Supplementary Table S1. Demographics and clinical characteristics in all patients.

Variables	All patients			*p*-value			
	COVID-19 n=51	Anti-MDA5 dermatomyositis n=17	Adult Still's disease n=66	For three	COVID-19 *vs.* Dermato-myositis	COVID-19 *vs.* Adult Still's disease	Dermato-myositis *vs.* Adult Still's disease
Demographics							
Female, n (%)	10 (28.6%)	12 (70.6)	53 (80.3%)	<0.01*	<0.01*	<0.01*	0.23
Age	56.1 ± 17.1	50.9 ± 17.3	43.0 ± 18.9	<0.01*	0.35	<0.01*	0.20
Died in hospital	2 (3.9%)	4 (23.5%)	0 (0%)	<0.01*	0.12	0.02*	<0.01*
Symptoms							
Fever (>37.5ºC), n (%)	51 (100%)	5 (29.4%)	62 (93.9%)	<0.01*	<0.01*	0.92	<0.01*
Fever (>38.5ºC), n (%)	39 (76.4%)	2 (11.8%)	48 (72.7%)	<0.01*	<0.01*	0.88	<0.01*
Hypoxaemia (SpO2≤93% on room air), n (%)	22 (43.1%)	13 (76.5%)	3 (4.5%)	<0.01*	<0.01*	<0.01*	<0.01*
Rash, n (%)	3 (5.9%)	17 (100%)	62 (93.9%)	<0.01*	<0.01*	<0.01*	0.84
Arthralgia, n (%)	6 (11.8%)	9 (69.2%)	58 (87.9%)	<0.01*	<0.01*	<0.01*	0.31
Lymphadenopathy/ hepatosplenomegaly, n (%)	6 (13.9%)	5 (11.6%)	43 (65.1%)	<0.01*	0.79	<0.01*	<0.01*
Lung involvement, n (%)	51 (100%)	17 (100%)	1 (2.0%)	<0.01*	NA	<0.01*	<0.01*
Thrombosis, n (%)	5 (9.8%)	1 (5.8%)	1 (1.5%)	0.03*	0.35	0.01*	0.26
Laboratory findings							
White blood cell (/µL)	4800 (4100-5500)	4300 (3400-6550)	15400 (10900-18900)	<0.01*	0.45	<0.01*	<0.01*
Neutrophil (/µL)	3800 (2761-4675)	3010 (2525-5400)	13309 (8804-16542)	<0.01*	0.36	<0.01*	<0.01*
Lymphocyte (/µL)	704 (405-1122)	688 (424-856)	882 (557-1268)	0.04*	0.42	0.11	0.03*
Neutrophil/Lymphocyte ratio	5.3 (3.1-310.4)	4.6 (3.3-12.9)	13.0 (8.3-22.4)	<0.01*	0.88	<0.01*	<0.01*
Platelets (x10^4/µL)	18.9 (14.4-24.2)	18.9 (14.8-28.3)	21.0 (13.8-26.2)	0.17			
Fibrinogen (mg/dL)	436 (333-513)	403 (306-426)	558 (410-685)	<0.01*	0.06	<0.01*	<0.01*
D-dimer (mg/dL)	1.7 (0.9-9.5)	2.4 (1.2-3.9)	11.3 (3.7-24.0)	<0.01*	0.90	<0.01*	<0.01*
LDH (U/L)	273 (207-387)	398 (312-656)	505 (357-776)	<0.01*	<0.01*	<0.01*	0.27
AST (U/L)	36 (23-62)	56 (39-137)	82 (52-169)	0.05*	0.04*	<0.01*	0.16
CPK (IU/L)	68 (45-87)	113 (73-371)	36 (27-75)	<0.01*	<0.01*	0.03*	<0.01*
CRP (mg/dL)	7.1 (2.2-13.0)	0.8 (0.1-2.0)	9.0 (4.7-17.9)	<0.01*	<0.01*	0.20	<0.01*
Ferritin (ng/mL)	544 (215-1403)	1319 (755-2734)	6362 (1849-25297)	<0.01*	<0.01*	<0.01*	<0.01*
IgG (mg/dL)	1137 (984-1278)	1333 (1151-1542)	1455 (1120-1731)	<0.01*	<0.01*	<0.01*	0.69
Triglycerides (mg/dL)	116 (74-163)	180 (150-200)	120 (97-189)	0.02	<0.01*	0.20	0.06
KL-6 (U/dL)	269 (229-446, n=45)	530 (418-781)	236 (181-323, n=34)	<0.01*	0.04*	<0.01*	<0.01*
Antinuclear antibody, n (%)	6 (12.5%, n=48)	5 (29.4%)	11 (16.7%)	<0.01*	<0.01*	0.38	<0.01*
Rheumatoid factor, n (%)	2 (4.4%, n=48)	3 (18.7%, n=16)	3 (4.5%, n=64)	0.21			
Antiphospholipid antibody, n (%)	4 (14.8%, n=27)	4 (23.5%, n=16)	2 (3.0%, n=44)	0.07			
Anti-cardiolipin antibody, n (%)	0 (0%, n=27)	4 (23.5%, n=16)	2 (3.0%, n=44)	0.01*	<0.01*	0.87	0.01*
Lupus anticoagulant, n (%)	4 (14.8%, n=27)	0 (0%, n=13)	0 (0%, n=24)	0.04*	0.11	0.02*	NA

Values are mean ± SD or median (IQR) unless otherwise specified. NA: Not applicable.
COVID-19: Coronavirus disease 2019; MDA: melanoma differentiation-associated protein 5: LDH: lactate dehydrogenase; AST: aspartate aminotransferase; ALT: alanine aminotransferase; CRP: C-reactive protein; KL-6: Krebs von den Lungen-6 (sialylated carbohydrate antigen).

Supplementary Table S2. Patient demographics and severities between the patients with high and low serum ferritin levels in COVID-19, anti-MDA5 dermatomyositis and adult Still's disease.

Variables	All patients								
	COVID-19 n=51			anti-MDA5 dermatomyositis n=17			Adult Still's disease n=66		
	Ferritin <500 ng/ml n=29	Ferritin ≥500 ng/ml n=22	*p*-value	Ferritin <500 ng/ml n=3	Ferritin ≥500 ng/ml n=14	*p*-value	Ferritin <500 ng/ml n=7	Ferritin ≥500 ng/ml n=59	*p*-value
Demographics									
Female, n (%)	14 (48.3%)	2 (9.1%)	< 0.01*	3 (100%)	9 (64.3%)	0.22	5 (71.4%)	48 (81.3%)	0.39
Age	49.8 ± 20.3	59.8 ± 14.2	0.08	26.3 ± 12.6	56.1 ± 13.3	0.02*	41.4 ± 19.7	45.7 ± 18.9	0.56
Fever (>38.5ºC), n (%)	16 (55.2%)	19 (86.4%)	0.02*	1 (33.3%)	3 (21.4%)	0.66	3 (42.9%)	45 (76.2%)	0.06
Rash, n (%)	1 (3.5%)	2 (9.1%)	0.39	3 (100%)	14 (100%)	NA	5 (71.4%)	54 (91.5%)	0.10
Arthralgia, n (%)	2 (6.9%)	3 (13.7%)	0.42	2 (66.7%)	9 (64.3%)	0.94	4 (57.1%)	44 (74.5%)	0.33
Lymphadenopathy/ hepatosplenomegaly, n (%)	2 (6.9%)	3 (13.7%)	0.42	1 (33.3%)	3 (21.4%)	0.66	3 (42.9%)	43 (72.9%)	0.10
Laboratory findings									
White blood cell (/µL)	4800 (4300-5850)	5250 (3900-7025)	0.72	2200 (2170-4000)	4650 (3725-7125)	0.03*	11900 (9900-15400)	16400 (11100-19300)	0.17
Neutrophil (/µL)	3712 (2733-4310)	3997 (2741-5807)	0.28	1525 (1438-2924)	3301 (2760-5953)	0.04*	8698 (8210-14233)	13768 (9448-16622)	0.11
Lymphocyte (/µL)	870 (668-1441)	507 (249-1018)	0.02*	470 (418-752)	713 (370-968)	0.45	896 (640-1912)	882 (556-1242)	0.62
D-dimer (mg/dL)	1 (0.65-1.7)	5.3 (1.1-17.0)	0.20	1.3 (0.5-3.3)	1.9 (1.0-3.9)	0.50	9.7 (6.2-12.3)	12.3 (3.3-24.1)	0.83
LDH (U/L)	226 (182-299)	401 (274-510)	<0.01*	362 (171-633)	433 (313-694)	0.54	235 (180-267)	566 (409-792)	<0.01
CRP (mg/dL)	2.2 (0.5-5.2)	10.8 (6.8-18.6)	<0.01*	0.1 (0.01-0.24)	1.2 (0.3-2.1)	0.03*	7.7 (3.4-12.3)	9.2 (4.7-17.1)	0.55
Ferritin (ng/mL)	128 (52-306)	1232 (780-2049)	<0.01*	300 (218-323)	1711 (967-3268)	0.01*	162 <(112-360)	8107 (3293-29850)	<0.01*
Severity									
Died in hospital	0 (0%)	2 (9.1%)	0.26	0 (0%)	4 (28.6%)	0.29	0 (0%)	0 (0%)	NA
Hypoxaemia (SpO2≤93% on room air), n (%)	2 (6.9%)	19 (86.4%)	<0.01*	0 (0%)	10 (71.4%)	0.02*	0 (0%)	2 (3.3%)	0.71
EULAR/ACR/PRINTO criteria for MAS	0 (0%)	14 (63.6%)	<0.01*	0 (0%)	10 (71.4%)	0.04*	0 (0%)	40 (67.8%)	<0.01*
HScore	48.5 ± 21.0	85.0 ± 33.1	<0.01*	56.6 ± 11.0	76.5 ± 31.5	0.31	27.1 ± 28.9	132.2 ± 47.4	<0.01*
Thrombosis, n (%)	1 (3.4%)	4 (18.1%)	0.04*	0 (0%)	1 (7.1%)	0.63	1 (14.3%)	1 (1.7%)	0.20

Values are mean ± SD. COVID-19: Coronavirus disease 2019; MDA: melanoma differentiation-associated protein 5; EULAR/ACR/PRINTO criteria for MAS 2016 European League Against Rheumatism/American College of Rheumatology/Paediatric Rheumatology International Trials Organisation classification criteria for macrophage activation syndrome.

Supplement Table S3. Patient demographics and clinical characteristics who fulfilled the criteria of macrophage activation syndrome by European League Against Rheumatism /American College of Rheumatology/Pediatric Rheumatology International Trials Organization.

Variables	Patients met with EULAR/ACR/PRINTO MAS criteria			p-value			
	COVID-19 n=14	Anti-MDA5 dermatomyositis n=10	Adult Still's disease n=40	For three	COVID-19 vs. dermato-myositis	COVID-19 vs. Adult Still's disease	Dermato-myositis vs. Adult Still's disease
Demographics							
Female, n (%)	1 (7.1%)	7 (70.0%)	35 (87.5%)	<0.01*	<0.01*	<0.01*	0.43
Age	65.1 ± 11.0	57.8 ± 14.4	46.9 ± 187	<0.01*	0.22	<0.01*	0.09
Died in hospital	2 (14.3%)	3 (30.0%)	0 (0%)		<0.01*	0.35<0.01*	<0.01*
Symptoms							
Fever (>37.5ºC), n (%)	14 (100%)	3 (30.0%)	39 (97.5%)	<0.01*	<0.01*	0.55	<0.01*
Fever (>38.5ºC), n (%)	13 (92.9%)	1 (10.0%)	32 (80.0%)	<0.01*	<0.01*	0.26	<0.01*
Hypoxaemia (SpO2≤93% on room air), n (%)	12 (85.7%)	8 (80.0%)	2 (5.0%)	<0.01*	0.53	<0.01*	<0.01*
Rash, n (%)	2 (14.3%)	14 (100%)	38 (95.0%)	<0.01*	<0.01*	<0.01*	0.64
Arthralgia, n (%)	2 (14.3%)	7 (70.0%)	33 (82.5%)	<0.01*	<0.01*	<0.01*	0.43
Lymphadenopathy/ hepatosplenomegaly, n (%)	0 (0%)	0 (0%)	29 (72.5%)	<0.01*	0.51	<0.01*	<0.01*
Lung involvement, n (%)	14 (100%)	10 (100%)	1 (2.5%)	<0.01*	NA	<0.01*	<0.01*
Thrombosis, n (%)	3 (21.4%)	0 (0%)	0 (0%)	0.03*	0.35	0.01*	0.26
Laboratory findings							
White blood cell (/μL)	5200 (3525-6525)	4650 (3725-7125)	15000 (10580-19305)	<0.01*	0.66	<0.01*	<0.01*
Neutrophil (/μL)	4393 (2607-5445)	4025 (2687-6970)	12705 (8784-16602)	<0.01*	0.98	<0.01*	<0.01*
Lymphocyte (/μL)	440 (141-707)	750 (445-982)	755 (556-1222)	<0.01*	0.15	<0.01*	0.44
Neutrophil/Lymphocyte ratio	9.6 (5.1-30.9)	6.7 (2.7-21.8)	13.8 (8.4-22.4)	0.22			
Platelets (x10^4/μL)	12.0 (6.8-20.4)	22.6 (12.7-31.3)	17.1 (12.1-23.0)	0.08			
Fibrinogen (mg/dL)	526 (424-615)	383 (294-415)	433 (369-584)0.04*	<0.01*	0.25	0.14	
D-dimer (mg/dL)	5.5 (1.7-21.0)	2.5 (0.8-7.5)	13 (3.1-30.7)	0.13			
LDH (U/L)	472 (322-880)	341 (309-704)	577 (445-792)	0.08			
AST (U/L)	100 (45-232)	57 (46-202)	101 (69-178)	0.30			
CPK (IU/L)	77 (44-98)	99 (74-564)	44 (25-104)	0.03*	0.08	0.48	0.01*
CRP (mg/dL)	9.0 (4.5-17.7)	12.4 (7.1-20.5)	1.4 (0.5-2.4)	<0.01*	<0.01*	0.12	<0.01*
Ferritin (ng/mL)	1801 (916-2677)	2004 (1138-3268)	8540 (4371-30580)	<0.01*	0.54	<0.01*	0.01*
IgG (mg/dL)	1161 (1055-1323)	1393 (1313-1630)	1259 (1065-1536)	<0.01*	<0.01*	0.15	0.17
Triglycerides (mg/dL)	128 (62-160)	182 (156-192)	170 (117-226)	0.07			
KL-6 (U/dL)	279 (229-526)	566 (433-924)	233 177-318	<0.01*	<0.01*	0.02*	<0.01*
Antinuclear antibody, n (%)	2 (14.2%)	2 (20.0%)	5 (12.5%)	0.38			
Rheumatoid factor, n (%)	1 (7.1%)	1 (10.0%)	3 (7.5%)	0.45			
Antiphospholipid antibody, n (%)	1 (7.1%)	1 (10.0%)	0 (0%)	0.16			
Anti-cardiolipin antibody, n (%)	0 (0%)	1 (10.0%)	0 (0%)	0.06			
Lupus anticoagulant, n (%)	1 (7.1%)	0 (0%)	0 (0%)	0.16			

Values are mean ± SD or median (IQR) unless otherwise specified.
EULAR/ACR/PRINTO European League Against Rheumatism/American College of Rheumatology /Paediatric Rheumatology International Trials Organization; COVID-19: Coronavirus disease 2019; MDA5: melanoma differentiation-associated protein 5; LDH: lactate dehydrogenase; AST: aspartate aminotransferase; ALT: alanine aminotransferase; CRP: C-reactive protein; KL-6: Krebs von den Lungen-6.