

Therapie bradykarder und tachykarder Herzrhythmusstörungen als Ursache oder Folge der Herzinsuffizienz

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24.09.2022

Kardiocentrum Frankfurt
an der Klinik Rotes Kreuz





Disclosures

Vorträge/Beratertätigkeit:

Berlin-Chemie

BMS

Pfizer

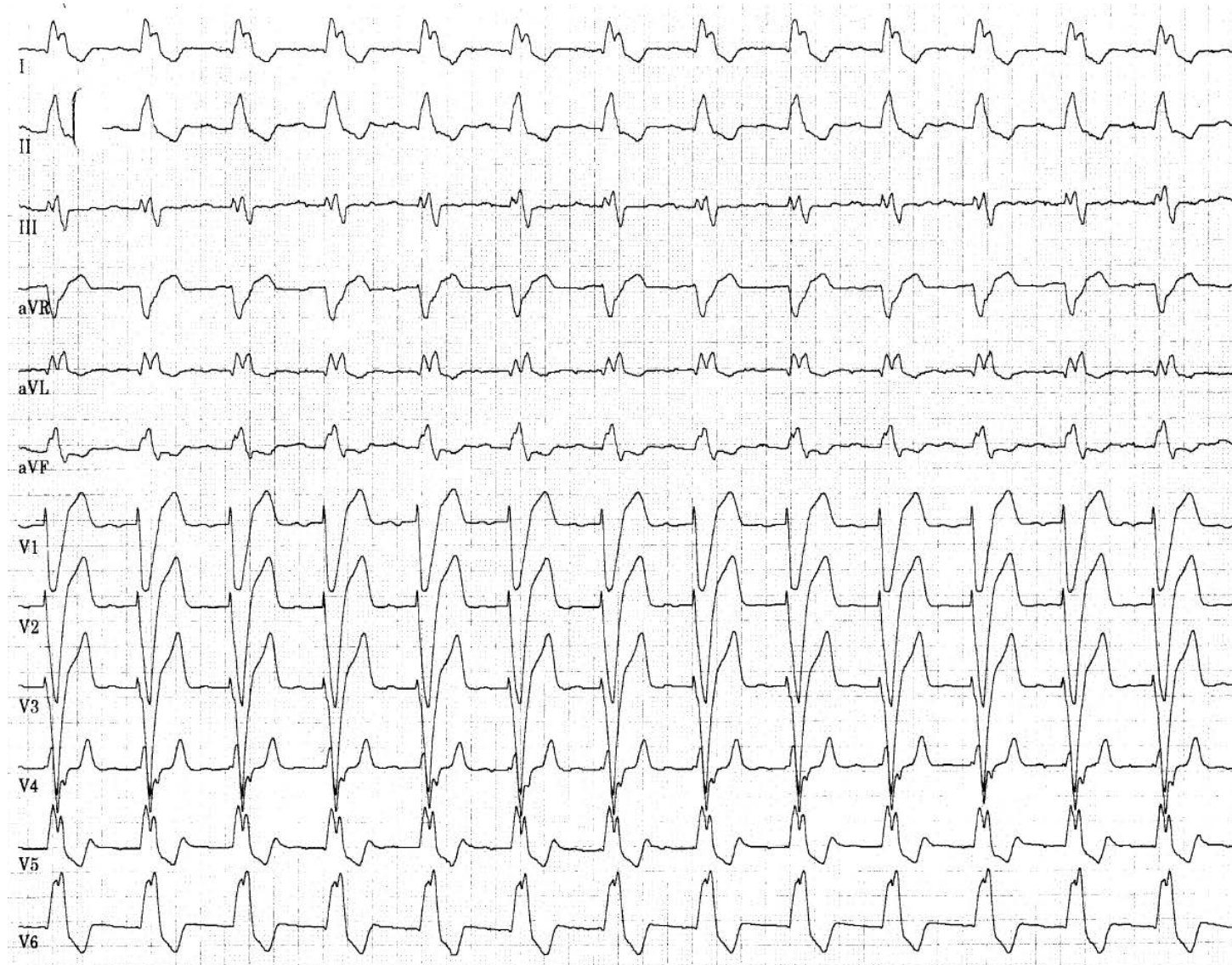
Bayer

Daiichii-Sankyo

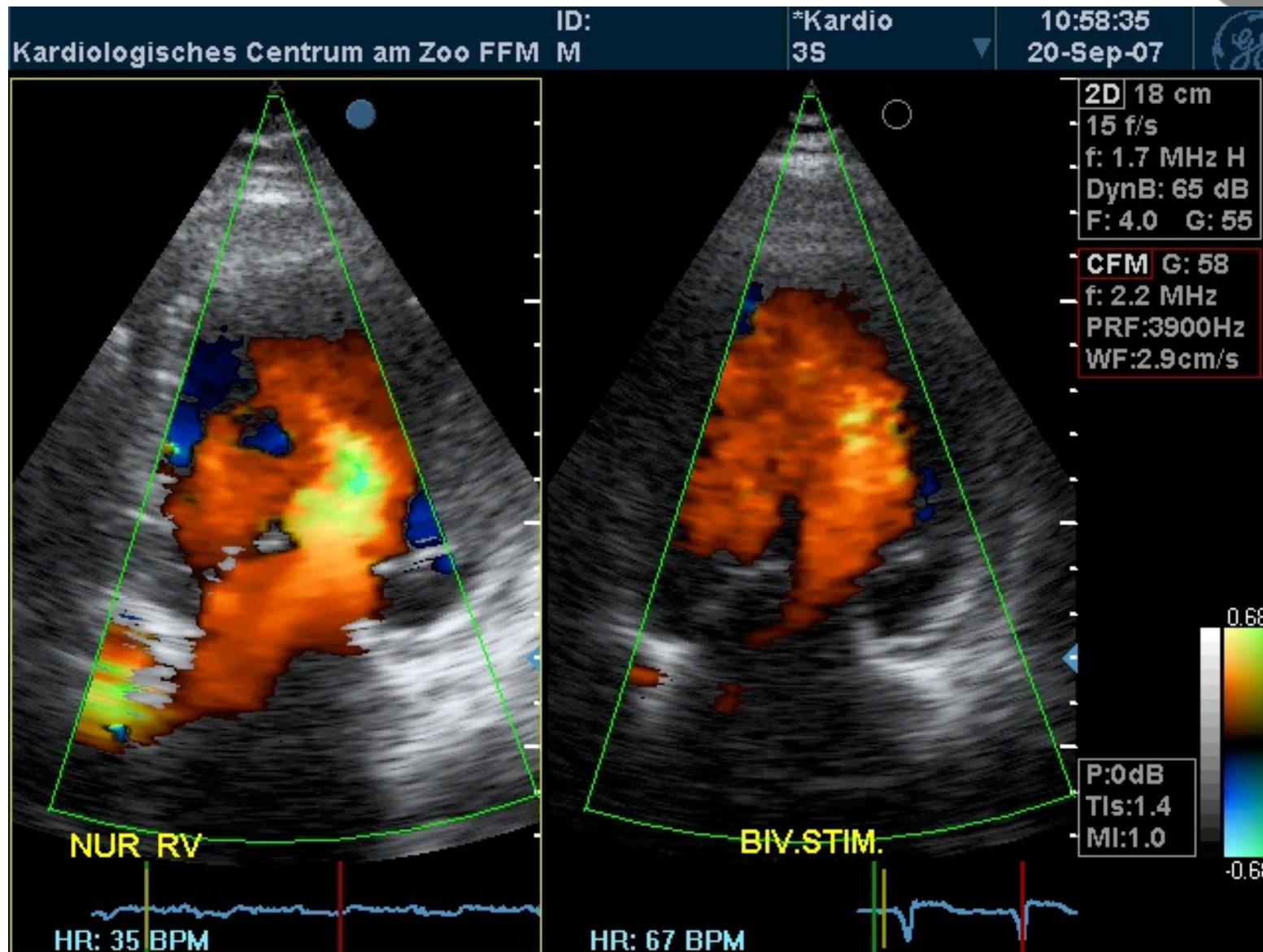
Boston Scientific

Abbott

Resynchronisationstherapie



Resynchronisationstherapie



Resynchronisationstherapie



Trial	Patients	NYHA class	LVEF(%)	LVEDD (mm)	SR/AF	QRS (ms)	ICD
PATH CHF	41	III,IV	≤35%	Not specified	SR	≥120	No
MUSTIC-SR	58	III	≤35%	≥60	SR	≥150	No
MIRACLE	453	III,IV	≤35%	≥55	SR	≥130	No
MUSTIC AF	43	III	≤35%	≥60	AF	≥200	No
MIRACLE ICD	369	III,IV	≤35%	≥55	SR	≥130	Yes
CONTAK CD	227	II,IV	≤35%	Not specified	SR	≥120	Yes
MIRACLE ICD II	186	II	≤35%	≥55	SR	≥130	Yes
PATH CHF II	89	III,IV	≤35%	Not specified	SR	≥120	Yes/No
COMPANION	1520	III,IV	<35%	Not specified	SR	>120	Yes/No
CARE HF	# 10 000 patients included in the RCTs						
RethinQ	172	III,IV	≤35%	Not specified	SR	≤130 & Dys	Yes
REVERSE	610	I,II	≤40%	≥55	SR	≥120	Yes/No
MADIT CRT	1800	I,II	≤30%	Not specified	SR	≥130 ms	Yes
RAFT	1800	II,III	≤30%	>60	SR/AF	≥130; ≥200 *	Yes
BLOCK-HF	691	I,II,III	≤50%	Not specified	SR/AF	Any	Yes/No
Echo-CRT	821	III,IV	≤35%	Not specified	SR	≤130 & Dys	Yes
BLOCK-HF	791	I-III	≤50%	Not specified	SR / AF	No criteria	Yes/ no
BIOPACE	1810	No	Not SPecified	Not specified	SR / AF	No criteria	No

Resynchronisationstherapie



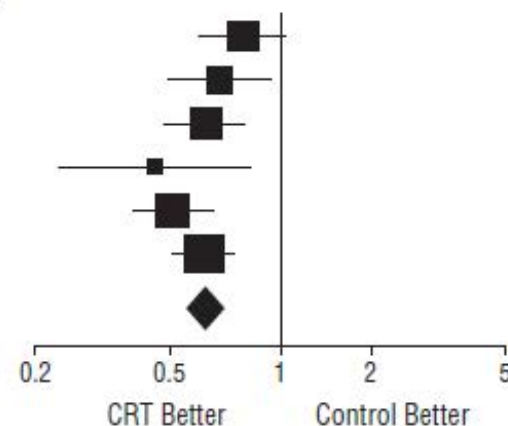
- Symptomatische Verbesserung der Herzinsuffizienz
- Verbesserung der Lebensqualität
- Verbesserung des LV-Reverse-Remodelings
- Reduktion der Hospitalisationen aufgrund HI
- Mortalitätsreduktion

Resynchronisationstherapie

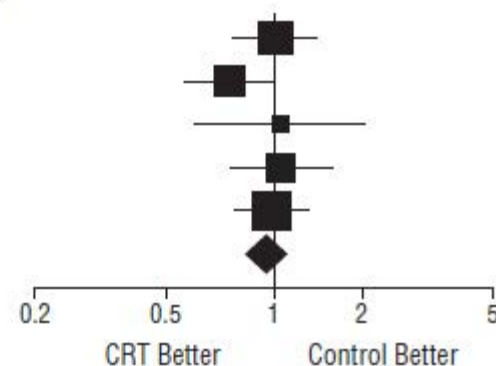


QRS-Breite entscheidend für Erfolg

Statistics for each study			
	RR (95% CI)	z Value	P Value
COMPANION (QRS, 148-168 ms, n=314)	0.78 (0.59-1.04)	-1.70	.09
COMPANION (QRS, >168 ms, n=287)	0.66 (0.47-0.93)	-2.35	.02
CARE-HF (QRS, >159 ms, n=505)	0.60 (0.46-0.79)	-3.70	<.001
REVERSE (QRS, >151 ms, n=307)	0.42 (0.22-0.81)	-2.61	.009
MADIT-CRT (QRS, >149 ms, n=1175)	0.48 (0.37-0.63)	-5.41	<.001
RAFT (QRS, >149 ms, n=1036)	0.59 (0.48-0.73)	-4.93	<.001
Meta-analysis	0.60 (0.53-0.67)	-8.67	<.001



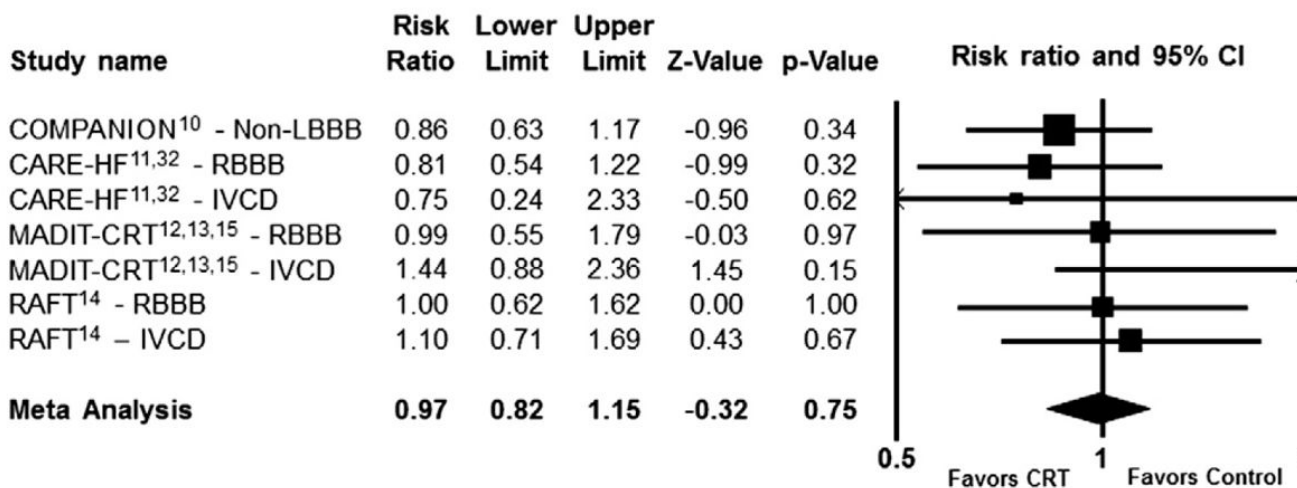
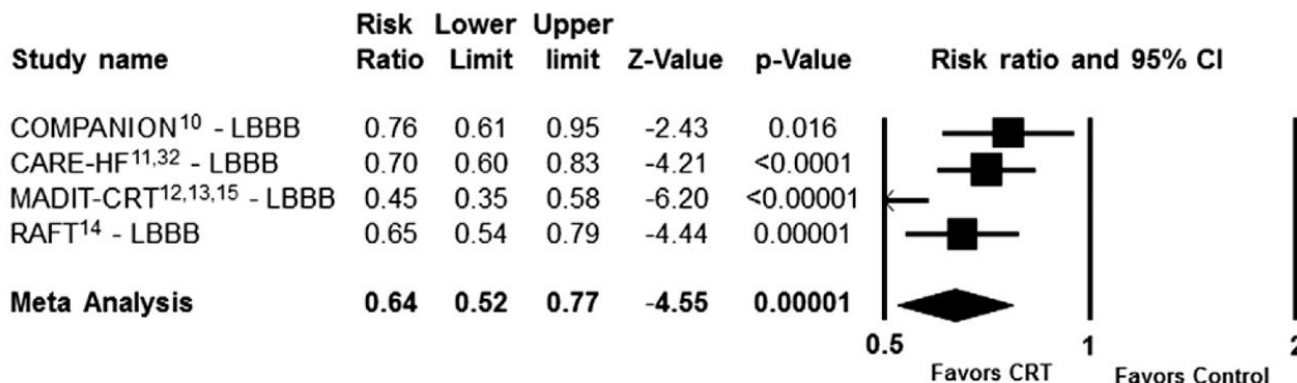
Statistics for each study			
	RR (95% CI)	z Value	P Value
COMPANION (QRS, 120-147 ms, n=324)	1.01 (0.76-1.35)	0.07	.95
CARE-HF (QRS, 120-159 ms, n=290)	0.74 (0.54-1.02)	-1.86	.06
REVERSE (QRS, 120-151 ms, n=303)	1.05 (0.58-1.89)	0.16	.87
MADIT-CRT (QRS, 130-149 ms, n=645)	1.06 (0.74-1.52)	0.32	.75
RAFT (QRS, 120-149 ms, n=627)	0.99 (0.77-1.27)	-0.08	.94
Meta-analysis	0.95 (0.82-1.10)	-0.68	.49





Resynchronisationstherapie

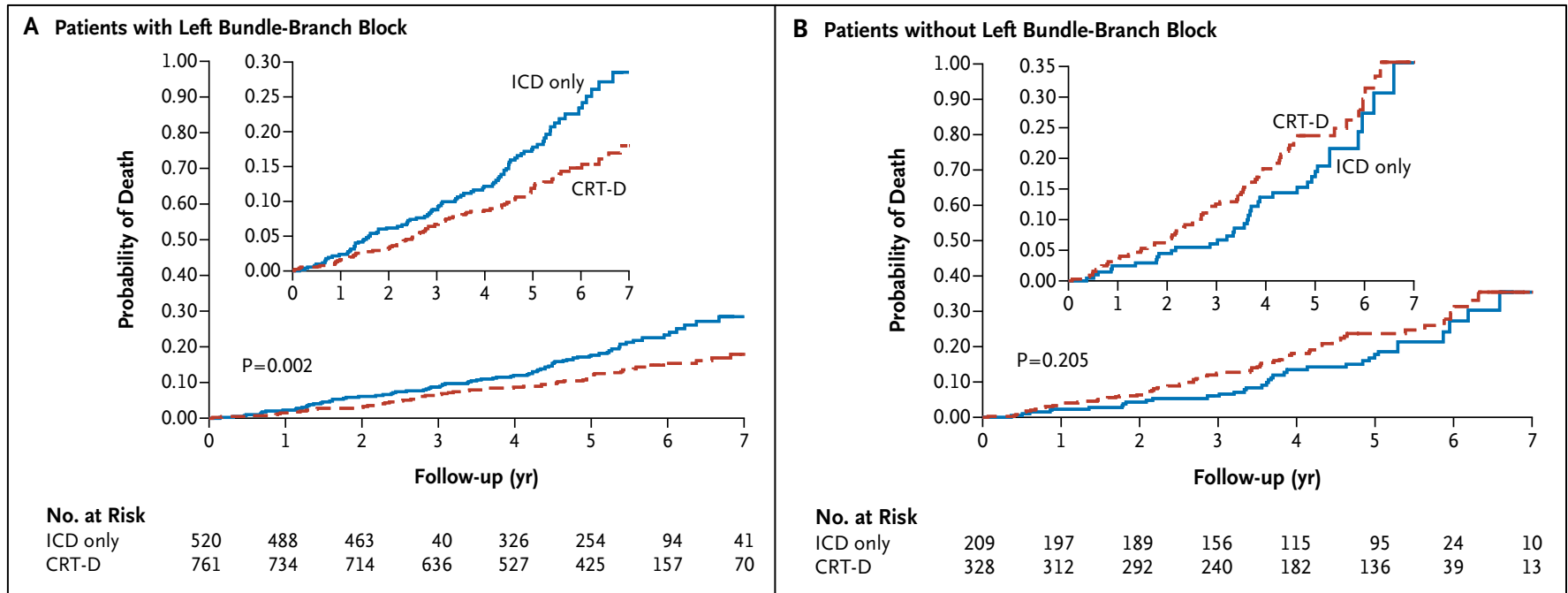
QRS-Morphologie entscheidend für Erfolg



Resynchronisationstherapie



Überlebensvorteil nur bei LSB





The NEW ENGLAND JOURNAL *of* MEDICINE

ORIGINAL ARTICLE

Biventricular Pacing for Atrioventricular Block and Systolic Dysfunction

Anne B. Curtis, M.D., Seth J. Worley, M.D., Philip B. Adamson, M.D.,
Eugene S. Chung, M.D., Imran Niazi, M.D., Lou Sherfese, Ph.D.,
Timothy Shinn, M.D., and Martin St. John Sutton, M.D.,
for the Biventricular versus Right Ventricular Pacing in Heart Failure
Patients with Atrioventricular Block (BLOCK HF) Trial Investigators

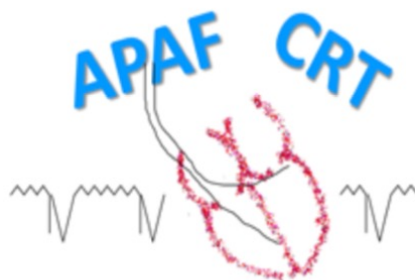
Characteristic	Pacemaker (N=484)		ICD (N=207)		All Patients (N=691)	
	Biventricular Pacing (N=243)	Right Ventricular Pacing (N=241)	Biventricular Pacing (N=106)	Right Ventricular Pacing (N=101)	Biventricular Pacing (N=349)	Right Ventricular Pacing (N=342)
Male sex — no. (%)	181 (74.5)	168 (69.7)	87 (82.1)	81 (80.2)	268 (76.8)	249 (75.4)
Age — yr	74.4±10.2	73.8±10.8	72.0±9.3	71.0±10.0	73.7±10.0	73.0±10.6
Left ventricular ejection fraction — %	43.4±6.5	42.5±6.6	33.0±7.8	32.9±8.0	40.3±8.4	39.6±8.3
Left ventricular ejection fraction >35% — no. (%)	213 (87.7)	215 (89.2)	30 (28.3)	25 (24.8)	243 (69.6)	240 (70.2)
Heart rate — beats/min	68.7±23.4	68.7±23.9	68.2±16.9	69.1±17.4	68.5±21.6	68.8±22.2
QRS duration — msec	125.4±32.8	124.5±31.1	122.5±30.1	119.3±30.2	124.6±32.0	123.0±30.8
NYHA class — no. (%) [†]						
I	35 (14.4)	47 (19.5)	11 (10.4)	16 (15.8)	46 (13.2)	63 (18.4)
II	141 (58.0)	126 (52.3)	67 (63.2)	58 (57.4)	208 (59.6)	184 (53.8)
III	66 (27.2)	68 (28.2)	28 (26.4)	27 (26.7)	94 (26.9)	95 (27.8)
Cardiomyopathy — no. (%) [‡]						
Ischemic	94 (38.7)	91 (37.8)	67 (63.2)	59 (58.4)	161 (46.1)	150 (43.9)
Nonischemic	47 (19.3)	65 (27.0)	26 (24.5)	25 (24.8)	73 (20.9)	90 (26.3)
Unknown	2 (0.8)	6 (2.5)	1 (0.9)	3 (3.0)	3 (0.9)	9 (2.6)
Other	9 (3.7)	6 (2.5)	2 (1.9)	2 (2.0)	11 (3.2)	8 (2.3)
CAD — no. (%)	151 (62.1)	147 (61.0)	82 (77.4)	72 (71.3)	233 (66.8)	219 (64.0)
Myocardial infarction — no. (%)	93 (38.3)	77 (32.0)	56 (52.8)	47 (46.5)	149 (42.7)	124 (36.3)
Hypertension — no. (%)	200 (82.3)	200 (83.0)	84 (79.2)	87 (86.1)	284 (81.4)	287 (83.9)
Atrial fibrillation — no. (%)	136 (56.0)	133 (55.2)	44 (41.5)	52 (51.5)	180 (51.6)	185 (54.1)
Diabetes — no. (%)	90 (37.0)	87 (36.1)	47 (44.3)	37 (36.6)	137 (39.3)	124 (36.3)
Atrioventricular block — no. (%) [§]						
1st degree	39 (16.0)	35 (14.5)	29 (27.4)	31 (30.7)	68 (19.5)	66 (19.3)
2nd degree	84 (34.6)	70 (29.0)	35 (33.0)	38 (37.6)	119 (34.1)	108 (31.6)
3rd degree	120 (49.4)	135 (56.0)	42 (39.6)	32 (31.7)	162 (46.4)	167 (48.8)
Bundle-branch block — no. (%)						
Left	86 (35.4)	75 (31.1)	37 (34.9)	27 (26.7)	123 (35.2)	102 (29.8)
Right	52 (21.4)	55 (22.8)	21 (19.8)	19 (18.8)	73 (20.9)	74 (21.6)

EF ≤ 50%

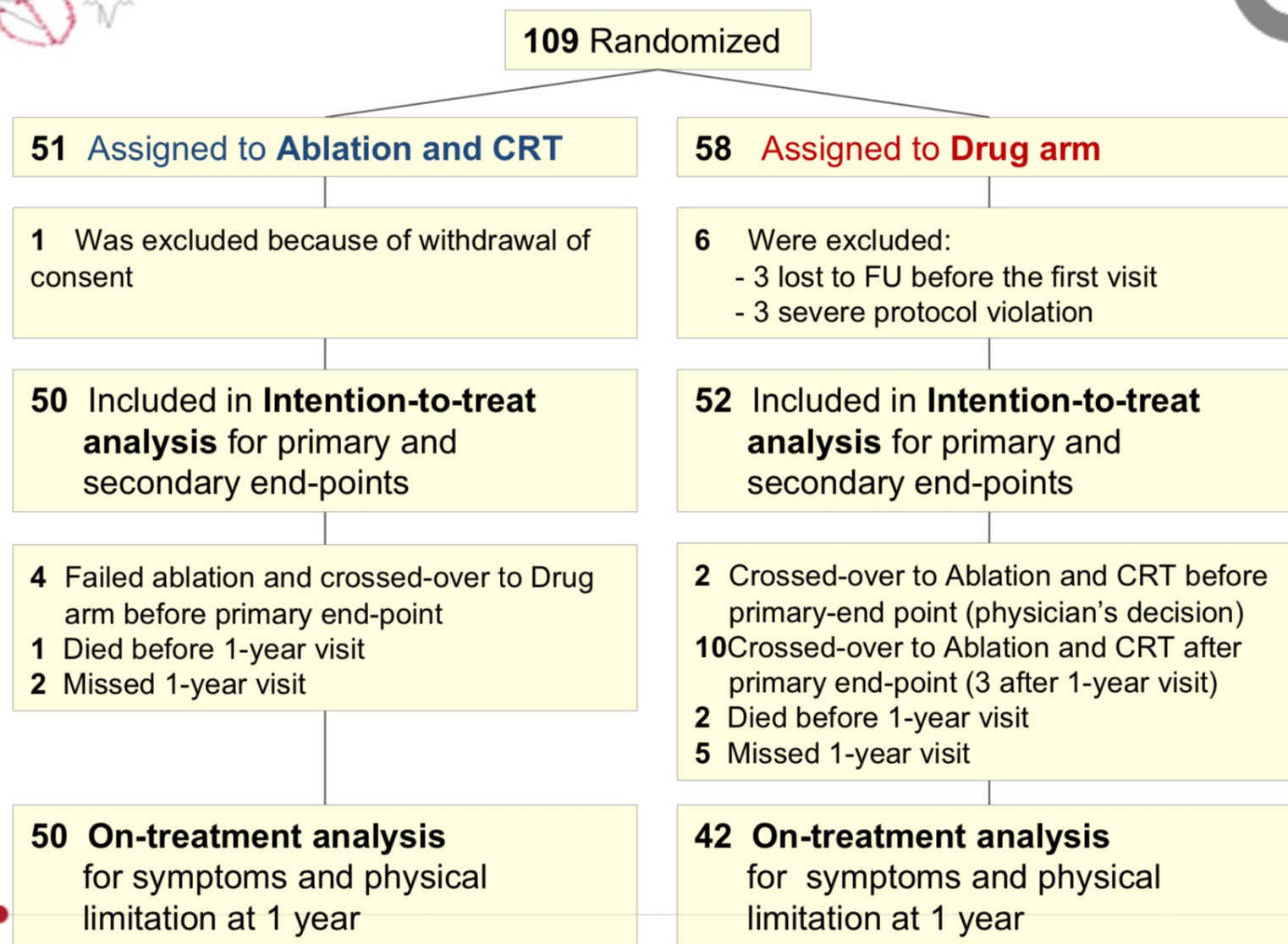
Block-HF: Ergebnisse



Outcome	Pacemaker (N=484)		ICD (N=207)		Hazard Ratio (95% CI)*		
	Biventricular Pacing (N=243)	Right Ventricular Pacing (N=241)	Biventricular Pacing (N=106)	Right Ventricular Pacing (N=101)	Pacemaker (N=484)	ICD (N=207)	All Patients (N=691)
	<i>number of patients</i>						
Primary outcome	108	127	52	63	0.73 (0.58–0.91)	0.75 (0.57–1.02)	0.74 (0.60–0.90)
Event related to left ventricular end-systolic volume index	56	79	31	36			
Urgent care visit for heart failure	40	38	16	23			
Death	12	10	5	4			
Secondary outcomes‡							
Death or urgent care visit for heart failure	78	95	39	44	0.73 (0.56–0.94)	0.73 (0.53–1.02)	0.73 (0.57–0.92)
Death or hospitalization for heart failure	76	89	39	40	0.77 (0.58–1.00)	0.80 (0.58–1.13)	0.78 (0.61–0.99)
Death	52	64	23	26	0.83 (0.59–1.17)	0.84 (0.55–1.28)	0.83 (0.61–1.14)
Hospitalization for heart failure	49	63	27	27	0.68 (0.49–0.94)	0.73 (0.50–1.11)	0.70 (0.52–0.93)



**A randomized controlled trial of AV junction ablation and
cardiac resynchronization therapy in patients with
permanent atrial fibrillation and narrow QRS
(APAF - CRT)**

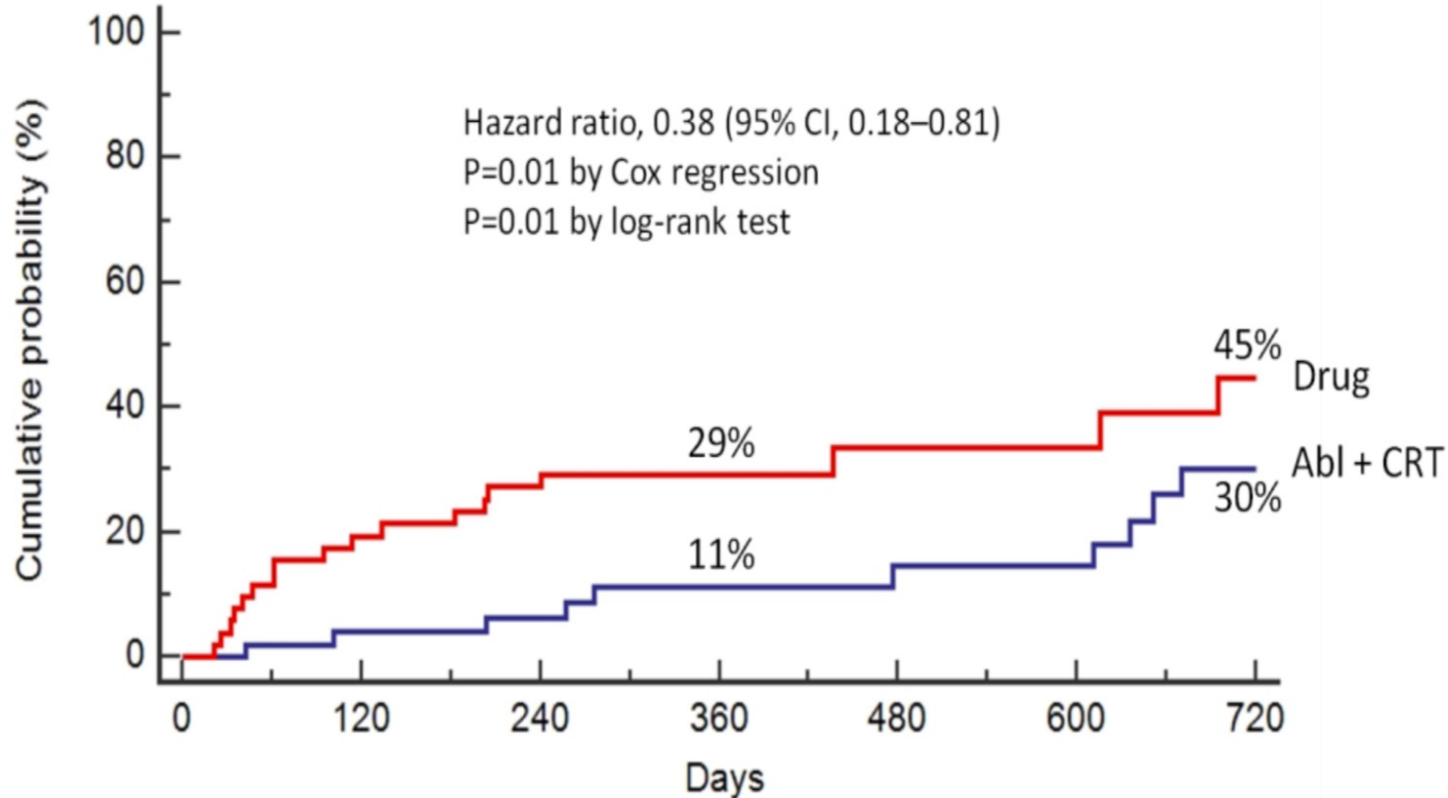


Patient characteristics on enrolment

	Abl + CRT (n=50)	Drug (n=52)
Age, years	71 ±12	72 ±9
Male sex	28 (56)	28 (54)
History of AF:		
- Duration of permanent AF, months	13 (8;36)	18 (8;43)
- Previous attempt/s of catheter ablation of AF	5 (10)	5 (10)
- Number of hospitalizations in the previous year	1.5 ± 0.7	1.7 ± 1.2
Symptoms and physical capacity:		
- New York Heart Association class ≥III	32 (64)	34 (65)
- European Heart Rhythm Association class ≥III	38 (76)	31 (60)
Standard electrocardiogram		
- Heart rate, bpm	100±23	103±19
- QRS width, ms	97±14	94±12
Echocardiogram		
- Ejection fraction	41 ± 12	40 ± 12



Primärer Endpunkt: Tod aufgrund HF, HF-Hospitalisation oder Verschlechterung HF



Number at risk

Group: Abl + CRT

50	46	39	31	25	24	14
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Group: Drug

52	41	34	28	15	13	7
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Resynchronisationstherapie



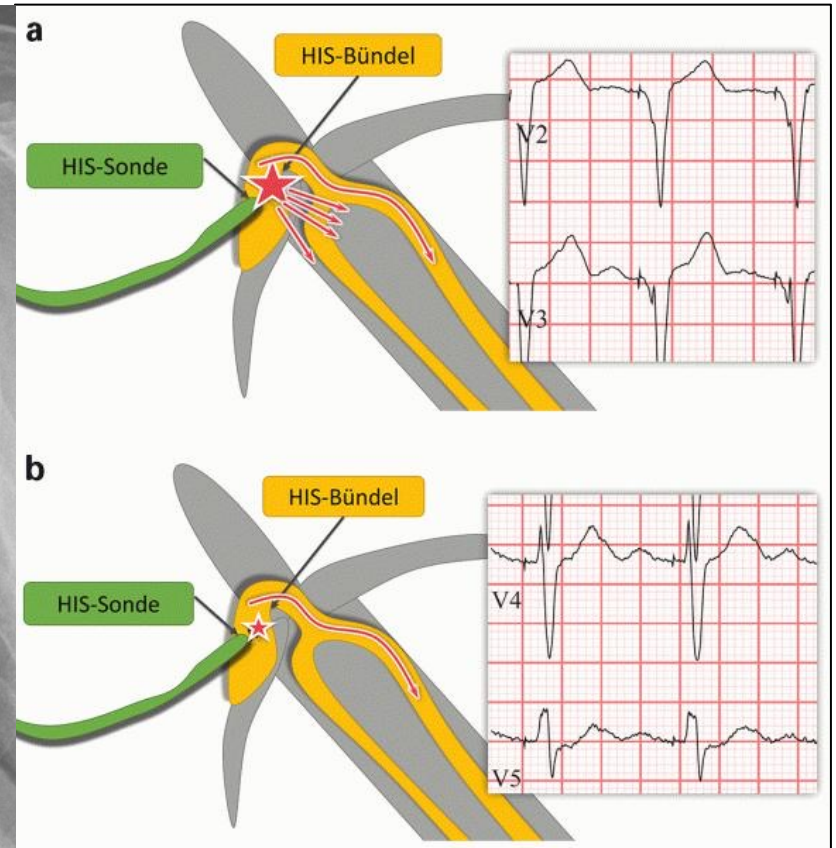
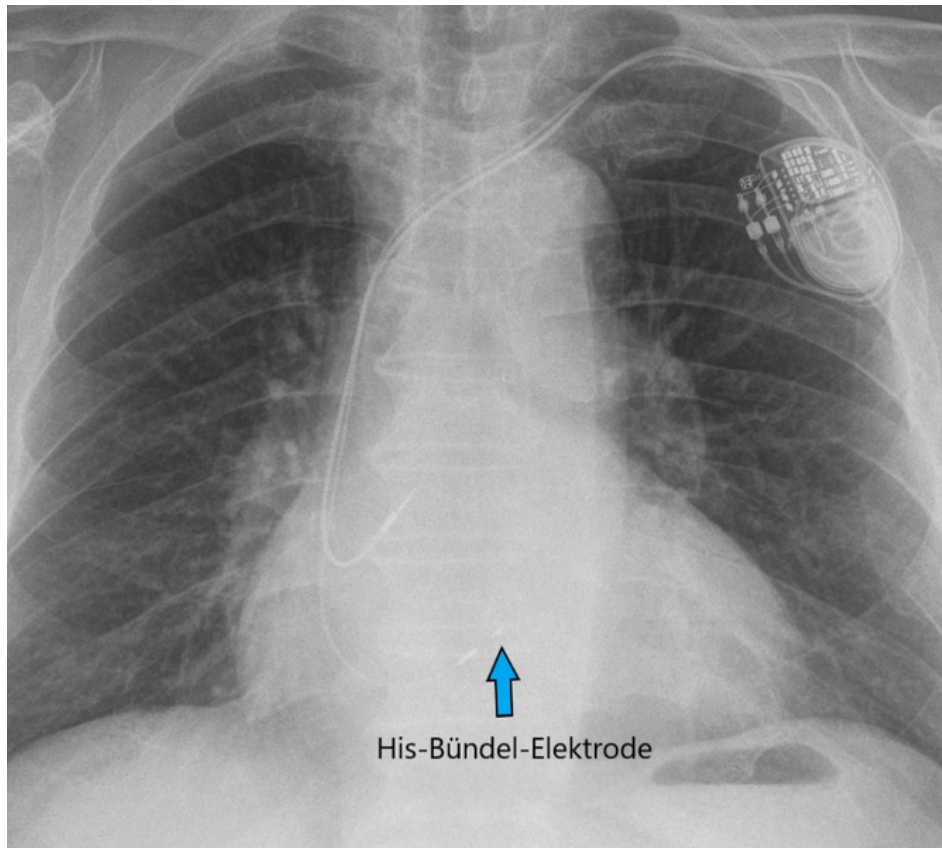
Recommendations	Class	Level
CRT is recommended for symptomatic patients with HF in SR with a QRS duration ≥ 150 ms and LBBB QRS morphology and with LVEF $\leq 35\%$ despite OMT in order to improve symptoms and reduce morbidity and mortality.	I	A
CRT should be considered for symptomatic patients with HF in SR with a QRS duration of 130–149 ms and LBBB QRS morphology and with LVEF $\leq 35\%$ despite OMT in order to improve symptoms and reduce morbidity and mortality.	IIa	B
CRT should be considered for symptomatic patients with HF in SR with a QRS duration ≥ 150 ms and non-LBBB QRS morphology and with LVEF $\leq 35\%$ despite OMT in order to improve symptoms and reduce morbidity and mortality.	IIa	B
CRT may be considered for symptomatic patients with HF in SR with a QRS duration of 130–149 ms and non-LBBB QRS morphology and with LVEF $\leq 35\%$ despite OMT in order to improve symptoms and reduce morbidity and mortality.	IIb	B

Resynchronisationstherapie

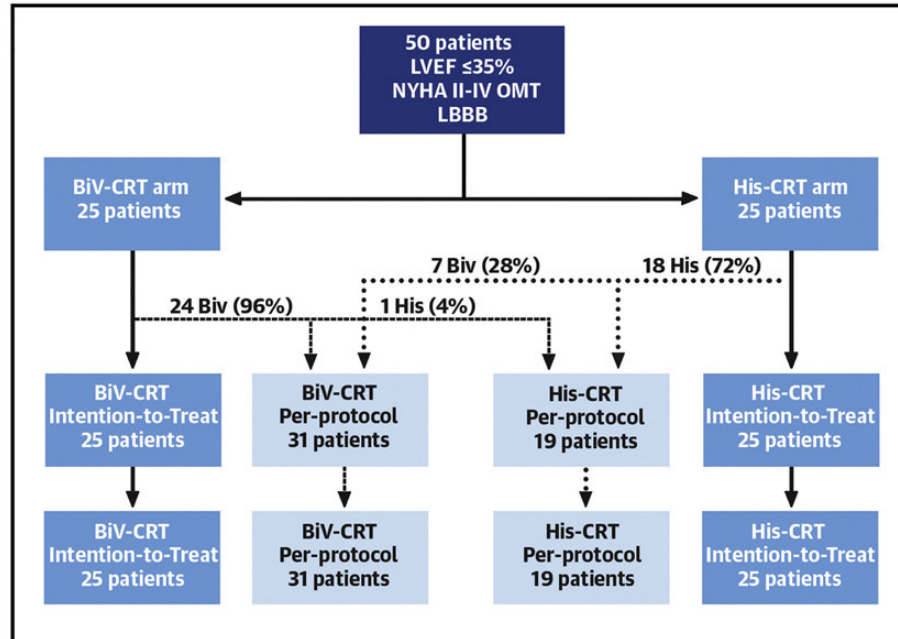


Recommendations	Class	Level
CRT rather than RV pacing is recommended for patients with HFrEF regardless of NYHA class or QRS width who have an indication for ventricular pacing for high degree AV block in order to reduce morbidity. This includes patients with AF.	I	A
Patients with an LVEF $\leq 35\%$ who have received a conventional pacemaker or an ICD and subsequently develop worsening HF despite OMT and who have a significant proportion of RV pacing should be considered for 'upgrade' to CRT.	IIa	B
CRT is not recommended in patients with a QRS duration < 130 ms who do not have an indication for pacing due to high degree AV block.	III	A

His-Bündel-Pacing

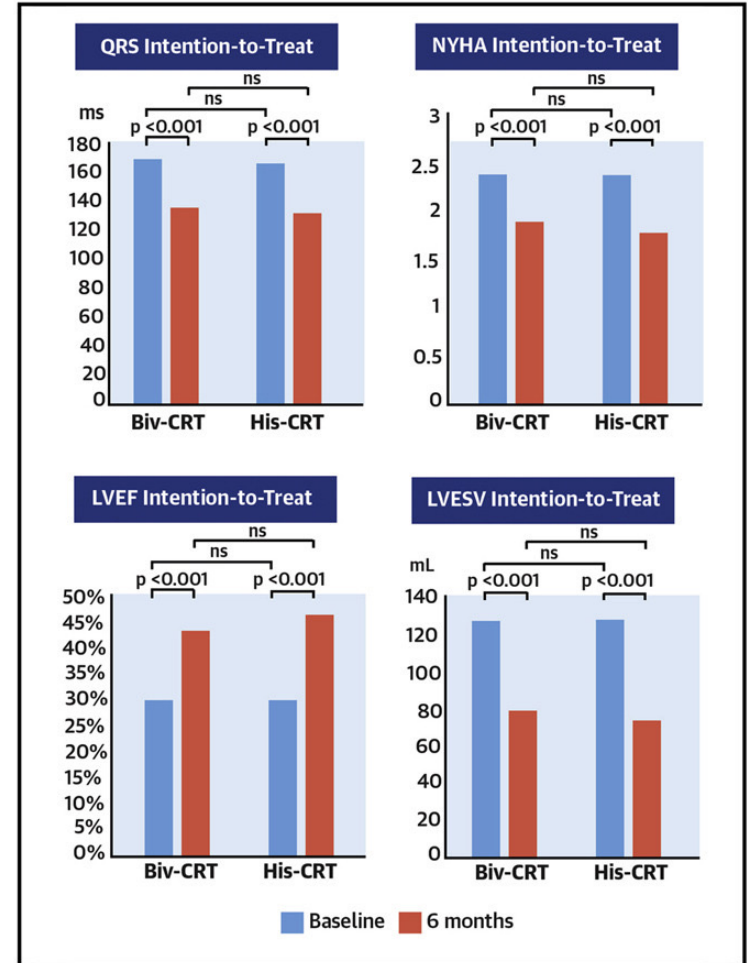


His-Bündel-Pacing



Pacing Thresholds	Implantation (V at 1 ms dur)	6-month FU (V at 1 ms dur)
LV-leads (n = 31)	1.1 ± 0.7	1.5 ± 0.6*
His-leads (n = 19)	2.2 ± 1.2	2.4 ± 1.6*

* p < 0.05 baseline vs. 6-months FU +p < 0.05 His-leads vs. LV-leads





Zusammenfassung Teil I

- Bei Pat. mit hochgradig eingeschränkter LV-EF ($\leq 35\%$) und LSB ist die Resynchronisationstherapie eine etablierte und gute Therapie
- Bei zu erwartendem hohem ventrikulärem Pacinganteil (z.B. höhergradiger AV-Block, geplante AV-Knoten-Ablation) sollte auch bei bereits leicht- bis mittelgradig eingeschränkter LV-EF ($< 50/\text{min}$) eine CRT-Implantation evaluiert werden (unabhängig vom Ausgangs-QRS-Komplex)
- Das His-Bündel-Pacing könnte zukünftig eine Alternative zur Resynchronisations-Therapie werden



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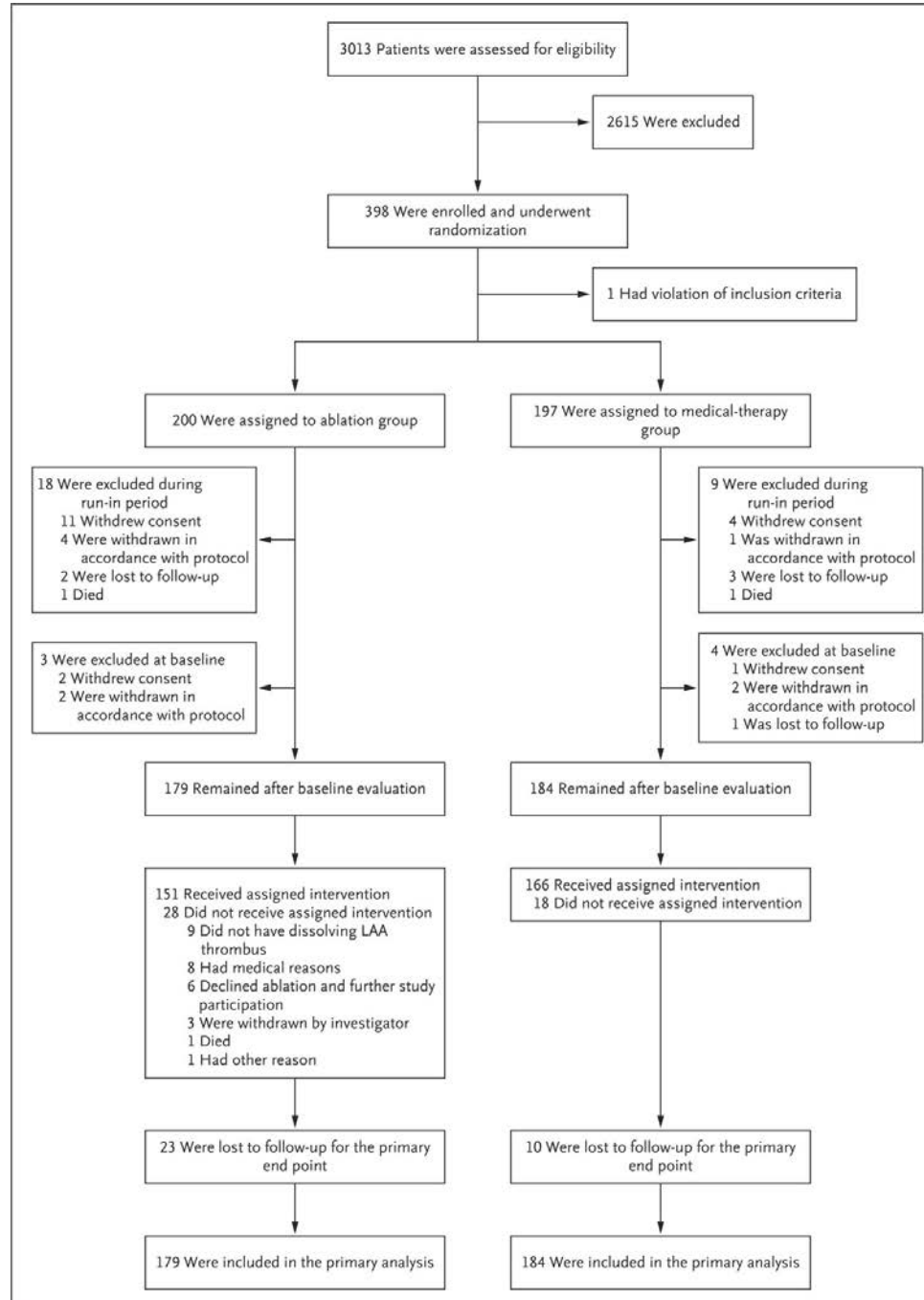
ESTABLISHED IN 1812

FEBRUARY 1, 2018

VOL. 378 NO. 5

Catheter Ablation for Atrial Fibrillation with Heart Failure

Nassir F. Marrouche, M.D., Johannes Brachmann, M.D., Dietrich Andresen, M.D., Jürgen Siebels, M.D.,
Lucas Boersma, M.D., Luc Jordaens, M.D., Béla Merkely, M.D., Evgeny Pokushalov, M.D.,
Prashanthan Sanders, M.D., Jochen Proff, B.S., Heribert Schunkert, M.D., Hildegard Christ, M.D.,
Jürgen Vogt, M.D., and Dietmar Bänsch, M.D., for the CASTLE-AF Investigators*



Patientencharakteristika



Characteristic	Treatment Type	
	Ablation (N = 179)	Medical Therapy (N = 184)
Age — yr		
Median	64	64
Range	56–71	56–73.5
Male sex — no. (%)	156 (87)	155 (84)
Body-mass index†		
Median	29.0	29.1
Range	25.9–32.2	25.9–32.3
New York Heart Association class — no./total no. (%)		
I	20/174 (11)	19/179 (11)
II	101/174 (58)	109/179 (61)
III	50/174 (29)	49/179 (27)
IV	3/174 (2)	2/179 (1)
Cause of heart failure — no. (%)‡		
Ischemic	72 (40)	96 (52)
Nonischemic	107 (60)	88 (48)
Type of atrial fibrillation — no. (%)		
Paroxysmal	54 (30)	64 (35)
Persistent	125 (70)	120 (65)
Long-standing persistent (duration >1 year)	51 (28)	55 (30)
Left atrial diameter		
Total no. of patients evaluated	162	172
Median — mm	48.0	49.5
Interquartile range — mm	45.0–54.0	5.0–55.0
Left ventricular ejection fraction		
Total no. of patients evaluated	164	172
Median — %	32.5	31.5
Interquartile range — %	25.0–38.0	27.0–37.0
CRT-D implanted — no. (%)§	48 (27)	52 (28)
ICD implanted — no. (%)§	131 (73)	132 (72)
Dual-chamber	128 (72)	123 (67)
Single-lead device with “floating” atrial sensing dipole	3 (2)	9 (5)

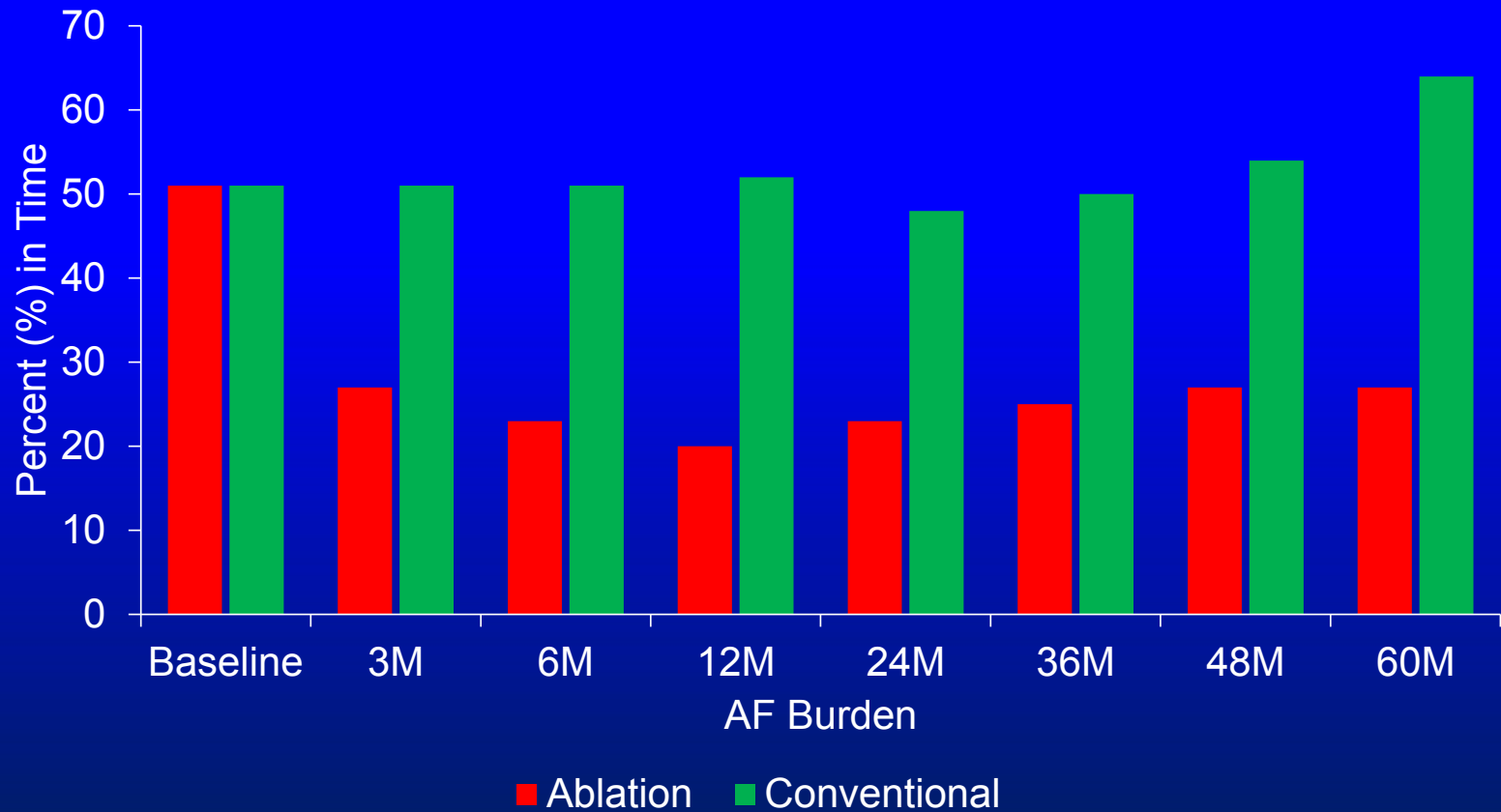
Patientencharakteristika



	Ablation group (179 patients)	Conventional group (184 patients)
ACE-inhibitor or ARB – no. (%)	94	91
Beta-blocker – no. (%)	93	95
Diuretic – no. (%)	93	93
Digitalis – no. (%)	18	31
Oral anticoagulant – no. (%)	93	96
Antiarrhythmic drug – no. (%)	32	30
Amiodarone – no. (%)	97	85



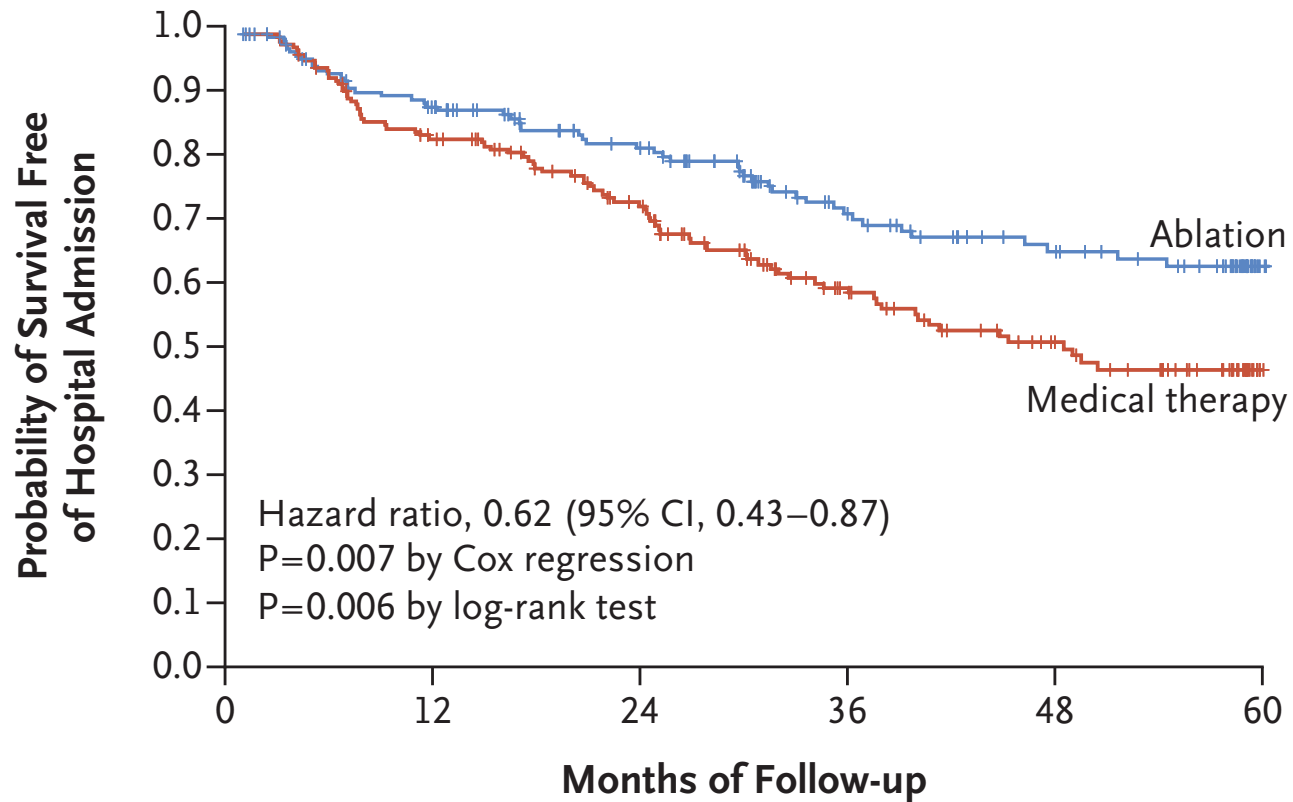
AF Burden Derived from Memory of Implanted Devices



Ergebnisse



A Death or Hospitalization for Worsening Heart Failure



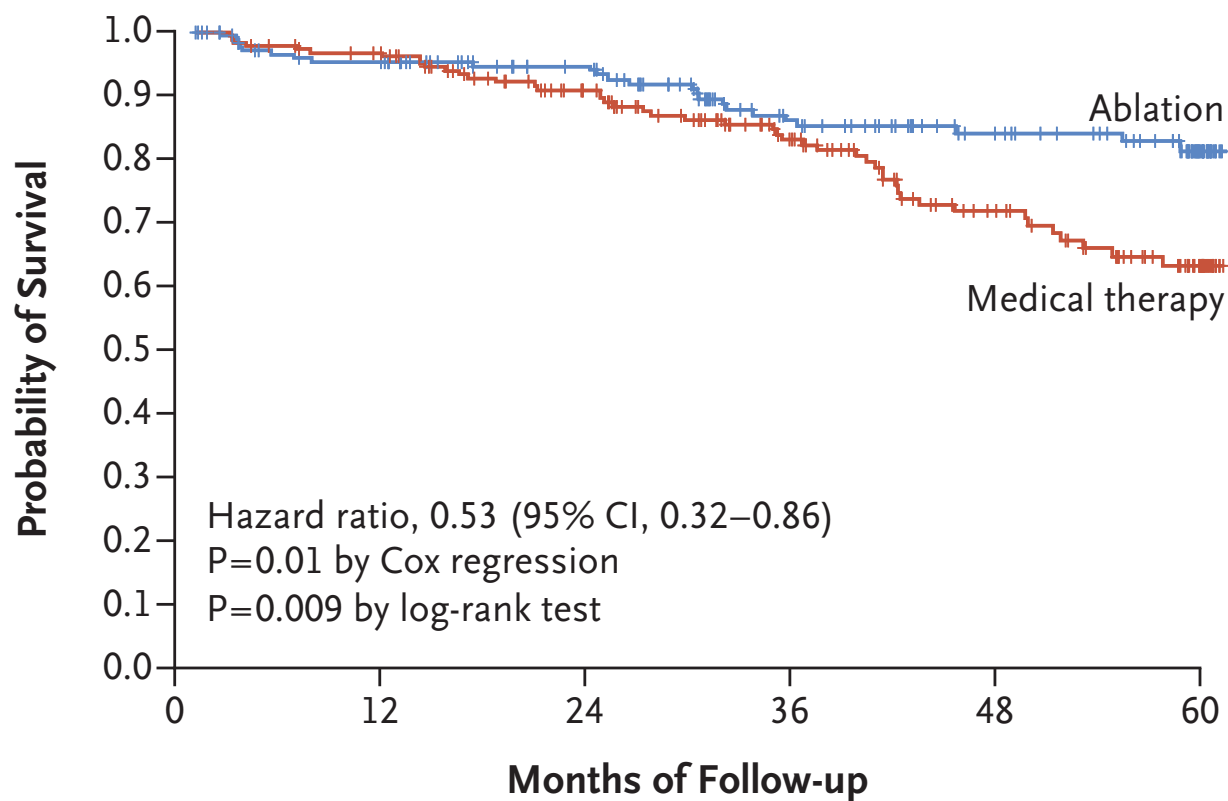
No. at Risk

Ablation	179	141	114	76	58	22
Medical therapy	184	145	111	70	48	12

Ergebnisse



B Death from Any Cause



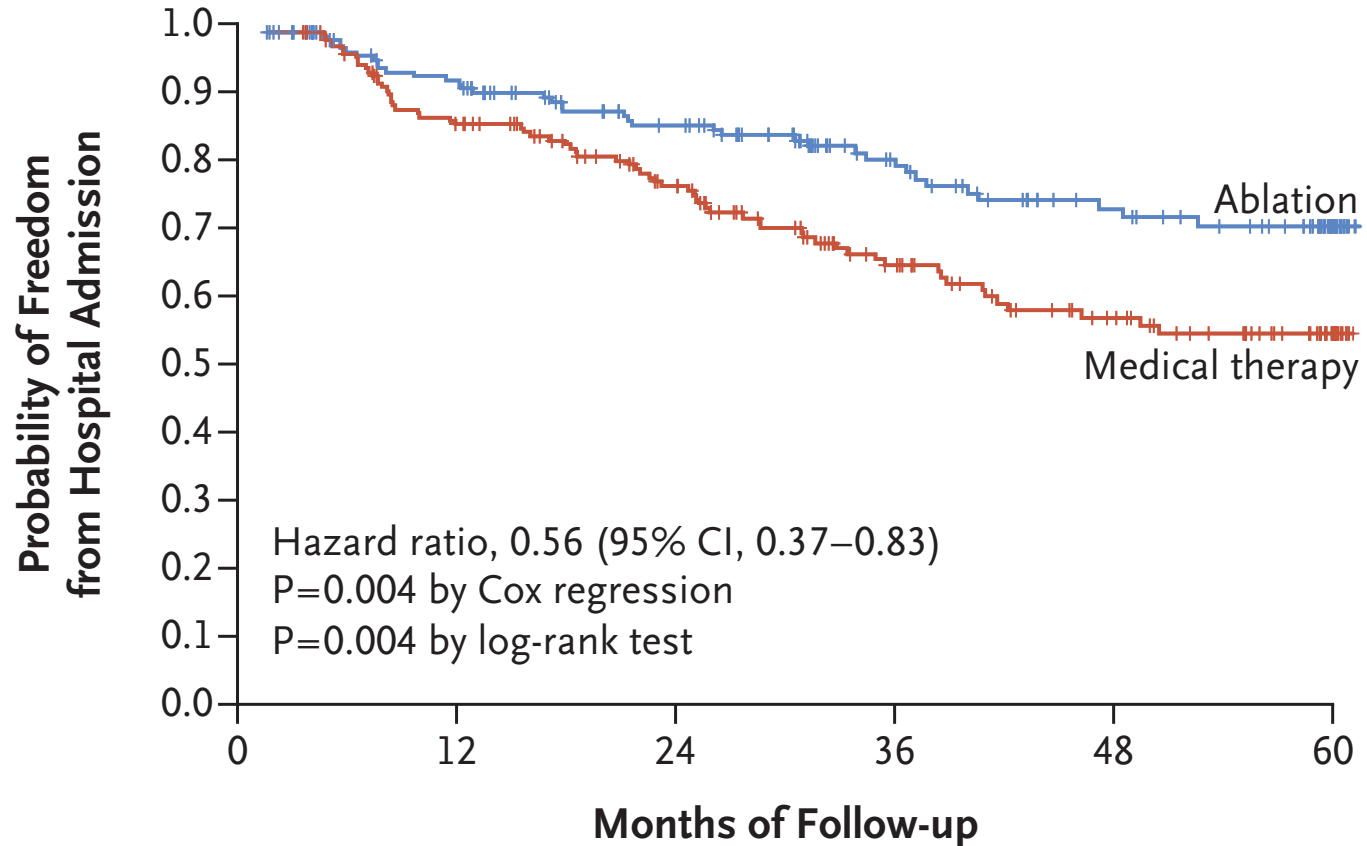
No. at Risk

Ablation	179	154	130	94	71	27
Medical therapy	184	168	138	97	63	19

Ergebnisse

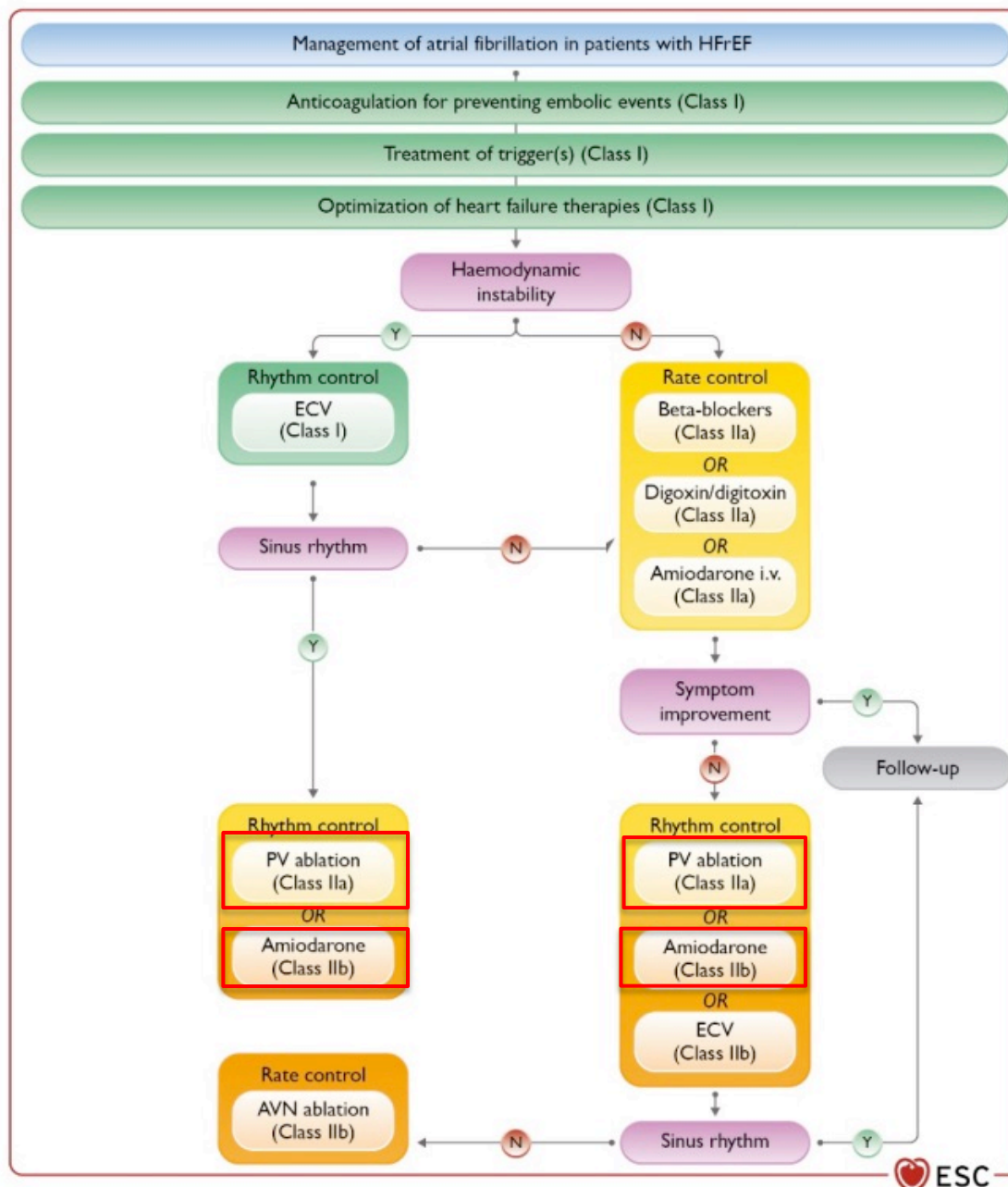


C Hospitalization for Worsening Heart Failure



No. at Risk

Ablation	179	141	114	76	58	22
Medical therapy	184	145	111	70	48	12





HFrEF – NYHA III- 82 J. Pat.in

Wirkstoff	Handelsname	Stärke	Form	Mo	Mi	Ab	zN	Einheit	Hinweise
Dauermedikation									
Carvedilol	Carvedilol AI 25mg Tabletten		Tabl	1/2	0	1/2	0		
Spironolacton	Spironolacton AL 50		Tabl	1/2	0	0	0		
Torasemid	Torasemid-ratiopharm 20mg Tabletten		Tabl	1	1	0	0		
Simvastatin	Simvastatin AbZ 40mg Filmtabletten		Tabl	0	0	1	0		
Amiodaron	Amiodaron-ratiopharm 100mg Tabletten		Tabl	1	0	0	0		
Phenprocoumon	FALITHROM	3 mg	Tabl	siehe Hinweis					nach Wert / 1Abdsx
Sacubitril-Natrium - Va...	ENTRESTO 97 MG/103 MG FILMTABLETTEN	226,13 mg	Tabl	1	0	1	0		
Dapagliflozin	FORXIGA 10MG FILMTABLETTEN		Tabl	1	0	0	0		
Bedarfsmedikation									
Pantoprazol	Pantoprazol Heumann 20mg magensaftres. Tabletten		Tabl	1	0	0	0		bei Magenbeschwerden/Sodbrennen

I25.19G Koronare Herzkrankheit II (Ria chron 100- RMS 50% - LHK 2012 KCF)
Z95.5G Z. n. PTCA mit Implantation eines Stents Ria mit chron Verschluss seit 2006
I25.29G Zustand nach Vorderwandinfarkt mit
I25.3G Vorderwandaneurysma und
I25.5G Global hochgradig eingeschränkte linksventrikuläre Funktion
Z95.0G Zustand nach ICD-Implantation mit biventrikulärer Stimulation 2006 und Aggregat
Wechsel 2011 Med Protecta und 2 .Re op 5/2017 mit Biotronic inlexa 3 HFt
LV Reizschwellenanstieg - Ausschluss Sondendislokation - LV Sondenneuimplantation 2017
FRKK via CS
I44.2G AV-Block Grad III
I50.13G Herzinsuffizienz NYHA III mit Dekomp bei Vhf und Reizschwellenanstieg LV Sonde 2 / 2017
I48.1G Par. Vorhofflimmern mit KV 2/2017 CCB unter Amiodaron
I49.9G Atriale Tachykardie 2018 mit passager VAT
Z92.1G Dauerantikoagulation
I34.0G nichtrheumatische Mitralklappeninsuffizienz I
I50.13G Herzinsuffizienz NYHA III 2022
N18.3G Niereninsuffizienz IV

Fantastischen Vier !
Betablocker
MRI

Sacubitril-Valsartan
SGLT II Hemmer

Labor :
GFR 27,6ml/min
K: 4,4
Nt Pro 3434 pg/ml
KG konstant –
keine ödeme

RR 130/80 mmHg.



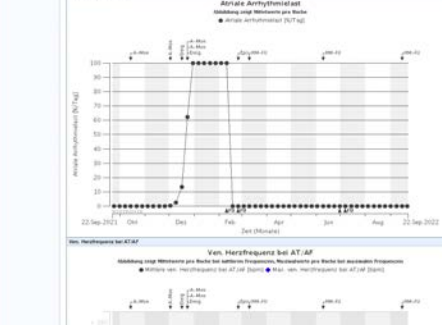
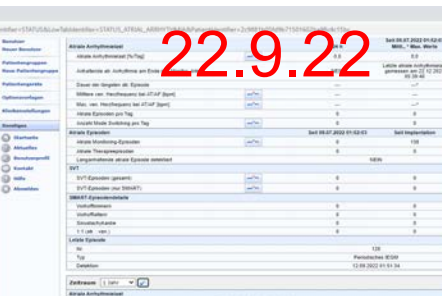
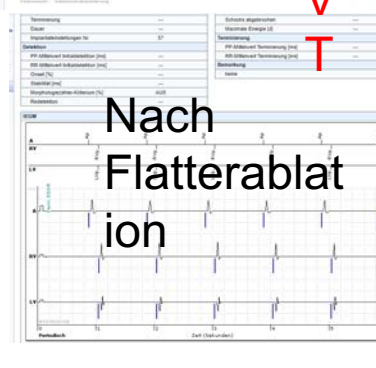
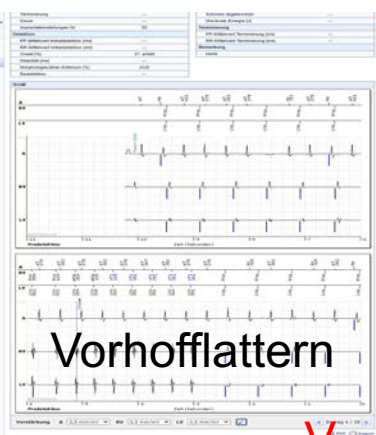
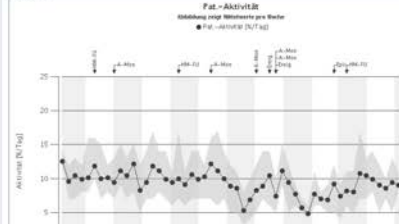
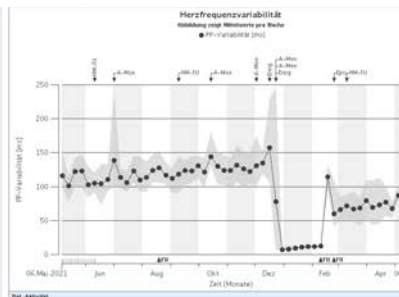
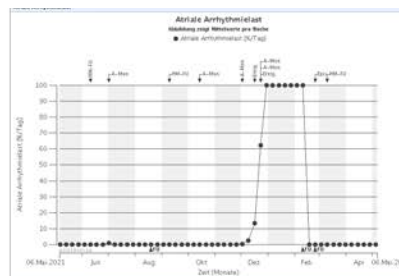
KHK mit RIA 100% und ICD –dann AV Block III- Seit 2006 CRTD mit
Grundfreq.60 /min-im DDDR Modus





Hilft hier das Telemonitoring ? Ja

Seit Ablation 2/22 keine erneute Atriale Tachykardie – nt pro BNP halbiert – Az wieder gebessert.



Zusammenfassung Teil II



- Hinsichtlich VHF-Rezidivrate ist die interventionelle Therapie auch bei herzinsuffizienten Patienten langfristig effektiver als eine antiarrhythmische Medikation
- Bei HI-Patienten scheint dieses auch mit einer verbesserten Prognose für Mortalität und Rehospitalisierung verbunden zu sein
- Daher sollte bei diesem Patientenkollektiv auch aus prognostischer Indikation frühzeitig eine Ablation evaluiert werden



Vielen Dank !