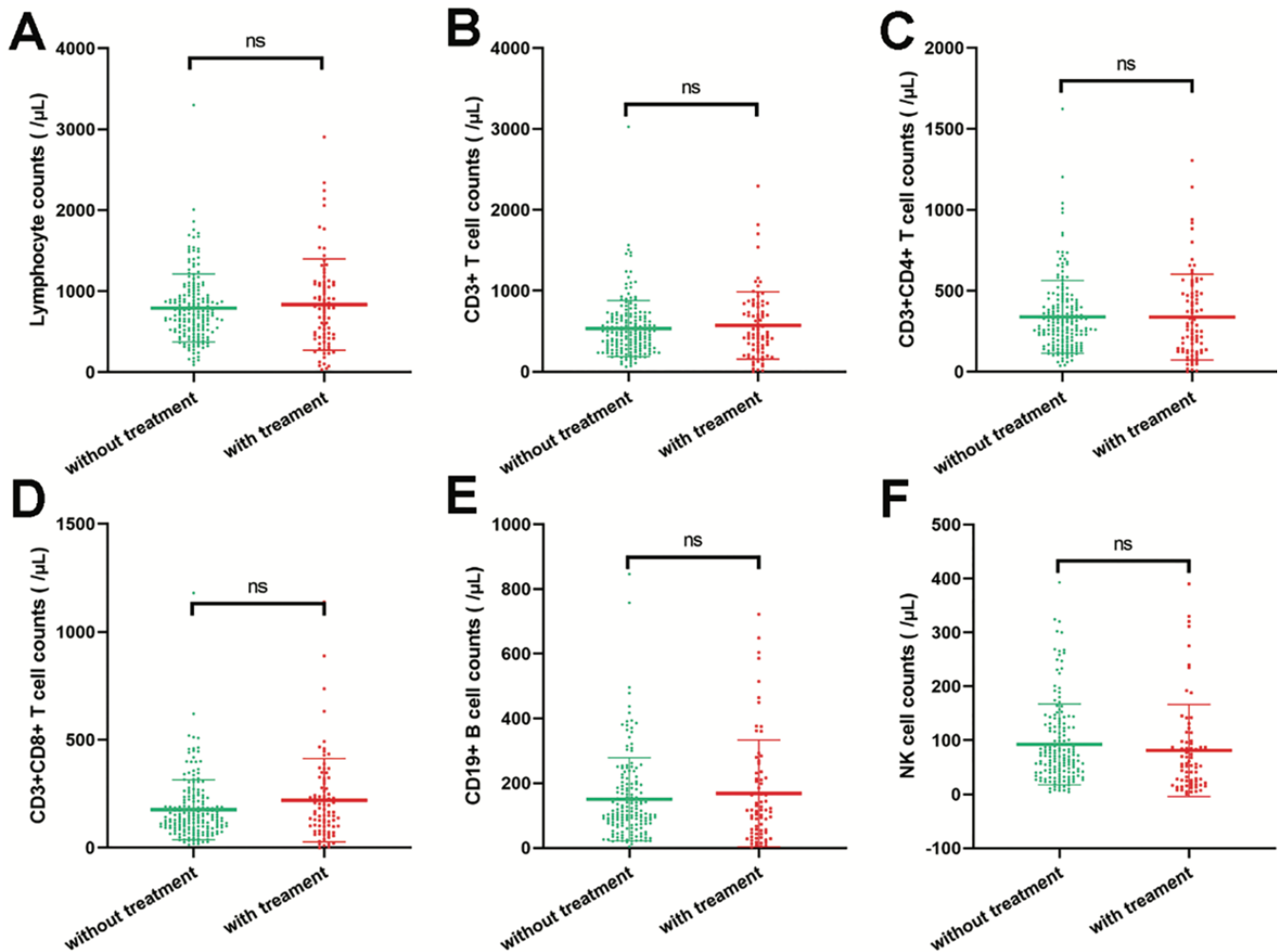




Supplementary Fig. S1. Comparison of lymphocyte subsets between treatment-naïve patients and previously-treated anti-MDA5⁺ DM patients. Comparison of lymphocytes, CD3⁺ T cells, CD3⁺CD4⁺ T cells, CD3⁺CD8⁺ T cells, CD19⁺ B cells and NK cells between treatment-naïve and previously-treated anti-MDA5⁺ DM patients respectively.

Supplementary Table S1. Lymphocyte subsets comparison between RP-ILD and non-RP-ILD of patients with anti-MDA5⁺ DM.

Lymphocytes subsets	With RP-ILD (n=144)	Without RP-ILD (n=124)	<i>p</i> -value
Lymphocytes counts/ μL	652 (406-892)	861 (592-1101)	<0.001
Proportion of CD3 ⁺ T (%)	68.2 (55.3-76.5)	70.0 (60.0-80.0)	0.048
CD3 ⁺ T cell counts/ μL	397 (235-626)	549 (406-738)	<0.001
Proportion of CD3 ⁺ CD4 ⁺ T cells (%)	41.0 (31.5-49.8)	43.1 (33.0-50.0)	0.339
CD3 ⁺ CD4 ⁺ T cell counts/ μL	244 (134-390)	340 (229-472)	<0.001
Proportion of CD3 ⁺ CD8 ⁺ T cells (%)	21.8 (15.2-28.6)	24.0 (17.6-30.8)	0.067
CD3 ⁺ CD8 ⁺ T cell counts/ μL	119 (71-201)	180 (121-293)	<0.001
Ratio of CD4 ⁺ T/CD8 ⁺ T cells	1.77 (1.28-2.68)	1.87 (1.34-2.64)	0.725
Proportion of CD3-CD19 ⁺ B cells (%)	16.7 (12.4-25.9)	14.8 (9.0-24.0)	0.026
CD3-CD19 ⁺ B cell counts/ μL	104 (60-184)	123 (67-226)	0.273
Proportion of NK cells (%)	9.1 (5.0-14.9)	10.1 (6.0-16.0)	0.200
CD16 ⁺ CD56 ⁺ NK cell counts/ μL	55 (28-92)	83 (44-142)	<0.001

Supplementary Table S2. Comparisons of clinical characteristics between survivors and non-survivors of patients with anti-MDA5⁺ DM.

Clinical characteristics	Non-survivors (n=69)	Survivors (n=195)	<i>p</i> -value
Demographic features			
Age at disease onset(years)	56 (52-66)	51 (44-58)	<0.001
Female, n (%)	41 (59.4)	130 (66.7)	0.502
Disease duration (months)	1.2 (0.9-2.2)	2.1 (1.2-4.1)	<0.001
Manifestations of Skin			
Rash, n (%)	61 (88.4)	180 (92.3)	0.323
Skin ulcers, n (%)	20 (29.0)	25 (12.8)	0.002
Heliotrope rash, n (%)	38 (55.1)	135 (69.2)	0.033
Gotttron sign, n (%)	35 (50.7)	116 (59.5)	0.206
Mechanic's hands, n (%)	13 (18.8)	46 (23.6)	0.416
Skin roughness, n (%)	17 (24.6)	56 (28.7)	0.515
Hair loss, n (%)	2 (2.9)	16 (8.2)	0.221
Musculoskeletal involvement			
Myalgia, n (%)	16 (23.2)	70 (35.9)	0.053
Muscle weakness, n (%)	16 (23.2)	87 (44.6)	0.002
Respiratory involvement			
ILD, n (%)	67 (97.1)	182 (93.3)	0.390
RP-ILD, n (%)	66 (95.7)	75 (38.5)	<0.001
Other clinical symptoms			
Fever, n (%)	50 (72.5)	89 (45.6)	<0.001
Fatigue, n (%)	65 (94.2)	162 (83.1)	0.022
Arthralgia/arthritis, n (%)	23 (33.3)	106 (54.4)	0.003
Morning stiffness, n (%)	5 (7.2)	26 (13.3)	0.177
Raynaud phenomenon, n (%)	0 (0)	16 (8.2)	0.031
Dysphagia, n (%)	2 (2.9)	14 (7.2)	0.323
Choking on drinking water, n (%)	0 (0)	9 (4.6)	0.153
Hoarseness of voice, n (%)	5 (7.2)	10 (5.1)	0.726
Pharyngalgia, n (%)	6 (8.7)	19 (9.7)	0.798
Anorexia, n (%)	41 (59.4)	69 (35.4)	0.001
Weight loss, n (%)	31 (33.9)	73 (37.4)	0.274
Complications			
Mediastinal emphysema, n (%)	14 (20.3)	14 (7.2)	0.002
Macrophage activation syndrome, n (%)	8 (11.6)	5 (2.6)	0.008
Initial treatment strategy			
Glucocorticoids monotherapy, n (%)	21 (30.4)	8 (4.1)	<0.001
Dual therapy, n (%)	24 (34.8)	82 (42.1)	0.290
Triple therapy, n (%)	22 (31.9)	103 (52.8)	0.003
Initial treatment regimens			
Conventional immunosuppressants			
CTX, n (%)	25 (36.2)	95 (48.7)	0.073
CsA, n (%)	8 (11.6)	49 (25.1)	0.019
Tacrolimus, n (%)	28 (40.6)	94 (48.2)	0.275
MMF, n (%)	0 (0)	2 (1)	1.000
Biological agents			
RTX, n (%)	0 (0)	2 (1.0)	1.000
Tocilizumab, n (%)	3 (4.3)	2 (1.0)	0.220
JAK inhibitors	8 (11.6)	52 (26.7)	0.010
Tofacitinib, n (%)	8 (11.6)	48 (24.6)	0.023
Baricitinib, n (%)	0 (0)	4 (2.1)	0.532
Intravenous immunoglobulin, n (%)	55 (79.7)	129 (66.2)	0.035

Supplementary Table S3. Comparisons of serological parameters between survivors and non-survivors of patients with anti-MDA5⁺ DM.

Baseline serological parameters	Non-survivors (n=69)	Survivors (n=195)	<i>p</i> -value
WBC, ×10 ⁹ /L	6.38 (4.24-8.25)	4.90 (3.64-6.52)	0.001
Lymphocytes, ×10 ⁹ /L	0.54 (0.35-0.84)	0.81 (0.54-1.07)	<0.001
Neutrophils, ×10 ⁹ /L	4.95 (3.52-7.00)	3.56 (2.37-5.01)	<0.001
NLR	8.92 (4.82-16.68)	4.38 (2.84-6.89)	<0.001
Hemoglobin, g/L	119.1 ± 15.5	119.5 ± 17.0	0.839
Platelet, ×10 ⁹ /L	220 (155-278)	204 (158-245)	0.165
ALT, U/L	54 (30-93)	36 (20-59)	0.001
AST, U/L	68 (47-101)	43 (26-79)	<0.001
GGT, U/L	102 (62-165)	44 (25-87)	<0.001
ALP, U/L	88 (70-108)	72 (60-89)	<0.001
ALB, g/L	30.2 ± 3.9	35.0 ± 5.3	<0.001
SUA, μmol/L	199 (167-249)	232 (192-283)	0.003
CK, U/L	74 (38-158)	64 (35-124)	0.381
CK-Mb, U/L	21.5 (14.9-30.0)	19.4 (14.8-27.1)	0.226
LDH, U/L	424 (336-609)	322 (273-389)	<0.001
α-HBDH, U/L	292 (236-343)	238 (209-289)	0.001
KL-6, U/mL	1359 (876-2118)	838 (613-1317)	<0.001
Serum ferritin, ng/mL	1651 (729-2821)	747 (320-1288)	<0.001
Anti-Ro52 antibody positive, n(%)	52 (75.4)	102 (52.3)	0.001
Levels of anti-MDA5 autoantibodies, U/mL	181 (161-204)	175 (143-200)	0.072
IL-6, pg/mL	5.54 (2.97-19.35)	4.27 (3.08-10.04)	0.714
ESR, mm/H	44 (28-60)	26 (13-45)	<0.001
CRP, mg/L	14.3 (5.2-39.0)	3.1 (1.5-9.7)	<0.001
IgG, g/L	13.3 (10.7-15.2)	12.2 (10.1-15.3)	0.164
IgA, g/L	2.8 (2.1-3.6)	2.7 (1.9-3.6)	0.374
IgM, g/L	1.3 (1.0-1.6)	1.2 (0.9-1.7)	0.170

Supplementary Table S4. Univariate and multivariate analysis of mortality associated factors for anti-MDA5⁺ DM patients.

Variables	Univariate analysis		Multivariate analysis	
	HR (95% CI)	<i>p</i> -value	HR (95% CI)	<i>p</i> -value
Age of disease onset ≥ 51 years	2.378 (1.402-4.033)	0.001		
Disease duration ≤ 3 months	2.629 (1.447-4.774)	0.002	2.519 (1.094-5.802)	0.030
Skin ulcers	2.569 (1.584-4.617)	<0.001		
Heliotrope rash	0.581 (0.371-0.911)	0.018		
Muscle weakness	0.483 (0.290-0.805)	0.005		
Arthralgia/arthritis	0.516 (0.324-0.822)	0.005		
Fever	2.053 (1.274-3.310)	0.003		
Anorexia	1.989 (1.268-3.120)	0.003		
RP-ILD	22.176 (8.093-60.771)	<0.001	10.502 (3.214-34.324)	<0.001
Mediastinal emphysema	2.516 (1.450-4.367)	0.001		
Lymphocytes counts ≤ 550/μL	2.760 (1.763-4.320)	<0.001		
CD3 ⁺ T cell counts ≤ 425/μL	3.448 (2.138-5.561)	<0.001		
CD4 ⁺ T cell counts ≤ 272/μL	2.407 (1.495-3.874)	<0.001		
CD8 ⁺ T cell counts ≤ 128/μL	3.189 (1.995-5.908)	<0.001		
NK cell counts ≤ 130/μL	3.848 (1.545-9.986)	0.004	5.128 (1.231-21.358)	0.025
ALB ≤ 33g/L	5.523 (3.182-9.588)	<0.001		
LDH ≥ 390U/L	3.867 (2.438-6.134)	<0.001	3.049 (1.593-5.835)	0.001
CRP < 8mg/L	3.849 (2.377-6.232)	<0.001	3.559 (1.819-6.963)	<0.001
KL-6 ≥ 986U/mL	2.436 (1.432-4.143)	0.001		
Serum ferritin ≥ 967ng/mL	3.299 (1.895-5.745)	<0.001		
Anti-Ro52 antibody positive	2.561 (1.510-4.343)	<0.001		