SUPPLEMENTARY TABLES

Table S1. Inclusion/Exclusion Criteria

Inclusion Criteria
Aged 35-75 (including 35 and 75).
Have signed the Informed Consent Form.
Patients have chronic left ventricular dysfunction.
Patients have NYHA Class III-IV cardiac function in spite of optimal heart failure maximally tolerated guideline-directed medical therapy.
Patients have indications for Coronary Artery Bypass Grafting.
20% ≤ LVEF ≤ 45% as determined by echocardiogram (data collected up to 6 months prior to inclusion evaluation are valid; data collected within 1 month since a myocardial infarction are invalid).
Weakening or absence of segmental regional wall motion as determined by standard imaging.
Exclusion Criteria
PRA ≥ 20% or DSA-positive.
Previous implantation of ICD, CRT or similar treatment.
Valvular heart disease or received heart valvular disease
Previous percutaneous transluminal coronary intervention (PCI)
Atrial fibrillation
History of sustained ventricular tachycardia or sudden cardiac death.
Baseline glomerular filtration rate <30ml/min/1.73m^2.
Liver dysfunction, as evidenced by enzymes (AST and ALT) greater than three times the ULN.
Hematological abnormality: A hematocrit <25% as determined by HCT, white blood cell<2500/ul or platelet values <100000/ul without another explanation.
Known, serious radiographic contrast allergy, penicillin allergy, streptomycin allergy.
Coagulopathy (INR>1.3) not due to a reversible cause.
Contra-indication to performance of an MRI scan.
History of organ transplant.
Clinical history of malignancy within 5 years (patients with prior malignancy

must be disease-free for 5 years).

Non-cardiac condition that limits lifespan <1 year.

Chronic therapy with immunosuppressant medication, such as glucocorticoids and TNFα antagonist.

Patients' allergy to or contra-indication to immunosuppressants.

Serum positivity for HIV, HBV, HCV, TP.

Currently enrolled in other investigational therapeutic or device study.

Female patient who is pregnant or breast-feeding.

Other conditions that researchers consider not suitable to participate in this study.

Table S2. Proportion of Premature ventricular beats to total heartbeats assessed by Holter monitoring within 1-month postoperatively in all patients.

No.	D7	D14	D21	D28
Control group				
003	0.10%	0.10%	< 1%	< 1%
004	< 1%	< 1%	< 1%	< 1%
006	2%	1%	2%	2%
007	1%	< 1%	3%	2.30%
010	< 1%	< 1%	< 1%	< 1%
011	< 1%	< 1%	< 1%	< 1%
014	< 1%	< 1%	< 1%	< 1%
015	< 1%	< 1%	< 1%	< 1%
019	< 1%	NA	NA	NA
020	2%	NA	NA	NA
Cell therapy group				
001	6.20%	100%	100%	100%
002	0.70%	32%	4%	< 1%
005	< 1%	9%	18%	13%
008	0.52%	94%	3%	5%
009	0.02	82	< 1%	< 1%
012	27	< 1%	2%	2%
013	< 1%	97%	95%	7%
016	5%	100%	< 1%	< 1%
017	47%	99%	77%	86%
018	< 1%	98%	< 1%	< 1%

Table S3. Serious Adverse Events

Case No.	Serious adverse event	Group	Causality	Outcome
001	Ventricular tachycardia	Cell therapy	Possibly Related	Resolved
001	Cardiac dysfunction	Cell therapy	Possibly unrelated	Improved
001	Severe hepatic impairment	Cell therapy	Possibly unrelated	Resolved
008	Severe hepatorenal impairment	Cell therapy	Possibly unrelated	Resolved
008	Ventricular tachycardia	Cell therapy	Possibly Related	Resolved
018	Ventricular fibrillation	Cell therapy	Possibly unrelated	Resolved
019	Cardiac arrest	Control	Unrelated	Fatal

Table S4. Adverse Events

	Control n=10	Cell therapy n=10
Serious adverse events		
Ventricular Tachycardia	0	2 (20%)
Cardiac dysfunction	0	1 (10%)
Ventricular Fibrillation	0	1 (10%)
Cardiac arrest	1 (10%)	0
Severe hepatic impairment	0	1 (10%)
Severe hepatorenal impairment	0	1 (10%)
Non-serious adverse events		
Premature Ventricular Complex	6 (60%)	10 (100%)
Ventricular Tachycardia	0	8 (80%)
Accelerated Idioventricular Rhythm	0	6 (60%)
Sinus Tachycardia	1 (10%)	1 (10%)
Atrial Tachycardia	1 (10%)	1 (10%)
Premature Atrial Complex	3 (30%)	5 (50%)
Atrial Flutter	2 (20%)	0
Atrial Fibrillation	1 (10%)	3 (30%)
Accelerated Junctional Rhythm	0	1 (10%)
Prolonged R-R interval	2 (20%)	1 (10%)
Atrioventricular Block	2 (20%)	2 (20%)
Intraventricular Block	0	2 (20%)
ST-segment elevation	2 (20%)	0
Myocardial ischemia	2 (20%)	0

Myocardial infarction	1 (10%)	1 (10%)
Hypotension	2 (20%)	3 (30%)
Angina	0	1 (10%)
Elevated blood pressure	1 (10%)	0
Anemia	8 (80%)	8 (80%)
Prolonged thrombin time	2 (20%)	1 (10%)
Prolonged Activated Partial Thromboplastin Time	2 (20%)	1 (10%)
Decreased platelet count	1 (10%)	3 (30%)
Decreased eGFR	1 (10%)	2 (20%)
Increased creatinine	0	3 (30%)
Increased urea	1 (10%)	1 (10%)
Urea protein positive	0	1 (10%)
Urine occult blood positive	0	1 (10%)
Acute kidney injury	0	1 (10%)
Renal insufficiency	0	1 (10%)
Increased alanine aminotransferase	3 (30%)	4 (40%)
Increased gamma-glutamyl transferase	0	1 (10%)
Increased alkaline phosphatase	0	2 (20%)
Pleural Effusion	2 (20%)	3 (30%)
Pulmonary Nodule	1 (10%)	1 (10%)
Pneumonia	1 (10%)	1 (10%)
COVID-19	2 (20%)	0
Urinary Tract Infection	0	1 (10%)
Elevated Interferon-gamma	0	1 (10%)
Decreased Thyroid-Stimulating Hormone	0	1 (10%)
Elevated Free Triiodothyronine	0	1 (10%)
Hypothyroidism	0	1 (10%)

Constipation	1 (10%)	1 (10%)
Fracture	0	1 (10%)
Cholelithiasis	1 (10%)	0
Hyperchloremia	1 (10%)	1 (10%)
Nasal bleeding	0	1 (10%)

Numbers represent n (%).

Table S5. Incidence of *De novo* PRA and DSA in Cell therapy group.

Time	Patients (n)	PRA-positive, n	DSA-positive, n
Baseline	10	0	0
1 month	10	0	4
6 months	9	3	8
12 months	9	0	4

PRA: panel reactive antibody; DSA: donor-specific antibody; All patients had confirmed baseline PRA and DSA negativity.

Table S6. Baseline and Changes in Echocardiographic Parameters at 6 and 12 Months

	Control	Cell therapy
Baseline		
Participants (n)	10	10
LVEF		
Mean±SD (%)	36.16 ± 3.86	37.80 ± 4.78
Median (%)-IQR	37.00 (34.45, 39.00)	38.50 (32.00, 41.25)
6 months		
Participants (n)	8	9
LVEF		
Mean±SD (%)	41.30 ± 4.42	41.89 ± 5.44
Median (%)-IQR	41.00 (40.00, 43.00)	42.00 (36.50, 46.00)
12 months		
Participants (n)	7	9
LVEF		
Mean±SD (%)	41.57 ± 4.19	42.55 ± 5.68
Median (%)-IQR	41.50 (38.00, 44.00)	42.00 (38.50, 46.00)

Numbers represent mean ± SD and median (IQR). LVEF: left ventricular ejection fraction.

Table S7. Baseline and Changes in Cardiac MRI Parameters at 12 Months

	Control	Cell therapy
Baseline		
Participants (n)	10	10
LVEF		
Mean±SD (%)	28.00 ± 8.83	27.50 ± 4.09
Median (%)-IQR	30.00 (23.75, 33.25)	28.00 (24.00, 30.25)
Stroke volume		
Mean±SD (ml)	41.07 ± 7.07	33.79 ± 13.42
Median (ml)-IQR	41.60 (39.85, 44.68)	34.35 (25.13, 45.15)
12 months		
Participants (n)	7	9
LVEF		
Mean±SD (%)	29.29 ± 9.41	29.22 ± 16.03
Median (%)-IQR	32.00 (26.00, 36.00)	25.00 (16.50, 39.00)
Stroke volume		
Mean±SD (ml)	34.09 ± 8.74	40.73 ± 16.62
Median (ml)-IQR	34.20 (26.10, 40.10)	38.70 (26.10, 56.75)

Numbers represent mean ± SD and median (IQR). LVEF: left ventricular ejection fraction.

Figure S1

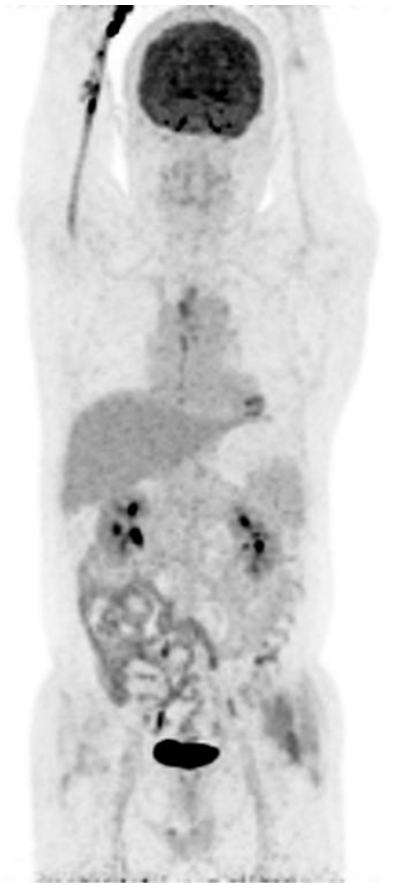

Figure S1 Representative image of 18F-FDG-PET at 12 months after hiPSC-CMs treatment in Cell therapy group.

Figure S2.

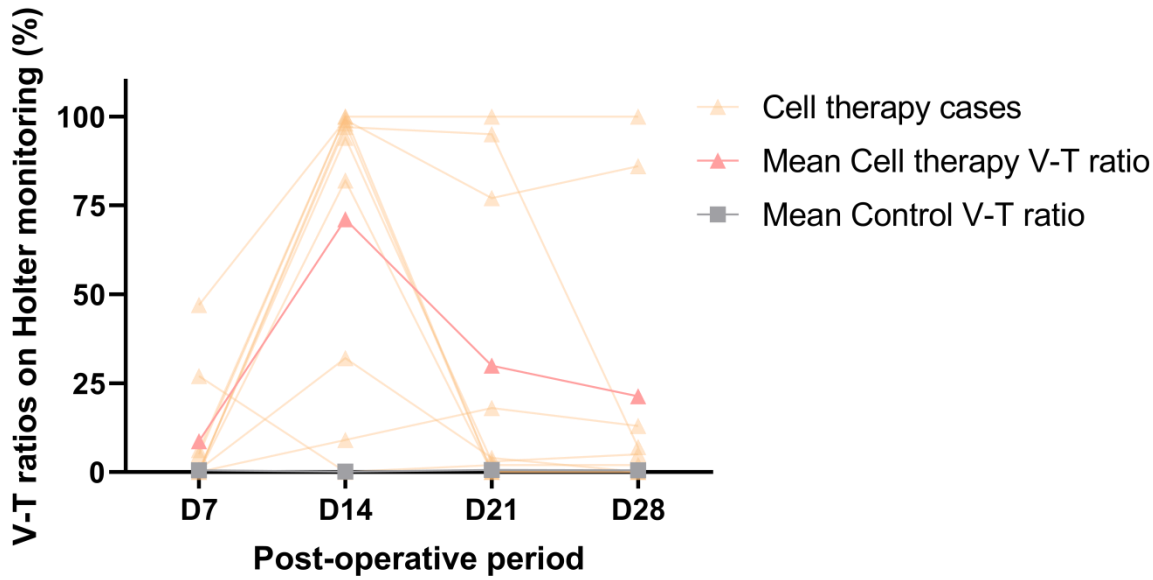

Figure S2. Temporal evolution of ventricular arrhythmia burden post-procedure.
Holter-monitored Premature ventricular-to-total beat ratio (V-T ratio, %) at postoperative day 7, 14, 21 and 28 post-procedure.

Figure S3.

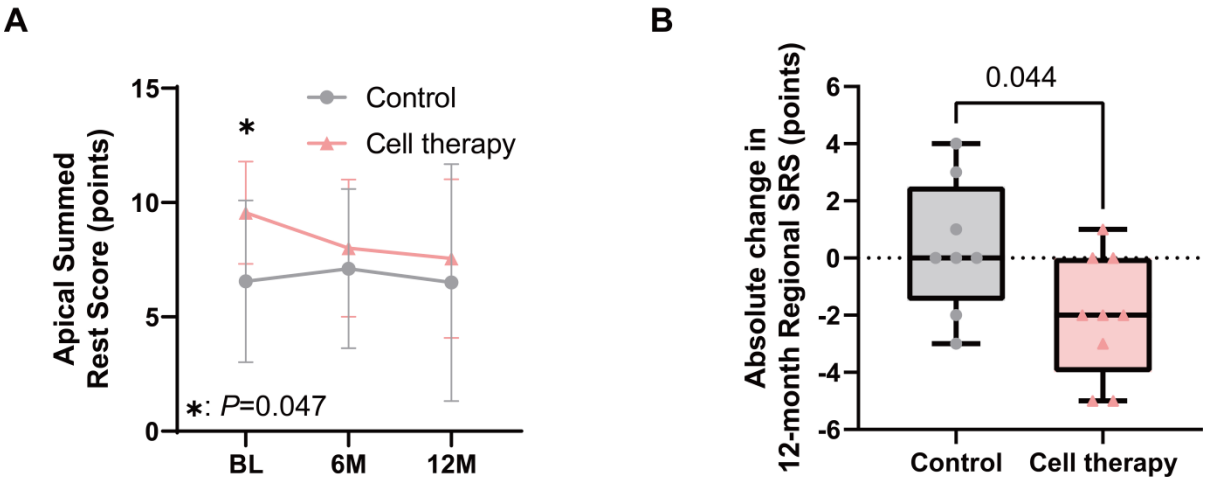

Figure S3. Quantitative analysis of Apical summed rest score.

(A) Longitudinal change in Apical Summed Rest Score (SRS) from baseline to 12-month follow-up as detected by ^{99m}Tc SPECT-CT. (B)12-month absolute change in apical SRS. The apical region was defined as apical anterior (13), apical septal (14) and apex (17) segments according to the 17-segment myocardial model. Differences between groups (two-tailed Student's *t*-test) are numerically annotated in the corresponding panels.