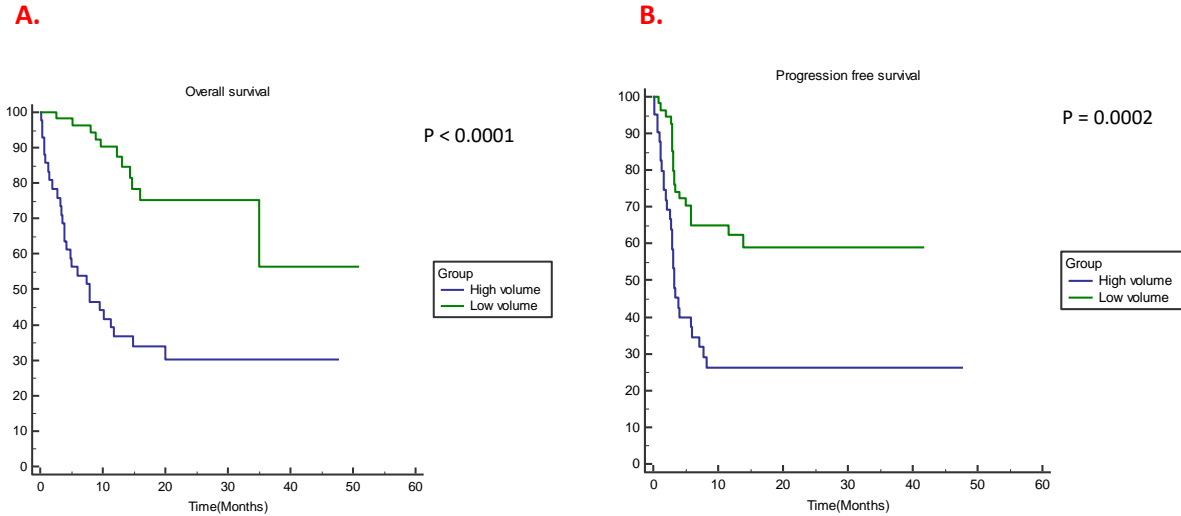


Supplemental Methods

Baseline MTV was calculated via custom tool implemented on MIM PACS version 6.8.4 (MIM Software Inc, Cleveland, OH). Using this workflow function, the right lobe of the liver was first manually selected to create a ≤ 3 cm spherical volume of interest (VOI) that served as a reference. Using the liver reference, metabolically active regions were identified and displayed on the scan similar to the PET Response Criteria in Solid Tumors (PERCIST criteria).ⁱ Each lesion had a peak standardized uptake value corrected for lean body mass (SUL_{peak}) equal or greater than the mean SUL in the liver VOI plus two times its standard deviation.ⁱⁱ Corresponding PET regions were subsequently computed. For each PET region, voxels equal or greater than 41% of SUVmax were identified and a boundary was set to create a metabolically active region.ⁱⁱⁱ The workflow included voxels over 41% SUVmax to be considered for MTV calculation of the lesion (mL). For imaging studies without abdominal region, an alternative workflow was used to calculate the MTV, which used a previously calculated liver reference for the same patient scan. For ^{18}F -FDG PET/CT scans with pre-marked lesions, we directly applied a workflow to compute the final MTV.

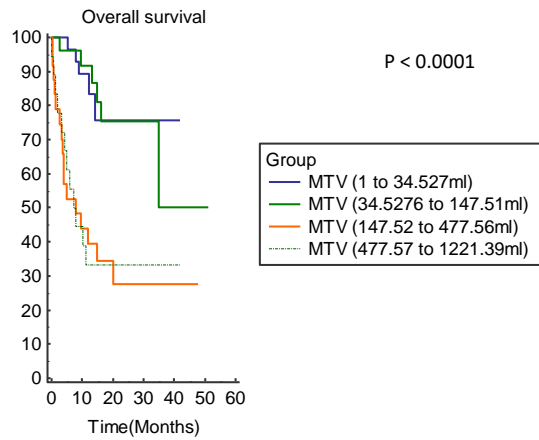


Supplemental Figure 1. Kaplan-Meier survival curves by low versus high MTV-Manual (cut-off 147.5 mL). (A) OS (B) PFS for patients in cohort 1 and 2 combined (n= 96).

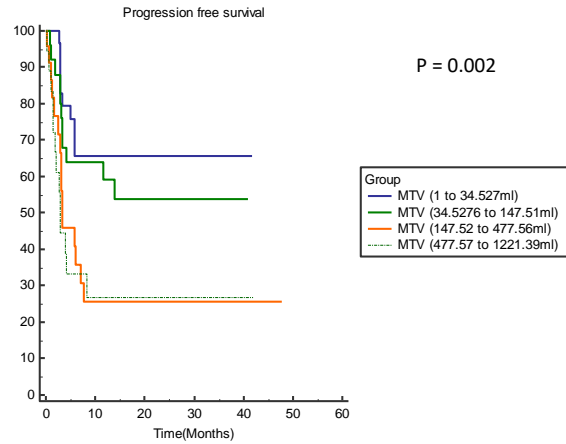
Supplemental Table 1. Multivariate Model for cohort 1 and 2 combined (n= 96).

Overall Survival	Variable	Univariate analysis Odds ratio(95%CI)	Multivariate analysis Odds ratio(95%CI)	Multivariate analysis P value
	MTV Manual (147.5 cut off)	0.20(0.10 to 0.41)	0.21(0.10 to 0.47)	0.0001
	Bridging Therapy (yes vs. no)	1.45(0.77 to 2.76)	1.17(0.61 to 2.24)	0.61
	Raised LDH before conditioning (greater than 2x UNL vs. less than 2X UNL)	2.58(1.32 to 5.05)	1.12(0.54 to 2.33)	0.75
Progression Free Survival	Variable	Univariate analysis Odds ratio(95%CI)	Multivariate analysis Odds ratio(95%CI)	Multivariate analysis P value
	MTV Manual (147.5 cut off)	0.36(0.20 to 0.63)	0.35(0.18 to 0.67)	0.001
	Bridging Therapy (yes vs. no)	1.09(0.62 to 1.91)	0.93(0.53 to 1.65)	0.82
	Raised LDH before conditioning > 2xULN vs. < 2xULN	1.79(0.93 to 3.45)	0.98(0.47 to 2.04)	0.97

A.



B.



Supplemental Figure 2. Kaplan-Meier survival curves by low versus high MTV-Manual (cut-off 147.5 mL) quartiles. (A) OS (B) PFS for patients in cohort 1 and 2 combined (n= 96).

Supplemental Table 2. Multivariate Model (with MTV quartiles) for cohort 1 and 2 combined (n= 96).

Overall Survival	Variable	Multivariate analysis Odds ratio(95%CIs)	Multivariate analysis P value
	MTV Group (1 to 34.527ml)	-	-
	MTV Group (34.5276 to 147.51ml)	1.20(0.36 to 3.96)	0.76
	MTV Group (147.52 to 477.56ml)	5.19(1.85 to 14.57)	0.001
	MTV Group (477.57 to 1221.39ml)	4.57(1.38 to 15.15)	0.01
	Bridging Therapy (yes vs. no)	1.21(0.61 to 2.40)	0.58
	Raised LDH before conditioning > 2xULN vs. < 2xULN	1.16(0.53 to 2.55)	0.69
Progression Free Survival	Variable	Multivariate analysis Odds ratio(95%CIs)	Multivariate analysis P value
	MTV Group (1 to 34.527ml)	-	-
	MTV Group (34.5276 to 147.51ml)	1.39(0.58 to 3.29)	0.45
	MTV Group (147.52 to 477.56ml)	3.10(1.36 to 7.09)	0.007
	MTV Group (477.57 to	3.92(1.45 to 10.56)	0.006

	1221.39ml)		
	Bridging Therapy (yes vs. no)	0.87 (0.47 to 1.59)	0.65
	Raised LDH before conditioning > 2xULN vs. < 2xULN	0.91(0.41 to 1.97)	0.81

Supplemental Table 3. Final Multivariate Model for patients with “true” baseline PET (n= 72). 72 out of 96 patients fit the following criteria: no bridging therapy, or only steroids as bridging, or bridging and baseline PET done afterwards. In addition, patients must have had baseline PET within 28 days from start of conditioning chemotherapy (one patient had a baseline scan the day of CAR T-cell infusion).

Outcome	Variable	Multivariate analysis Odds ratio (95%CI)	Multivariate analysis P value
Overall survival	MTV Manual High vs. low	0.22(0.09 to 0.54)	0.001
	Bridging Therapy Yes vs. No	1.39(0.65 to 2.96)	0.39
	LDH before conditioning > 2xULN vs. < 2xULN	0.80(0.32 to 2.01)	0.64
Progression free survival	MTV Manual High vs. low	0.37(0.17 to 0.79)	0.001
	Bridging Therapy Yes vs. No	1.03(0.53 to 2.01)	0.92
	LDH before conditioning > 2xULN vs. < 2xULN	0.86(0.34 to 2.14)	0.74

References

ⁱ Wahl RL, Jacene H, Kasamon Y, Lodge MA. From RECIST to PERCIST: Evolving Considerations for PET response criteria in solid tumors. *J Nucl Med.* 2009;50:122S–50S.

ⁱⁱ O JH, Lodge MA, Wahl RL. Practical PERCIST: A Simplified Guide to PET Response Criteria in Solid Tumors 1.0. *Radiology.* 2016;280(2):576-84.

ⁱⁱⁱ Meignan M, Sasanelli M, Casasnovas RO, et al. Metabolic tumour volumes measured at staging in lymphoma: methodological evaluation on phantom experiments and patients. *Eur. J. Nucl. Med. Mol. Imaging.* 2014;41:1113-1122.