

Supplementary material

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Table S1. Standard preset parameters measured and transmitted to the RM facility

Medtronic	Boston Scientific	Biotronik	St Jude (now Abbott)
Atrial, ventricular and biventricular pacing (if applicable)	Atrial, ventricular and biventricular pacing (if applicable)	Atrial, ventricular and biventricular pacing (if applicable)	Atrial, ventricular and biventricular pacing (if applicable)
%	%	%	%
AT/AF burden	AT/AF burden	AT/AF burden	AT/AF burden
Ventricular tachyarrhythmias	Ventricular tachyarrhythmias	Ventricular tachyarrhythmias	Ventricular tachyarrhythmias
Device therapies with EGMs	Device therapies with EGMs	Device therapies with EGMs	Device therapies with EGMs
Lead parameters - pacing, sensing and impedance	Lead parameters - pacing, sensing and impedance	Lead parameters - pacing, sensing and impedance	Lead parameters - pacing, sensing and impedance
Device settings	Device settings	Device settings	Device settings
V-V interval for biventricular pacing	V-V interval for biventricular pacing	V-V interval for biventricular pacing	V-V interval for biventricular pacing
Patient's activity	Patient's activity	Patient's activity	Patient's activity
Nocturnal heart rate	Nocturnal heart rate	Nocturnal heart rate	

Heart rate variability	Heart rate variability (SDANN)	Heart rate variability	Heart rate variability
	Respiratory rate		
Thoracic impedance	Thoracic impedance	Thoracic impedance (in some devices)	Thoracic impedance (in some devices)
			Ventricular pacing >40%
Battery longevity	Battery longevity	Battery longevity	Battery longevity
No contact with the device in 7 days	No contact with the device in 14 days	No messages received in 21 days	No contact with the device in 8 days

Abbreviations: AF, atrial fibrillation; AT, atrial tachycardia; EGM, electrogram; SDANN, standard deviation of the 5 minute average NN intervals; V-V, interventricular

Table S2. The causes of death based on the respective International Statistical Classification of Diseases and Related Health Problems (ICD-10) codes, ordered alphabetically

Cause of death	ICD-10
Enterocolitis due to <i>Clostridium difficile</i>	A04.7
Sepsis, unspecified	A41.9
Malignant neoplasm of hypopharynx, unspecified	C13.9
Malignant neoplasm of bladder	C67
Non-Hodgkin lymphoma, unspecified	C85.9
Type 2 diabetes mellitus with kidney complications	E11.2
Ischemic heart disease	I25.1, I25.9
Nonrheumatic mitral valve insufficiency	I34
Cardiac arrest, cause unspecified	I46.9
Heart failure	I50.0, I50.1, I50.9

Embolism and thrombosis of arteries of the lower extremities	I74.3
Influenza due to unidentified influenza virus with other respiratory manifestations	I11.1
Pneumonia	J15.8, J18.9
Unspecified pneumoconiosis	J64
Acute respiratory distress syndrome	J80
Pulmonary edema	J81.0
Respiratory failure	J96.0, J96.1, J96.9
Ileus, unspecified	K56.7
Alcoholic cirrhosis of liver	K70.3
Chronic kidney disease (CKD)	N18, N18.9
Dyspnea	R06
Respiratory arrest	R09.2
Shock, other	R57.8
Other general symptoms and signs	R68.8
Unspecified injury of face and head	S09.9
Injury of spleen	S36.0
Fracture of head and neck of femur	S72.0
<i>Other specified injuries</i> involving multiple body regions	<i>T06.8</i>
Poisoning by, adverse effect of and underdosing of anticoagulants and antithrombotic drugs	T45.5
Encounter for other specified aftercare	Z51.8
Heart transplant status	Z94.1

Table S3. Details of the overall population monitored remotely in our facility

Patients with ICD/CRT-D enrolled at the remote monitoring programme who generated at ≥ 1 remote transmission	All (n = 1271)
No alerts during the RM, % (n)	15.6% (n = 198)
Any alert during the RM, % (n)	84.4% (n = 1073)
Any alert in the first year of RM, % (n)	68.7% (n = 874)
Any alert in the first two years of RM, % (n)	73.7% (n = 938)
Any alert in the first three years of RM, % (n)	79.6% (n = 1013)
Duration of remote monitoring period in the overall population, years, median (IQR)	4.98 (3.62–6.73)
Mortality during the period of remote monitoring	
With no alerts during the RM, % (n/N)	12.6% (25/198)
With alerts during the RM, % (n/N)	29.7% (318/1,073)
Characteristics of the last transmission in patients with alerts during the RM	All patients with alerts (n = 318)
Alert-triggered, % (n/N)	47.8% (n = 152)
Non-alert-triggered, % (n/N)	52.2% (n = 166)

Abbreviations: CRT-D, cardiac resynchronization therapy – implantable cardioverter–defibrillator; ICD, implantable cardioverter-defibrillator; RM, remote monitoring

Table S4. Percentage of the causes of last alert-triggered transmissions, with respect to their occurrence during the entire RM period

Cause of alert	All alert-triggered transmissions (n = 142)	No of patients in whom such alert had ever occurred before (%)	No of patients in whom such alert occurred for the first time (%)
AF/AFL episode, n (%)	56 (39.4%)	54 (96.4%)	2 (3.6%)
SVT episode, n (%)	5 (3.5%)	5 (100%)	0
Lead dysfunction suspicion, n (%)	2 (1.4%)	2 (100%)	0
Ventricular tachycardia, n (%)	23 (16.2%)	19 (82.6%)	4 (17.4%)
Ventricular fibrillation, n (%)	15 (10.6%)	11 (73.3%)	4 (26.7%)
Biventricular pacing percentage reduction, n (%)	15 (10.6%)	13 (86.7%)	2 (13.3%)
Congestion monitor indications, n (%)	5 (3.5%)	5 (100%)	0
Others		21 (14.7%)	

Abbreviations: AF, atrial fibrillation; AFL, atrial flutter; ATP, antitachycardia pacing; ES, electrical storm; HV, high-voltage therapy; RM, remote monitoring; SVT, supraventricular tachycardia; VF, ventricular fibrillation; VT, ventricular tachycardia

Table S5. Causes of death in 78 patients with last alert-triggered transmission who died in the hospital

The primary cause of death	All (n = 78)
Heart failure, n (%)	34 (43.6%)
Respiratory failure, n (%)	4 (5.1%)
Chronic kidney disease, n (%)	4 (5.1%)
Pneumonia, n (%)	3 (3.9%)
Cardiac arrest, n (%)	3 (3.9%)
Heart transplant, n (%)	2 (2.6%)
Acute pulmonary oedema, n (%)	2 (2.6%)
Ischemic heart disease, n (%)	2 (2.6%)
Others, n (%)	18 (23.1%)

Table S6. The detailed characteristics of the transmissions caused by the ventricular tachyarrhythmias

Cause of alert	All alert-triggered transmissions (n = 142)
Ventricular tachycardia, n (%)	23 (16.2%)
Treated with ATP/HV, n (% of all VTs)	10 (43.5%)
Number of ATPs delivered to terminate VT, median (IQR)	1 (0–2)
Number of HVs delivered to terminate VT, median (IQR)	0 (0–0)
Number of patients in whom at least 1 HV	5
Ventricular fibrillation, n (%)	15 (10.6%)
Requiring ATP/HV, n (% of all VFs)	14 (93.3%)

Number of ATPs delivered to terminate VF, median (IQR)	1 (0–4)
Number of HVs delivered to terminate VF, median (IQR)	2 (1–5)

Abbreviations: ATP, antitachycardia pacing; HV, high-voltage therapy; VF, ventricular fibrillation; VT, ventricular tachycardia