

SUPPLEMENTAL MATERIAL

Table S1. Patient characteristics with and without a CTO.

Characteristics	CTO absent (n=176)	CTO present (n=100)	P- value
Age (years)	67 ± 10	66 ± 10	0.61
Male sex	154 (88%)	88 (88%)	0.90
Diabetes mellitus	28 (16%)	28 (28%)	0.02
Hypertension	76 (54%)	44 (49%)	0.46
Hyperlipidemia	49 (37%)	33 (38%)	0.84
BMI (kg/m ²)	27 ± 4	27 ± 5	0.92
Prior MI	113 (64%)	67 (67%)	0.64
Prior PCI	62 (35%)	28 (28%)	0.22
Prior CABG	61 (35%)	N/A	N/A
Atrial fibrillation	56 (32%)	33 (33%)	0.84
Creatinine (µmol/L)	85 (76 - 99)	87 (75 - 103)	0.99†
QRS duration (ms)	114 ± 26	111 ± 20	0.30
LVEF (%)	38 ± 12	38 ± 11	0.69
No. of segments with ischemic LGE*	4 (2-6)	6 (5-7)	<0.01†
No. transmural ischemic segments*	3 (0 – 4)	4 (2 – 6)	0.03†
No. subendocardial segments*	1 (0 – 3)	1 (0 – 4)	0.61†
ACEi/ARB	150 (85%)	87 (87%)	0.68
Beta-blockers	163 (93%)	88 (88%)	0.20
Amiodarone	24 (14%)	15 (15%)	0.76

ICD	162 (92%)	97 (97%)	0.10
CRT-D	14 (8%)	3 (3%)	0.10

Dichotomous variables compared using the chi-square test or Fischer's exact test. Continuous variables compared using t-tests unless otherwise indicated. * based on 166 patients; † tested using Mann-Whitney U test. ACEi, angiotensin converting enzyme inhibitors; ARB, angiotensin receptor blocker; BMI; body mass index; CABG, coronary arterial bypass graft surgery; CRT-D, resynchronisation therapy; ICD, implantable cardioverter defibrillator; LGE, late gadolinium enhancement; LVEF, left ventricular ejection fraction; MI; myocardial infarction; PCI, percutaneous coronary intervention.

Table S2. Patient characteristics with and without LGE-CMR.

Characteristics	Total Cohort (n=276)	Patients without CMR (n=110)	Patients with CMR (n=166)	P-value
ICD-off-label group	48 (17%)	16 (15%)	32 (19%)	0.31
Age (years)	67 ± 10	70 ± 8	65 ± 10	<0.01
Male sex	242 (80%)	97 (82%)	145 (87%)	0.84
Amsterdam UMC, Vrije Universiteit	190 (69%)	66 (60%)	124 (75%)	0.10
Northwest Clinics Alkmaar	86 (31%)	44 (40%)	42 (25%)	0.10
Cardiovascular risk factors				
Diabetes mellitus	56 (20%)	22 (20%)	34 (21%)	0.92
Hypertension	120 (44%)	47 (57%)	73 (49%)	0.29
Hyperlipidemia	82 (30%)	27 (35%)	55 (38%)	0.65
BMI (kg/m ²)	27 ± 4	27 ± 4	27 ± 4	0.55
Medical history				
Prior MI	180 (65%)	66 (60%)	114 (69%)	0.14
Prior PCI	90 (33%)	40 (36%)	50 (30%)	0.28
Prior CABG	61 (22%)	36 (33%)	25 (15%)	<0.01
LVEF (%)*	38 ± 11	36 ± 9	39 ± 12	0.17
Atrial fibrillation	89 (32%)	39 (36%)	50 (30%)	0.35
Creatinine (µmol/L)	86 (76 – 102)	91 (77 – 103)	85 (75 – 99)	0.34§
QRS duration (ms)	108 (96 – 126)	110 (96 – 130)	106 (96 – 122)	0.24§
Cardiac findings and intervention at index event				
VF at time of OHCA	180 (65%)	65 (59%)	115 (69%)	0.08

CK-MB † (ug/L)	22 (8 - 45)	37 (12 – 73)	19 (7 – 39)	0.01§
Troponine T ‡ (ug/L)	0.33 (0.11 – 0.98)	0.43 (0.10 – 1.37)	0.31 (0.12 – 0.87)	0.74§
Moderate/extensive exercise prior to arrest	69 (25%)	22 (22%)	47 (28%)	0.27
Diffuse non-obstructive CAD	74 (26%)	32 (29%)	42 (25%)	0.49
Multivessel disease	163 (59%)	76 (69%)	87 (52%)	<0.01
CTO present (no prior CABG)	100 (36%)	35 (32%)	65 (39%)	0.21
PCI performed	102 (37%)	37 (34%)	65 (39%)	0.35
CABG performed	26 (9%)	12 (11%)	14 (8%)	0.49
Complete revascularization	143 (52%)	57 (52%)	86 (52%)	0.99
<i>Medication at time of ICD implantation</i>				
ACEi/ARB	237 (86%)	93 (85%)	144 (87%)	0.61
Beta-blockers	251 (91%)	97 (88%)	154 (93%)	0.19
Ca channel blocker	23 (8%)	10 (9%)	13 (8%)	0.71
Amiodarone	39 (14%)	20 (18%)	19 (11%)	0.12
<i>Device Type and procedures</i>				
Upgrade procedures	15 (5%)	15 (14%)	0 (0%)	<0.001
ICD	259 (94%)	103 (94%)	156 (94%)	0.91
CRT-D	17 (6%)	7 (6%)	10 (6%)	0.91
<i>End points</i>				
Appropriate device therapy	106 (38%)	43 (39%)	63 (38%)	0.85

All-cause mortality	40 (15%)	18 (16%)	22 (13%)	0.47
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Dichotomous variables compared using the chi-square test or Fischer's exact test. Continuous variables compared using t-tests unless otherwise indicated.* based on 199 patients; † based on N=151; ‡ based on N=156; § tested using Mann-Whitney U test. ACEi, angiotensin converting enzyme inhibitors; ARB, angiotensin receptor blocker; BMI, body mass index; Ca, calcium; CABG, coronary arterial bypass graft surgery; CAD, coronary artery disease; CK-MB, creatinine kinase myocardial band, CRT-D, resynchronisation therapy; CTO, coronary chronic total occlusion; ICD, implantable cardioverter defibrillator; LVEF, left ventricular ejection fraction; MI, myocardial infarction; PCI, percutaneous coronary intervention; VF, ventricular fibrillation.

Table S3. Outcomes in the LGE-CMR-subgroup.

Parameters	Study cohort with CMR (n=166)	ICD-per-guideline with CMR (n=134)	ICD-off-label with CMR (n=32)	P-value
Appropriate ICD therapy	63 (38%)	57 (43%)	6 (19%)	0.01
ATP only	34 (20%)	31 (23%)	3 (9%)	0.08
ICD Shock	29 (17%)	26 (19%)	3 (9%)	0.18
Cumulative number of ICD therapy per patient	2 (1-4)	2 (1-4)	3 (2-3)	0.92*
VT ablation	15 (9%)	15 (11%)	0	0.08
All-cause mortality	22 (13%)	18 (13%)	4 (13%)	0.89

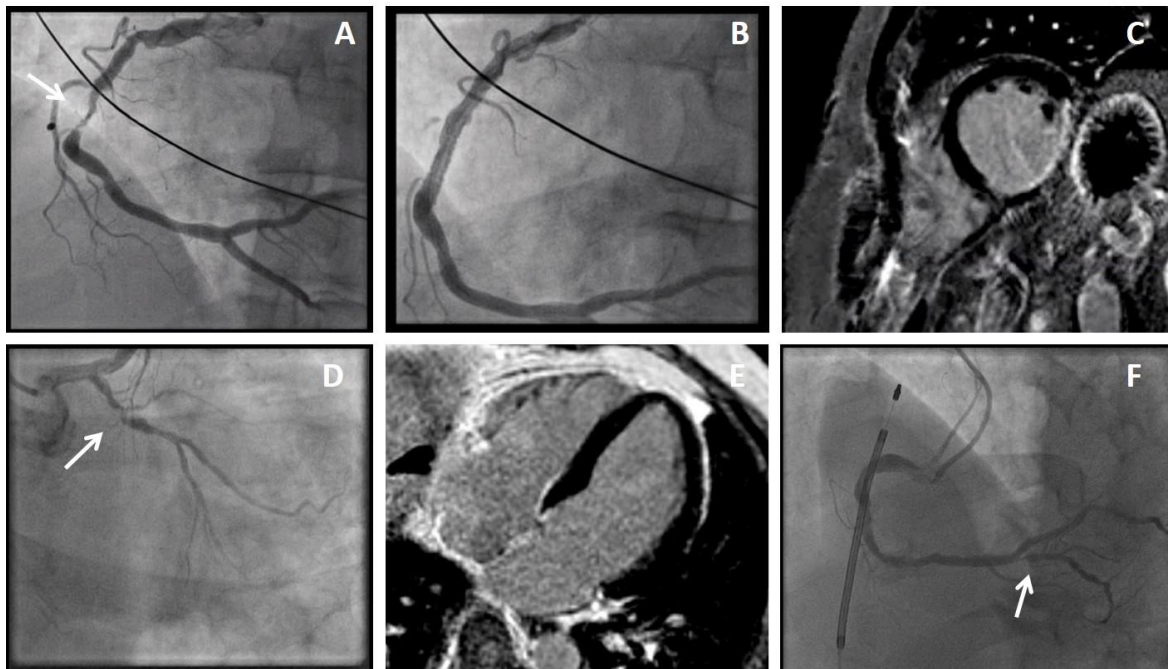
Dichotomous variables compared using the chi-square test or Fischer's exact test. Continuous variables compared using the Mann-Whitney U test. * tested using Mann-Whitney U test. ATP, anti-tachycardia pacing; CMR, cardiac magnetic resonance; ICD, implantable cardioverter defibrillator; VT ventricular tachycardia.

Table S4. Univariable and multivariable Cox regression analysis of clinical parameters for predicting appropriate device therapy in the total study cohort.

Parameter	HR (95% CI)	P-value	HR (95% CI)	P-value
N=276				
Univariable analysis			Multivariable analysis	
Age (years)	1.03 (1.01 – 1.05)	0.01	1.02 (1.01 – 1.04)	0.04
Male sex	2.10 (1.02 – 4.33)	0.04	2.39 (1.16 – 4.94)	0.02
Diabetes mellitus	1.15 (0.72 – 1.85)	0.55		
Prior MI	1.95 (1.25 – 3.05)	<0.01	1.64 (1.04 – 2.60)	0.03
Atrial fibrillation	1.20 (0.80 – 1.80)	0.38		
Beta-blocking therapy	1.00 (0.49 – 2.07)	0.99		
Creatinine (μmol/L)	1.00 (0.99 – 1.00)	0.66		
LVEF<35%	1.48 (0.90 – 2.43)	0.13		
Moderate-Intensive exercise	0.83 (0.52 – 1.32)	0.43		
CK-MB	1.00 (0.99 – 1.00)	0.53		
Multivessel CAD	1.24 (0.84 – 1.82)	0.29		
Incomplete revascularization	1.54 (1.05 – 2.26)	0.03	-	-
Untreated CTO	1.34 (0.88 – 2.02)	0.17		
ICD-Per-Guideline	3.30 (1.53 – 7.11)	<0.01	2.99 (1.40 – 6.47)	<0.01
CRT-D	1.73 (0.87 – 3.44)	0.12		

CAD, coronary artery disease; CK-MB, creatinine kinase myocardial band, CRT-D, resynchronization therapy defibrillator; CTO, coronary chronic total occlusion, ICD, implantable cardioverter defibrillator; LVEF, left ventricular ejection fraction; MI, myocardial infarction.

Figure S1. Case examples of ICD-off-label patients.



Case examples of two off-label patients. Case example 1 (A-C) is a patient with a history of a inferoposterolateral myocardial infarction. Acute angiography revealed a significant stenosis of the RCA (A), which was successfully treated with PCI (B). LGE-CMR showed a large transmural infarction in the inferolateral wall and a moderate LV function (LVEF 39%) (C). At follow-up the patient received two ICD shocks for VT. Case example 2 (D-F) is a patient without a cardiac history. After index cardiac arrest the angiography showed two significant stenosis of the RCX and RCA (D), which were both successfully stented. CMR revealed a good cardiac function (LVEF 55%) and without LGE. During follow-up, the patient developed VF and received an ICD shock. Repeated angiography revealed a newly developed stenosis of the RCA (F).