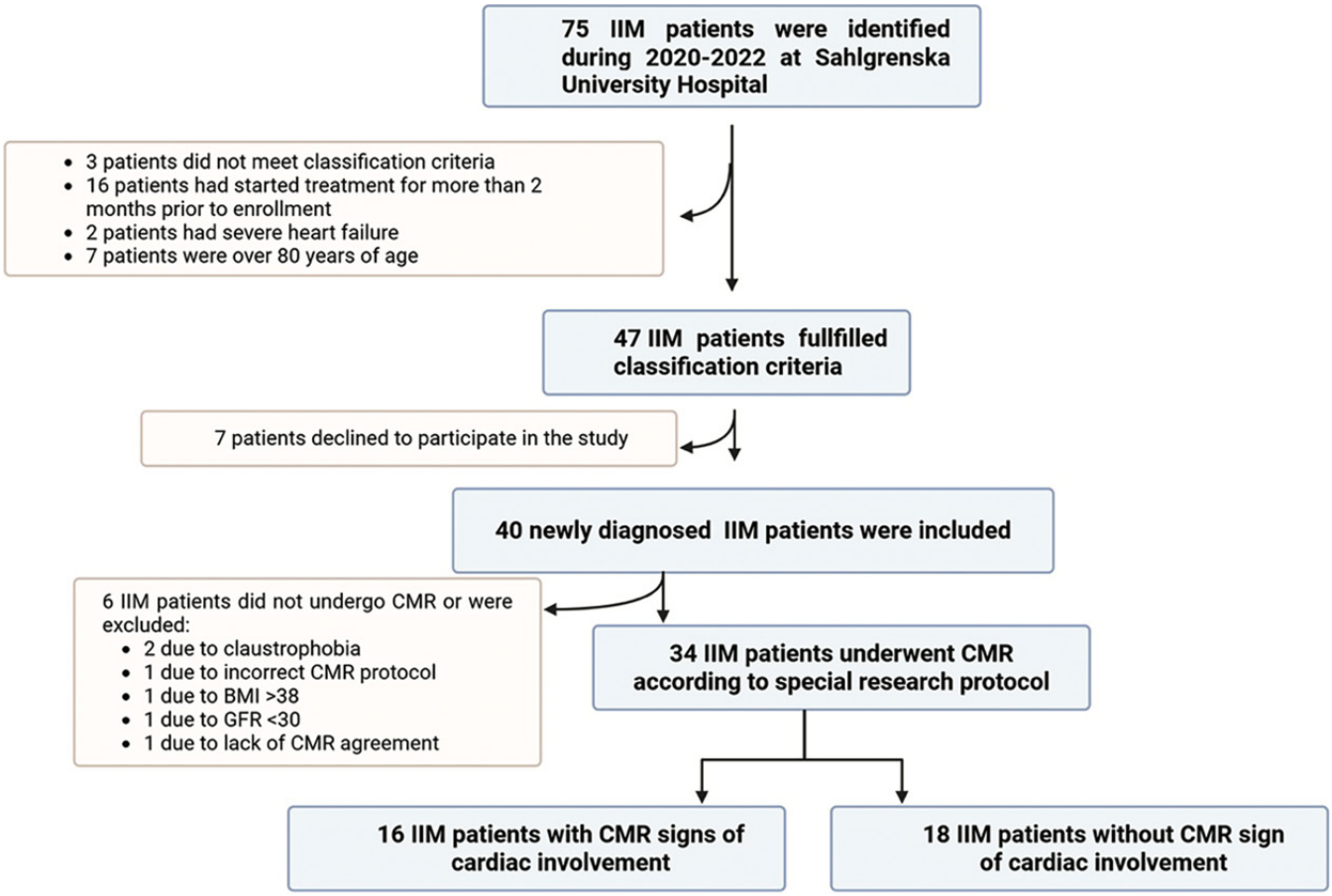

Supplementary Fig. S1. Overall design of the present study. Patients were included, if they met the 2017 EULAR/ACR classification criteria for IIM or the definite diagnosis of anti-synthetase syndrome (Connors, 2010) and overlap myositis (Troyanov, 2005).
IIM: idiopathic inflammatory myopathies; BMI: body mass index.

Supplementary Table S1. Myositis specific and myositis associated antibodies in IIM patients with and without CMR-verified cardiac involvement.

Antibody	Pericarditis (n=4)	Myocarditis/ perimyocarditis (n=7)	Previous myocarditis (n=5)	IIM without cardiac involvement (n=18)
Jo-1		2 [b]		5[a]
EJ				1
PL-12				1
PL-7				2 [a]
OJ				
SRP		1[b]		1
SAE-1			1	
NXP2				
TIF1-γ	1			1
MDA-5		1		3
Mi-2β	1		1	
Mi-2α				1
HMGCR	2		2	4
Ro-52		1		
PMScl-100		2[c]		
PMScl-75		1[c]		
Ku				1

[a] One patient exhibited positivity for two anti-synthetase antibodies (anti-Jo1, anti-PL7). [b] One patient presented simultaneously positive anti-Jo1 and anti-SRP antibodies. [c] One patient presented both anti-PM/Scl-75 and anti-PM/Scl-100 antibodies.
CMR: cardiac magnetic resonance; IIM: idiopathic inflammatory myopathies.

Supplementary Table S2. ECG and TTE findings in idiopathic inflammatory myopathies versus healthy controls.

Variables	Healthy controls (n=9)	IIM (n=34)	*p*-value
ECG			
Arrythmia, n (%)	1 (11)	10 (29)	0.406
Cardiac axis, °	44 (26-65)	22 (-1-54)	0.084
PQ interval, ms	160 (135-176)	160 (1432-178)	0.647
QRS, ms	98 (85-105)	90 (84-97)	0.303
QTc, ms	417 (406-430)	424 (414-436)	0.384
ST-T changes, n (%)	0 (0)	12 (35)	**0.043**
TTE			
LV-EDVI, ml/m^2	51 (47-58)	47 (42-54)	0.145
LV-ESVI, ml/m^2	21 (18-24)	19 (16-22)	0.155
EF%	61 (59-62)	61 (57-63)	0.791
GLS %	-21 (-24- (-18))	-21 (-24- (-19))	0.884
Diastolic dysfunction, n (%)	1 (11)	6 (18)	>0.999
Abnormal Filling pressure	0	2 (9)	>0.999
Cardiac output, mm/m^2	41 (38-47)	45 (36-50)	0.837
TAPSE, mm	24 (22-26)	22 (19-24)	0.258
s-PH (PAP>35mmHg)	0	7 (21)	0.313

Data are median (IQR) unless otherwise indicated.
ECG: electrocardiography; LV-EDVI: left ventricular end-diastolic volume index; LV-ESVI: left ventricular end-systolic volume index; EF: ejection fraction; GLS: global longitudinal strain; ms: millisecond; PAP: pulmonary artery pressure; TTE: transthoracic echocardiography; TAPSE: tricuspid annular plane systolic excursion; s-PH: suspected pulmonary hypertension.
Bold value indicates $p<0.05$.

Supplementary Table S3. Laboratory findings in IIM with and without cardiac involvement and healthy controls.

Variables	Healthy controls n=9	IIM without cardiac involvement, n=18	IIM with cardiac involvement, n=16
CK, µkat/L	1.5 (1-2.2)	3.3 (0.8-38)	23 (9-157)
Myoglobin, µg/L	32 (22-61)	92.5 (23.7-888.5)	563 (223-3536) *
Elevated CK, n (%)	0	8 (44)	13 (81) *
Elevated Myoglobin, n (%)	0	9 (50)	13 (81)
AST, µkat/L	0.4 (0.3-0.4)	0.7 (0.4-1.4)	2.5 (0.9-4) **
ALT, µkat/L	0.3 (0.2-0.5)	0.8 (0.3-2.1)	1.7 (1-4.1) *
CRP, mg/L	2.1 (1.6-3.8)	17 (5-30)	19 (7-32)
ESR mm/L	5 (3-9)	4 (2-8)	6 (2-19)
HB, g/L	146 (131-152)	131 (110-142)	132 (122-143)
WBC, 10^9/L	5 (4.6-6.2)	7 (6-11)	7 (5-9)
Platelet, 10^9/L	241 (210-272)	261 (217-324)	308 (234-530)
cTnI	4.9 (4.9-4.9)	5.5 (5-10.5)	9 (5-55)
Elevated cTnI (>36 ng/L)	0	2 (11)	6 (37)
NT-proBNP, ng/L	62 (24-94)	129 (68-408)	253 (123-865)
Elevated NT-proBNP (>125 ng/L)	0	11 (61)	12 (75)

Data are median (IQR), otherwise indicated.
ALT: alanine aminotransferase; AST: aspartate aminotransferase; CK: creatine kinase; CRP: C-reactive protein; cTnI: cardiac troponin I; ESR: erythrocyte sedimentation rate; HB: haemoglobin; IIM: idiopathic inflammatory myopathies; NT-proBNP: N-terminal pro-brain natriuretic peptide; WBC: white blood cell.
* $p<0.05$, ** $p<0.01$.

Supplementary Table S4. ECG and TTE findings in IIM with and without cardiac involvement *versus* healthy controls.

Variables	Healthy controls (n=9)	IIM without cardiac involvement (n=18)	IIM with cardiac involvement (n=16)
ECG			
Arrythmia, n (%)	1 (11)	4 (22)	6 (37)
Cardiac axis, °	44 (26-65)	12 (-5.2-47)	32 (6-64)
PQ interval, ms	160 (135-176)	169 (139-188)	159 (143-175)
QRS, ms	98 (85-105)	91 (84-100)	90 (82-94)
QTc, ms	417 (406-430)	424 (414-440)	423 (412-435)
ST-T changes, n (%)	0 (0)	7 (39)*	5 (31)
TTE			
LV-EDVI, ml/m^2	51 (47-58)	45 (41-47)	51 (43-68)
LV-ESVI, ml/m^2	21 (18-24)	18 (15-20)	20 (17-29)
EF%	61 (59-62)	61 (57-64)	60 (50-63)
GLS, %	-21 (-24- -18)	-22 (-24- -20)	-21 (-21- -15)
Diastolic dysfunction, n (%)	1 (11)	4 (26)	2 (17)
Abnormal Filling pressure	0	1 (6)	1 (6)
Cardiac output, mm/m^2	41 (38-47)	45 (36-47)	44 (37-52)
TAPSE, mm	24 (22-26)	22 (18-26)	22 (19-25)
PAP, mmHg	31 (29-33)	34 (30- 41)	33 (29-39)
sPH, n (%)	0	2 (14)	2 (17)

Data are median (IQR) unless otherwise indicated.
ECG: electrocardiography; LV-EDVI: left ventricular end-diastolic volume index; LV-ESVI: left ventricular end-systolic volume index; EF: ejection fraction; GLS: global longitudinal strain; IIM: idiopathic inflammatory myopathies; ms: millisecond; PAP: pulmonary artery pressure; TTE: transthoracic echocardiography; TAPSE: tricuspid annular plane systolic excursion; sPH: suspected pulmonary hypertension defined as a PAP > 35mmHg.
* p=0.029 between healthy controls and IIM without cardiac involvement.

Supplementary Table S5. CMR finding in IIM with and without cardiac involvement and healthy controls.

Variables	IIM with cardiac involvement n=16	IIM without cardiac involvement n=18	Healthy controls n=9
Non-ischemic LGE, n (%)	11 (69)***	1 (6)	1 (11)
Pathologic T2 BB STIR, n (%)	11 (69)****	0	0
Pathologic native T1 mapping, n (%)	8 (50)	3 (17)	2 (22)
Pathologic T2 mapping, n (%)	9 (56)***	0	0
LV-EDVI, ml/m^2	82 (58-87)	71 (57-88)	82 (54-88)
LV-ESVI, ml/m^2	30 (20-36)	28 (21-41)	35 (19-37)
LV-EF, %	61 (56-66)	59 (53-66)	59 (56-63)
RV-EDVI, ml/m^2	86 (58-92)	81 (57-87)	86 (56-92)
RV-ESVI, ml/m^2	31 (24-42)	32 (22-43)	38 (21-45)
RV-EF, %	58 (55-65)	57 (47-60)	57 (52-60)

Data are median (IQR), otherwise indicated.
CMR: cardiac magnetic resonance; LGE: late gadolinium enhancement; LV-EDVI: left ventricular end-diastolic volume index; LV-ESVI: left ventricular end-systolic volume index; LV-EF: left ventricular ejection fraction; RV-EDVI: right ventricular end-diastolic volume index; RV-ESVI: right ventricular end-systolic volume index; RV-EF: right ventricular ejection fraction; T2 BB STIR: T2-weighted black blood short tau inversion recovery sequence.
***p-value <0.001 between IIM with cardiac involvement, IIM without cardiac involvement.
****p-value <0.0001 between IIM with cardiac involvement, IIM without cardiac involvement.

Supplementary Table S6. Electrocardiographic and transthoracic changes in IIM patients with ongoing myocarditis/perimyocarditis, ongoing pericarditis and previous myocarditis.

	Ongoing myocarditis/ peri-myocarditis (n = 7)	Ongoing pericarditis (n= 4)	Previous myocarditis (n= 5)
Electrocardiographic changes			
Arrythmia, n (%)	4 (57)	0	2 (40)
Cardiac axis, °	26 (-41-65)	41 (18-61)	28 (7-56)
PQ interval, ms	160 (142-172)	142 (135-183)	160 (156-177)
QRS, ms	92 (88-94)	82 (82-88)	94 (83-109)
QTc, ms	426 (411-481)	428 (402-435)	415 (413-425)
Abnormal Q-wave, n (%)	0	0	0
Transthoracic echocardiography			
LV/EDVI, ml/m^2	65 (51-87)	45.6 (43.8-48.8)	56 (37-66)
LV/ESVI, ml/m^2	26 (19-58)	17 (16-19)	21 (17-31)
EF%	60 (40-62)	62 (61-63)	59 (42-65)
GLS %	-20 (-23 - -11)	-21.3 (-21.4- -21.3)	-20.6 (-20.8- -16.3)
Diastolic dysfunction, n (%)	0	2 (50)	0
High filling pressure, n (%)	1 (14)	0	0
Cardiac output, mm/m^2	43 (30-48)	49 (39-54)	44 (33-58)
TAPSE, mm	22 (19-33)	23 (18-26)	22 (17-23)
PAP, mmHg	33 (27-43)	37 (32-44)	30 (26-33)
sPH (PAP >35 mmHg), n (%)	1 (14)	2 (50)	0

Data are median (IQR; interquartile range), otherwise indicated.
EF: ejection fraction; GLS: global longitudinal strain; IIM: idiopathic inflammatory myopathy; LV/EDVI: left ventricular end-diastolic volume index; LV/ESVI: left ventricular end-systolic volume index; ms: millisecond; PAP: pulmonary artery pressure; sPH: suspected pulmonary hypertension; TAPSE: tricuspid annular plane systolic excursion.

Supplementary Table S7. Characteristics of 3 IIM patients with severe perimyocarditis.

Parameter	**Patient 1**	**Patient 2**	**Patient 3**
Age (years)	72	18	45
Gender	Male	Male	Male
BMI, kg/m^2	31	17	22
Comorbidities	Diabetes mellitus type2, hypertension, hyperlipidaemia	None	None
IIM subtype	Overlap myositis	IMNM	IMNM
Antibody profile	Anti-Jo1, ACPA	PM/SCL 75	None
Skeletal muscle markers	Elevated CK, myoglobin, AST, ALT	Elevated CK, myoglobin, AST, ALT	Elevated CK, myoglobin, AST, ALT
Cardiac injury markers - cTnI (>36 ng/L) -NTproBNP (>125 ng/L)	 970 1000	 6400 3630	 300 20800
Clinical manifestations	Myositis, arthralgia, interstitial lung disease	Myositis	Myositis, interstitial lung disease
Cardiac symptoms	0	0	Palpitation
ECG findings	None	Sinus arrhythmia, VES, ST-T changes	Sinus Tachycardia, Left Axis deviation, Intraventricular conduction defect
TTE findings	Normal findings	Pathologic EF, GLS, EDVI and ESVI	Pathologic EF, GLS, EDVI, ESVI and PAP
CMR findings	Pathologic T2 BB STIR, T1 and T2 mapping	Pathologic T2 BB STIR, T1 and T2 mapping	DE, Pathologic T2 BB STIR, T1 and T2 mapping

AST: aspartate aminotransferase; ALT: alanine aminotransferase BMI: body mass index; CK: creatine kinase; CMR: cardiac magnetic resonance; cTnI: cardiac troponin I; ECG: electrocardiography; IIM: idiopathic inflammatory myopathies; IMNM: immune-mediated necrotising myositis; LGE: late gadolinium enhancement; MSA: myositis specific antibodies; NT-proBNP: N-terminal pro-brain natriuretic peptide; TTE: transthoracic echocardiography.