.4)	5 (71.4)	0.33
Partial response	2 (22.2)	8 (22.9)	1.00	2 (18.2)	1 (14.3)	1.00
No response/stable disease	0 (0.0)	4 (11.4)	0.72	2 (18.2)	0 (0.0)	0.50
Progressive disease	4 (44.4)	9 (25.7)	0.41	3 (27.3)	1 (14.3)	1.00
Best treatment response						
Complete response	3 (33.3)	16 (45.7)	0.71	4 (36.4)	5 (71.4)	0.33
Partial response	2 (22.2)	7 (20.0)	1.00	2 (18.2)	1 (14.3)	1.00
No response/stable disease	0 (0.0)	4 (11.4)	0.57	2 (18.2)	0 (0.0)	0.50
Progressive disease	4 (44.4)	8 (22.9)	0.23	3 (27.3)	1 (14.3)	1.00
Received post-CAR therapy	3 (33.3)	15 (42.9)	0.72	6 (54.6)	3 (42.9)	1.00
Death due to progression of disease	5 (45.4)	12 (34.2)	0.24	2 (22.2)	1 (14.3)	1.00
	Tocilizumab n=15	No tocilizumab n=29		Tocilizumab n=10	No tocilizumab n=8	P
Treatment response at 30 days	9 (60.0)	18 (62.1)	0.89	5 (50.0)	5 (62.5)	0.59
Best treatment response as complete response	7 (46.7)	12 (41.4)	0.74	4 (40.0)	4 (50.0)	0.84
Received post-CAR therapy	5 (33.3)	13 (44.8)	0.46	3 (30.0)	5 (62.5)	0.16
Death due to progression of disease	7 (46.7)	10 (34.4)	0.43	1 (10.0)	2 (25.0)	0.56
Outcome	Filgrastim n=28	No filgrastim n=16	P	Filgrastim n=16	No filgrastim n=2	P
Treatment response at 30 days	15 (53.6)	12 (75.0)	0.16	10 (62.5)	2 (100)	0.53
Best treatment response as complete response	10 (35.7)	8 (50.00	0.35	8 (50.0)	1 (50.0)	1.00
Received post-CAR therapy	13 (46.4)	5 (31.3)	0.32	7 (43.8)	2 (100.0)	0.47
Death due to progression of disease	14 (50.0)	3 (18.8)	0.06	2 (12.5)	1 (50.0)	0.31