

Table S1. Clinical Features of The Study Cohort

<i>Characteristics</i>		
<i>n = 350</i>		<i>mean ± SD</i>
<i>Age at HCT</i>		39.6 ± 16.5
<i>Weight, kg</i>		69.6 ± 18.8
<i>KPS</i>		78.3 ± 11.8
<i>TLC, %predicted</i>		82.4 ± 18.8
<i>RV, %predicted</i>		89.5 ± 37.9
<i>FVC, %predicted</i>		76.4 ± 37.9
<i>FEV1, %predicted, pre-bronchodilator</i>		70.1 ± 26.3
<i>FEV1/FVC, %, pre-bronchodilator</i>		72.1 ± 15.8
<i>FEF 25-75%, %predicted</i>		62.8 ± 38.7
<i>DLCO adj, %predicted</i>		62.3 ± 19.9
<i>Time from HCT to cGvHD diagnosis (days)*</i>		342.2 ± 518.9
<i>Time from HCT to adjudicative PFT (days)*</i>		1967.7 ± 1572.7
<i>Different types of cGvHD treatment</i>		4.7 ± 2.2
		<i>n (%)</i>
<i>Recipient sex</i>	Female	156 (44.6)
<i>Recipient race</i>	White	307 (88.2)
<i>HCT location</i>	Local	312 (89.1)
	NIH	38 (10.9)
<i>Pre-HCT tobacco use</i>		97 (27.8)
<i>HCT indication</i>	AML, MDS, ALL	183 (52.3)
	CML, MPN	38 (10.9)
	CLL, HL, NHL, MM	106 (30.3)
	Others	23 (6.6)
<i>Disease status at HCT</i>	CR	160 (50.3)
<i>HLA</i>	MRD	177 (51.2)
	MUD	121 (35.0)
	MMUD	34 (9.8)
	Haploidentical	14 (4.0)
<i>Stem cell source</i>	PB	274 (80.4)
	BM	67 (19.6)
<i>Conditioning</i>	RIC	165 (47.7)
	MAC	181 (52.3)
<i>Busulfan</i>		136 (40.5)
<i>TBI</i>		138 (39.9)
<i>GvHD prophylaxis</i>	CNI + MTX	161 (49.8)
<i>2<sup>nd</sup> malignancy</i>		64 (18.3)
<i>Acute GvHD</i>		250 (71.4)
<i>cGvHD global severity</i>	Mild	7 (2.0)
	Moderate	78 (22.3)
	Severe	265 (75.7)
<i>Relapse/refractory primary malignancy</i>		52 (14.9)

Abbreviations: HCT: hematopoietic stem cell transplant; KPS: Karnofsky performance score; TLC: total lung capacity; RV: residual volume; FVC: forced vital capacity; FEV1: forced expiratory volume during the first second; FEF 25-75%: forced mid-expiratory flow; DLCO adj: diffusing capacity

of carbon monoxide adjusted for hemoglobin; NIH: National Institutes of Health; AML: acute myeloid leukemia; ALL: acute lymphoblastic leukemia; MDS: myelodysplastic syndrome; CML: chronic myelogenous leukemia; MPN: myeloproliferative neoplasm; CLL: chronic lymphocytic leukemia; HL: Hodgkin's lymphoma; NHL: non-Hodgkin's lymphoma; MM: multiple myeloma; CR: complete remission; HLA: human leukocyte antigen; MRD: matched related donor; MUD: matched unrelated donor; MMUD: mismatched unrelated donor; PB: peripheral blood; BM: bone marrow; RIC: reduced intensity conditioning; MAC: myeloablative conditioning; TBI: total body irradiation

Table S2. Clinical Features of Patients with Different CLAD-PcGvHD Phenotypes

<b>Characteristics</b>		<b>Obstruction n = 12</b>	<b>Restriction n=67</b>	<b>Mixed n=47</b>	<b>Undefined n=40</b>	<b>p</b>
<i>Age at HCT*</i>		51.8 ± 13.1	37.3 ± 14.3	44.4 ± 14.3	30.8 ± 17.4	<0.001
<i>Weight, kg*</i>		69.6 ± 16.4	69.7 ± 18.5	68.7 ± 16.0	66.0 ± 14.8	0.729
<i>KPS*</i>		82.5 ± 7.1	74.0 ± 13.3	74.8 ± 11.7	73.8 ± 10.6	0.281
<i>TLC, %predicted*</i>		99.5 ± 9.2	64.6 ± 13.6	71.2 ± 12.9	86.1 ± 17.7	<0.001
<i>RV, %predicted*</i>		122.0 ± 33.4	81.3 ± 33.9	85.0 ± 29.6	103.4 ± 59.5	<0.001
<i>FVC, %predicted, pre-bronchodilator*</i>		86.1 ± 11.5	53.9 ± 15.1	61.5 ± 14.6	71.8 ± 13.9	<0.001
<i>FEV1, %predicted, pre-bronchodilator*</i>		57.7 ± 15.9	55.0 ± 14.1	43.1 ± 15.0	48.8 ± 18.3	<0.001
<i>FEV1/FVC, %, pre-bronchodilator*</i>		52.1 ± 11.7	81.7 ± 8.8	53.9 ± 11.7	53.7 ± 15.6	<0.001
<i>FEF 25-75%, %predicted*</i>		26.7 ± 13.0	65.1 ± 34.4	19.8 ± 10.5	24.7 ± 14.8	<0.001
<i>DLCO adj, %predicted*</i>		67.5 ± 21.0	50.2 ± 17.8	52.7 ± 14.4	56.5 ± 13.6	<0.001
<i>Time from HCT to cGvHD diagnosis (days)<sup>§</sup></i>		220.9 ± 99.5	379.5 ± 366.1	223.76 ± 110.9	361.93 ± 489.8	0.040
<i>Time from HCT to adjudicative PFT (days)<sup>§</sup></i>		1706.3 ± 1025.2	2131.8 ± 1781.1	2286.2 ± 1556.1	2002.6 ± 1389.2	0.683
<i>Cumulative lines of systemic cGvHD treatment*</i>		4.9 ± 2.2	5.2 ± 2.0	5.4 ± 1.9	4.8 ± 2.7	0.324
<i>Recipient sex<sup>#</sup></i>	Female	10 (83.3)	25 (37.3)	19 (40.4)	20 (50.0)	0.230
<i>Recipient race<sup>#</sup></i>	White	11 (91.7)	57 (85.1)	45 (95.7)	35 (87.5)	0.326
<i>HCT location<sup>#</sup></i>	Local	12 (100)	62 (92.5)	44 (93.6)	36 (90.0)	0.694
	NIH	0	5 (7.5)	3 (6.4)	4 (10.0)	
<i>Pre-HCT tobacco use<sup>#</sup></i>		3 (25.0)	14 (20.9)	21 (44.7)	13 (32.5)	0.055
<i>HCT indication<sup>#</sup></i>	AML, MDS, ALL	9 (75.0)	38 (56.7)	29 (61.7)	20 (50.0)	0.399
	CML, MPN	2 (16.7)	5 (7.5)	4 (8.5)	8 (20.0)	
	CLL, HL, NHL, MM	1 (8.3)	20 (29.8)	13 (27.7)	9 (22.5)	
	Others	0	4 (5.9)	1 (2.1)	3 (7.5)	
<i>Disease status at HCT<sup>#</sup></i>	CR	8 (66.7)	35 (58.3)	26 (60.5)	23 (60.5)	0.960
<i>HLA<sup>#</sup></i>	MRD	6 (50.0)	38 (56.7)	29 (61.7)	17 (42.5)	0.201
	MUD	4 (33.3)	23 (34.3)	12 (25.5)	14 (35.0)	
	MMUD	0	5 (7.5)	4 (8.5)	7 (17.5)	
	Haploidentical	2 (16.7)	1 (1.5)	2 (4.3)	2 (5.0)	
<i>Stem cell source<sup>#</sup></i>	PB	12 (100)	51 (78.5)	42 (89.4)	33 (82.5)	0.181
	BM	0	14 (21.5)	5 (10.6)	7 (17.5)	
<i>Conditioning<sup>#</sup></i>	RIC	7 (58.3)	29 (43.3)	20 (43.5)	13 (33.3)	0.457
	MAC	5 (41.7)	38 (56.7)	26 (56.5)	26 (66.7)	
<i>Busulfan<sup>#</sup></i>		8 (72.7)	25 (37.3)	24 (53.3)	19 (54.3)	0.078
<i>TBI<sup>#</sup></i>		3 (25.0)	32 (47.8)	14 (30.4)	15 (38.5)	0.206
<i>2<sup>nd</sup> malignancy<sup>#</sup></i>		2 (16.7)	13 (19.4)	10 (21.3)	9 (22.5)	0.965
<i>Acute GvHD<sup>#</sup></i>		8 (66.7)	49 (73.1)	34 (72.3)	29 (72.5)	0.975
<i>cGvHD global severity<sup>#</sup></i>	Mild	0	1 (1.5)	0	0	0.732
	Moderate	0	5 (7.5)	5 (10.9)	5 (12.5)	
	Severe	12 (100)	61 (91.0)	41 (89.1)	35 (87.5)	
<i>Skin cGvHD<sup>#</sup></i>		6 (50.0)	60 (89.5)	35 (74.5)	24 (60.0)	<0.001

<i>Joints/fascia cGvHD#</i>	8 (66.7)	56 (83.6)	29 (61.7)	20 (50.0)	<0.001
<i>Liver cGvHD#</i>	5 (41.7)	40 (59.7)	25 (53.2)	19 (47.5)	0.514
<i>GI tract cGvHD#</i>	4 (33.3)	32 (47.8)	17 (36.2)	20 (50.0)	0.441
<i>Relapse/refractory primary malignancy#</i>	0	10 (14.9)	9 (19.2)	3 (7.5)	0.206

\*: mean ± SD, ANOVA test

§: mean ± SD, Kruskal-Wallis test

#: count (percentage), Chi-square test

Abbreviations: GC: GvHD control; CLAD-PcGvHD: pulmonary GvHD as defined by the adapted chronic lung allograft dysfunction criteria; UC: unclassified; HCT: hematopoietic stem cell transplant; KPS: Karnofsky performance score; TLC: total lung capacity; RV: residual volume; FVC: forced vital capacity; FEV1: forced expiratory volume during the first second; FEF 25-75%: forced mid-expiratory flow; DLCO adj: diffusing capacity of carbon monoxide adjusted for hemoglobin; NIH: National Institutes of Health; AML: acute myeloid leukemia; ALL: acute lymphoblastic leukemia; MDS: myelodysplastic syndrome; CML: chronic myelogenous leukemia; MPN: myeloproliferative neoplasm; CLL: chronic lymphocytic leukemia; HL: Hodgkin's lymphoma; NHL: non-Hodgkin's lymphoma; MM: multiple myeloma; CR: complete remission; HLA: human leukocyte antigen; MRD: matched related donor; MUD: matched unrelated donor; MMUD: mismatched unrelated donor; PB: peripheral blood; BM: bone marrow; RIC: reduced intensity conditioning; MAC: myeloablative conditioning; TBI: total body irradiation

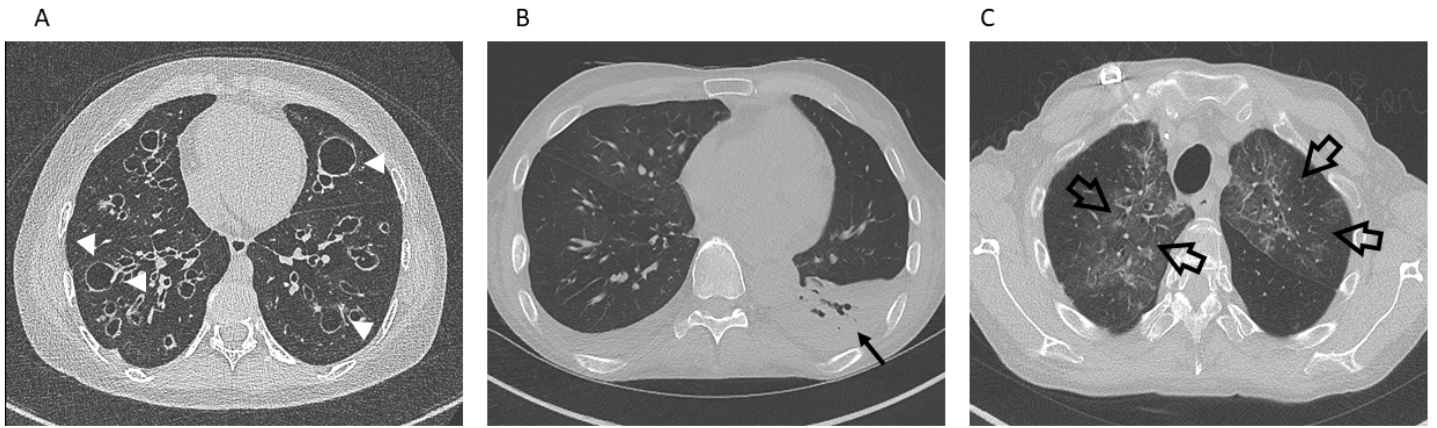
Table S3. Longitudinal PFT Trend

<i>Phenotype</i>	<i>Patients with historical PFT</i>	<i>Volume data available (N)</i>	<i>Mean Δ FEV1 (L, range)*</i>	<i>Mean Δ FEV1 (% range) #</i>	
<i>Obstruction</i>	Pre-transplant PFT (N)	2	1	-1.13	-51
	Early post-transplant PFT (N)	2	0	NA	NA
<i>Restriction</i>	Pre-transplant PFT (N)	18	7	-1.19 (-2.35 to -0.52)	-35 (-57 to -18)
	Early post-transplant PFT (N)	7	1	-0.57	-21
<i>Mixed</i>	Pre-transplant PFT (N)	7	5	-1.37 (-2.18 to -0.46)	-48 (-70 to -19)
	Early post-transplant PFT (N)	9	1	-1.47	-51
<i>Undefined</i>	Pre-transplant PFT (N)	10	9	-1.33 (-4.03 to -0.07)	-47 (-85 to -4)
	Early post-transplant PFT (N)	1	0	NA	NA
<i>Unclassified</i>	Pre-transplant PFT (N)	23	15	-0.42 (-1.56 to +0.38)	-14 (-46 to +23)
	Early post-transplant PFT (N)	2	0	NA	NA
<i>Control</i>	Pre-transplant PFT (N)	24	15	-0.07 (-0.73 to +0.53)	+1 (-21 to +35)
	Early post-transplant PFT (N)	0	0	NA	NA

\*: Δ FEV1 (L) = baseline pre-bronchodilator FEV1 (L) – pre-bronchodilator FEV1 on the adjudication PFT (L)

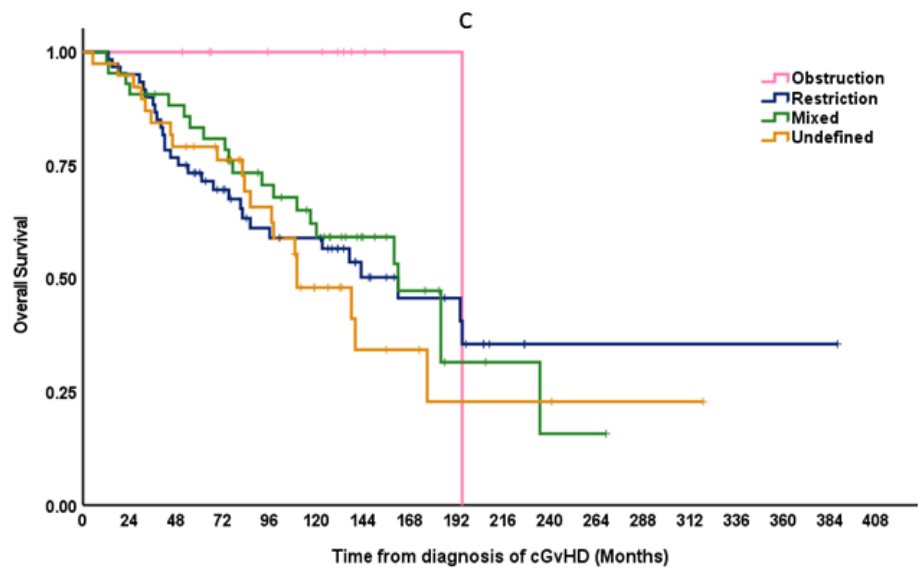
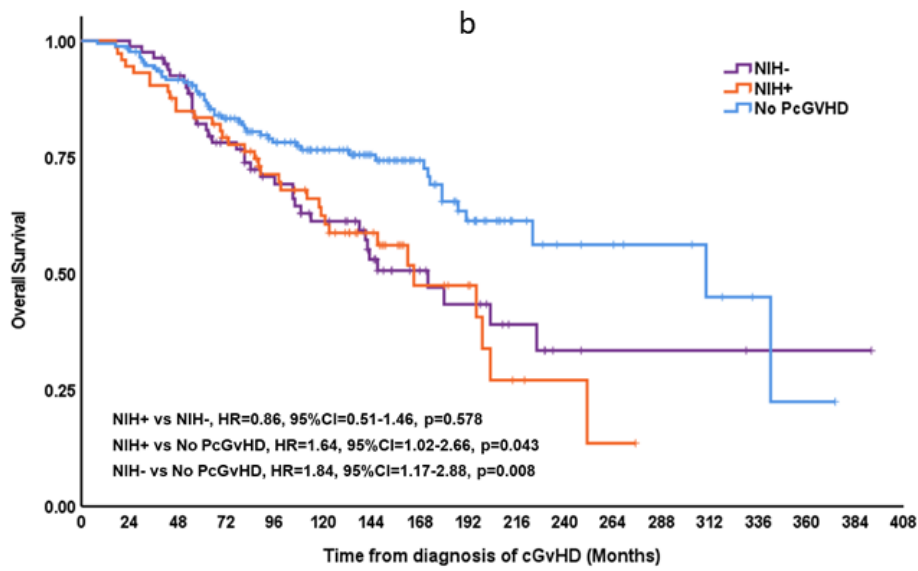
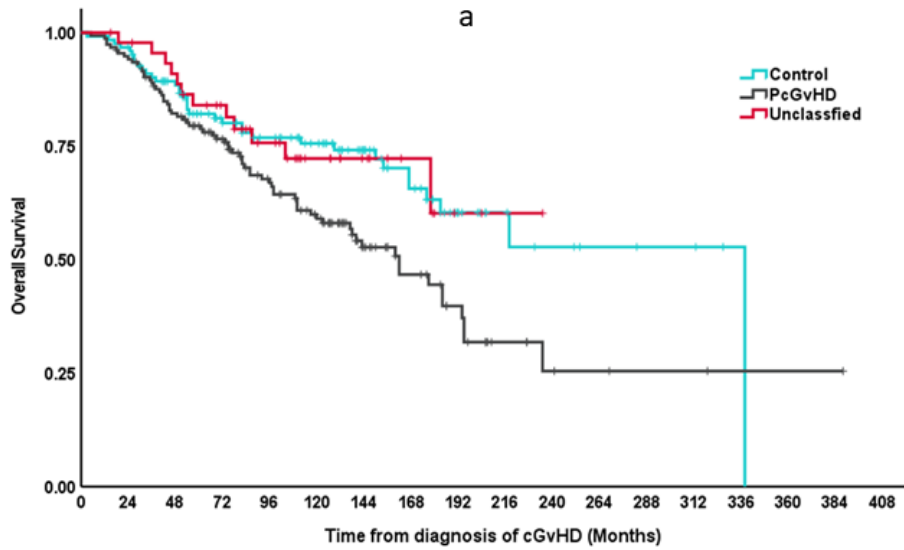
#: Δ FEV1 (%) = Δ FEV1 (L)/baseline pre-bronchodilator FEV1 (L)

**Figure S1**



**Figure S1: Examples of thoracic CT findings at full inspiration. A: cystic bronchiectasis (arrowhead); B: consolidation with air bronchogram (arrow); C: ground glass opacity (hollow arrow)**

Figure S2



**Figure S2. Kaplan-Meier curves displaying the post-cGvHD OS in the study cohort. a.** comparison of post-cGvHD OS between in the control, PcGvHD, and unclassified groups; **b.** comparison of post-cGvHD OS between the NIH-, NIH+ groups, and those who did not meet the Adapted Criteria; **c.** comparison of post-cGvHD OS between different PcGvHD phenotypes. All hazard ratios (95%CI, p-values) noted in the figures were from multivariable Cox proportional hazard models adjusting for age, recipient sex, KPS, transplant location (at the NIH or in the community), transplant indication, donor type, graft source, and relapse/refractory malignancy.