VŠEOBECNÁ FAKULTNÍ NEMOCNICE V PRAZE

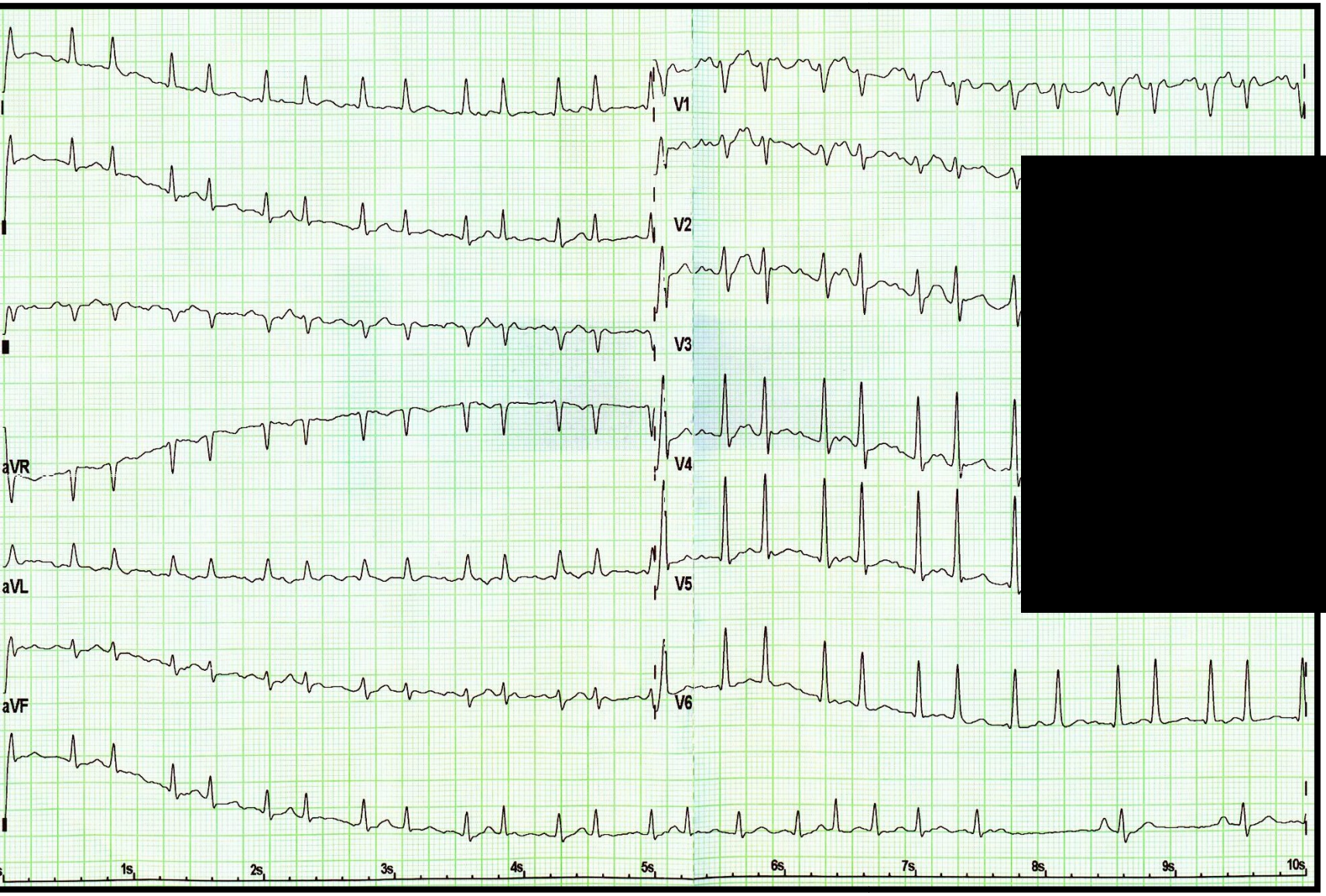
1. LÉKAŘSKÁ FAKULTA Univerzita Karlova

Akutní komplikace fibrilace síní

Update 2024

Štěpán Havránek

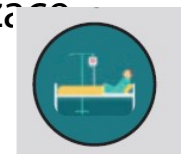
Paroxysmální fibrilace síní



Zdroj: Archiv II. interní klini

Rizika fibrilace síní

alita 	HR 1,5 – 3,5	Srdeční selhání Komorbidity CMP / SE
	20 – 30% ischem. CMP spojení s FS	Kardioembolizace Ateroskleróza
nkce LK / ní selhání 	20 – 30% pacientů s FS HR 4 – 5	Rychlá komorová odpověď Nepravidelná kontrakce komor Komorbidity

Demence / kognitivní deficit 	HR 1,6 / 1,4	Léze v bílé hmot Hypoperfúze Microembolizac
Deprese 	16 – 20%	Symptomy + ↓ QoL NÚ léků
Snížená kvalita života 	>60%	Symptomy Komorbidity Medikace
Hospitaliza 	10 – 40 % ročně	Léčba FS Léčba komplikac

mozková příhoda; SE, systémová embolizace; HR, poměr rizik; LK, levá
fibrilace síní; QoL, kvalita života; NÚ, nežádoucí účinek

ESC AFIB guidelines. European Heart Journal (202

Nová guidelines

ESC
European Society
of Cardiology

European Heart Journal (2024) 0
https://doi.org/10.1093/eurheartj/

024 ESC Guideline
f atrial fibrillation
ith the European
or Cardio-Thoraci

thors/Task Force Members: I
etherlands), Michiel Rienstra
rina V. Bunting ±, (Task For

ESC
European Society
of Cardiology

Europace (2024) **26**, 1–107
https://doi.org/10.1093/europace/euae043

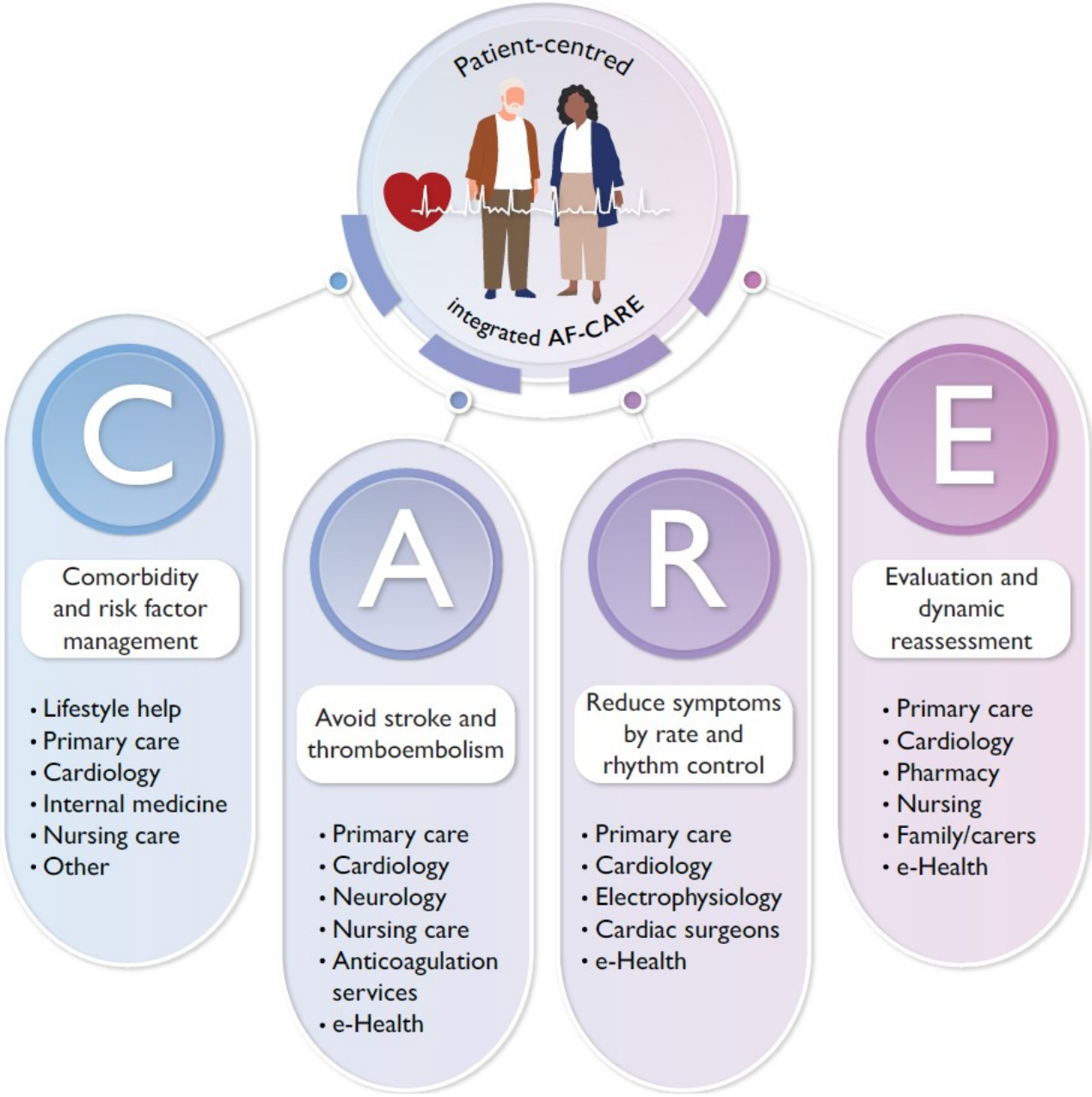
EHRA DOCUMENT

EHRA
European Heart
Rhythm Association

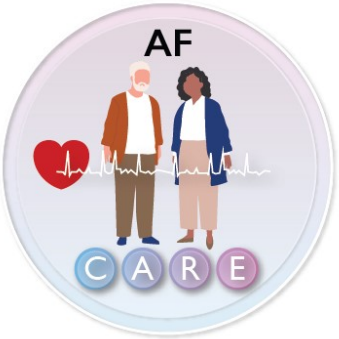
2024 European Heart Rhythm Association/ Heart Rhythm Society/Asia Pacific Heart Rhythm Society/Latin American Heart Rhythm Society expert consensus statement on catheter and surgical ablation of atrial fibrillation

Stylianos Tzeis [1]* (EHRA Chair), Edward P. Gerstenfeld[2] (HRS Co-Chair), Jonathan Kalman [3,4] (APHRS Co-Chair), Eduardo B. Saad [5,6] (LAHRS Co-Chair), Alireza Sepehri Shamloo [7] (Writing Group Coordinator), Jason G. Andrade [8], Chirag R. Barbhaiya [9], Tina Baykaner[10], Serge Boveda [11,12], Hugh Calkins [13], Ngai-Yin Chan [14], Minglong Chen [15], Shih-Ann Chen[16], Nikolaos Dagres [17], Ralph J. Damiano[18], Tom De Potter [19], Isabel Deisenhofer [20], Nicolas Derval [21], Luigi Di Biase [22], Mattias Duytschaever [23], Katia Dyrda [24], Gerhard Hindricks [17], Meleze Hocini [21], Young-Hoon Kim[25], Mark la Meir [26], Jose Luis Merino [27,28], Gregory F. Michaud[29], Andrea Natale [30,31,32,33], Isabelle Nault [34], Santiago Nava [35], Takashi Nitta [36], Mark O'Neill [37], Hui-Nam Pak [38], Jonathan P. Piccini [39], Helmut Pürerfellner [40], Tobias Reichlin [41], Luis Carlos Saenz [42], Prashanthan Sanders [43], Richard Schilling [44], Boris Schmidt [45], Gregory E. Supple [46], Kevin L. Thomas [39], Claudio Tondo [47,48], Atul Verma [49], and Elaine Y. Wan [50]

Atrial fibrillation



ESC guidelines for AFIB 2024. EHJ 2024.



Equality in healthcare provision (gender, ethnicity, socioeconomic) (Class I)

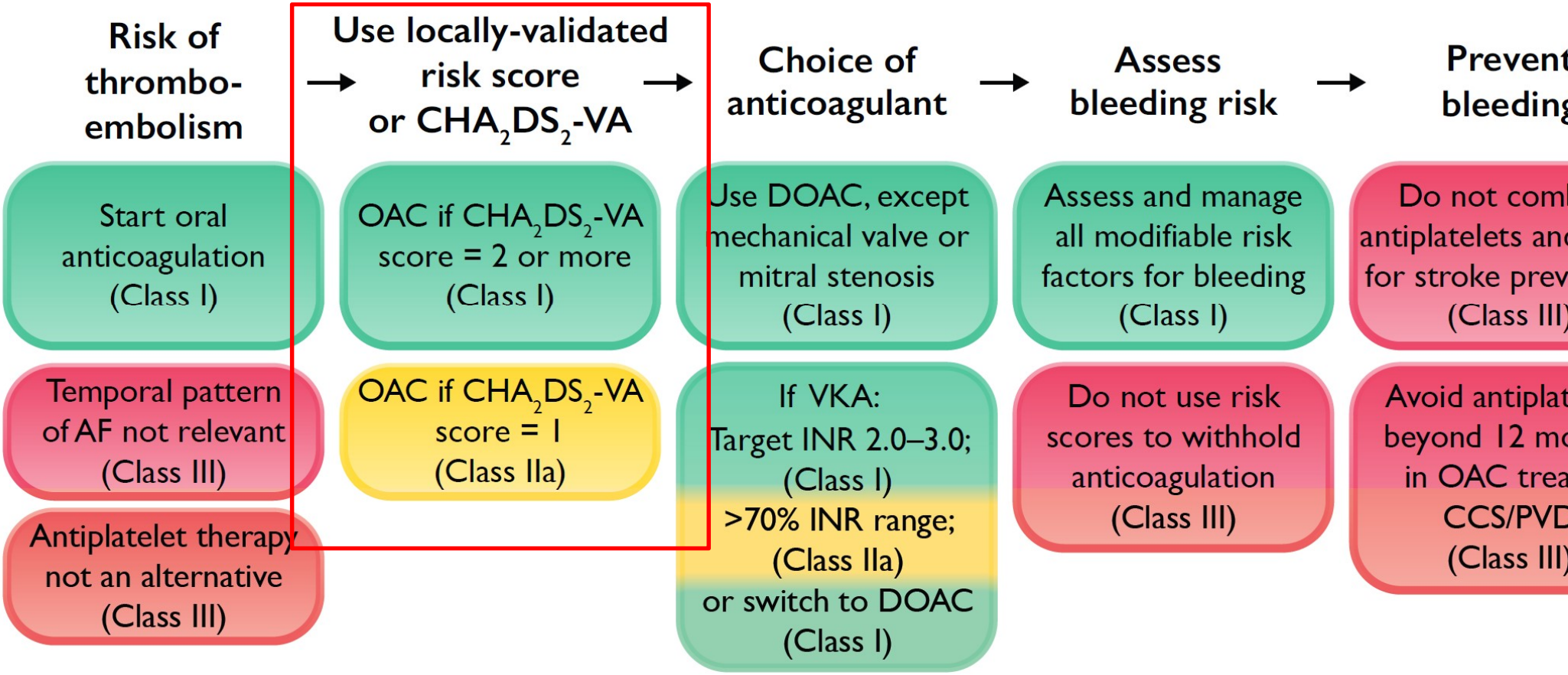
Education for patients, families and healthcare professionals (Class I)

Patient-centred AF management with a multidisciplinary approach (Class IIa)

Comorbidity and risk factor management

Hypertension	Heart failure	Overweight or obese	Obstructive sleep apnoea	Alcohol
Blood pressure lowering treatment (Class I)	Diuretics for congestion (Class I)	Weight loss (target 10%)[a] (Class I)	Management of OSA[a] (Class IIb)	Reduce to ≤3 drinks per week (Class I)
	Appropriate HFrEF medical therapy (Class I)	Bariatric surgery if rhythm control[a] (Class IIb)		
Diabetes mellitus			**Exercise capacity**	**Other risk factors comorbidities**
Effective glycaemic control[a] (Class I)	SGLT2 inhibitors (Class I)		Tailored exercise programme (Class I)	Identify and manage aggressively[a] (Class I)

Avoid stroke and thromboembolism



ESC guidelines for AFIB 2024. EHJ 2024.

CHA_2DS_2VA

CHA_2DS_2-VA component		Definition and comments	Points awarded
C	Chronic heart failure	Symptoms and signs of heart failure (irrespective of LVEF, thus including HFpEF, HFmrEF, and HFrEF), or the presence of asymptomatic LVEF ≤40%.[261–263]	1
H	Hypertension	Resting blood pressure >140/90 mmHg on at least two occasions, or current antihypertensive treatment. The optimal BP target associated with lowest risk of major cardiovascular events is	1
A	Age		2
D	Dia		1
S	Pri thr		2
V	Vas	imaging.[267] OR Peripheral vascular disease, including: intermittent claudication, previous revascularization for PVD, percutaneous or surgical intervention on the abdominal aorta, and complex aortic plaque on imaging (defined as features of mobility, ulceration, pedunculation, or thickness ≥4 mm).[268,269]	1
A	Age 65–74 years	1 point is given for age between 65 and 74 years.	1

However, implementation has varied in terms of gender. Female sex is an age-dependent stroke risk modifier rather than a risk factor per se.[112,256,257] The inclusion of gender complicates clinical practice both for healthcare professionals and patients.[258] It also omits individuals who identify as non-binary, transgender, or are undergoing sex hormone therapy. Previous guidelines from the ESC (and globally) have

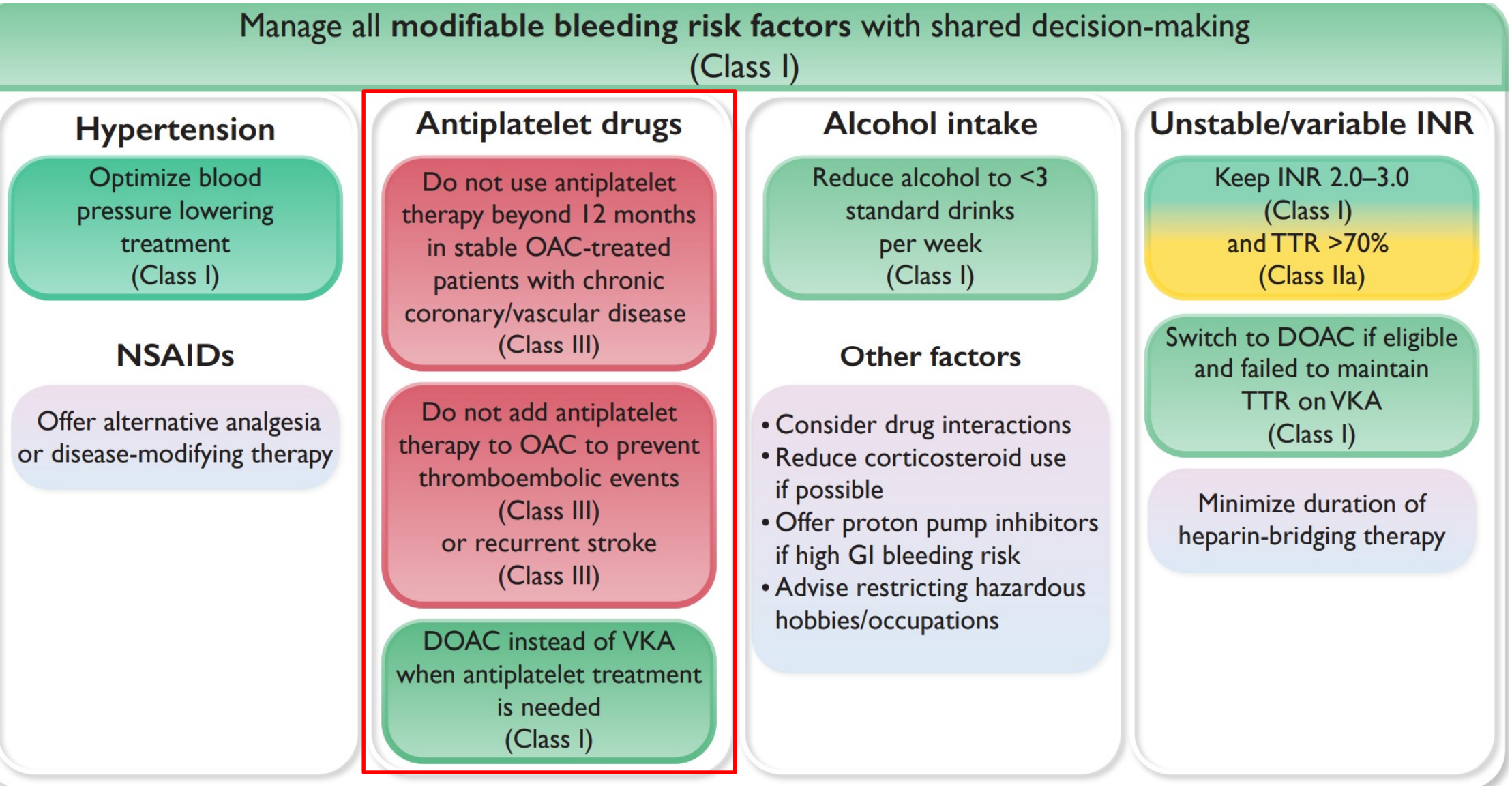
ESC guidelines for AFIB 2024. EHJ 2024.

Riziko krvácení

Recommendations	Class[a]	Level[b]
Assessment and management of modifiable bleeding risk factors is recommended in all patients eligible for oral anticoagulation, as part of shared decision-making to ensure safety and prevent bleeding.[439–444]	I	B
Use of bleeding risk scores to decide on starting or withdrawing oral anticoagulation is not recommended in patients with AF to avoid under-use of anticoagulation.[431,445,446]	III	B

ESC guidelines for AFIB 2024. EHJ 2024. 00

Riziko krvácení



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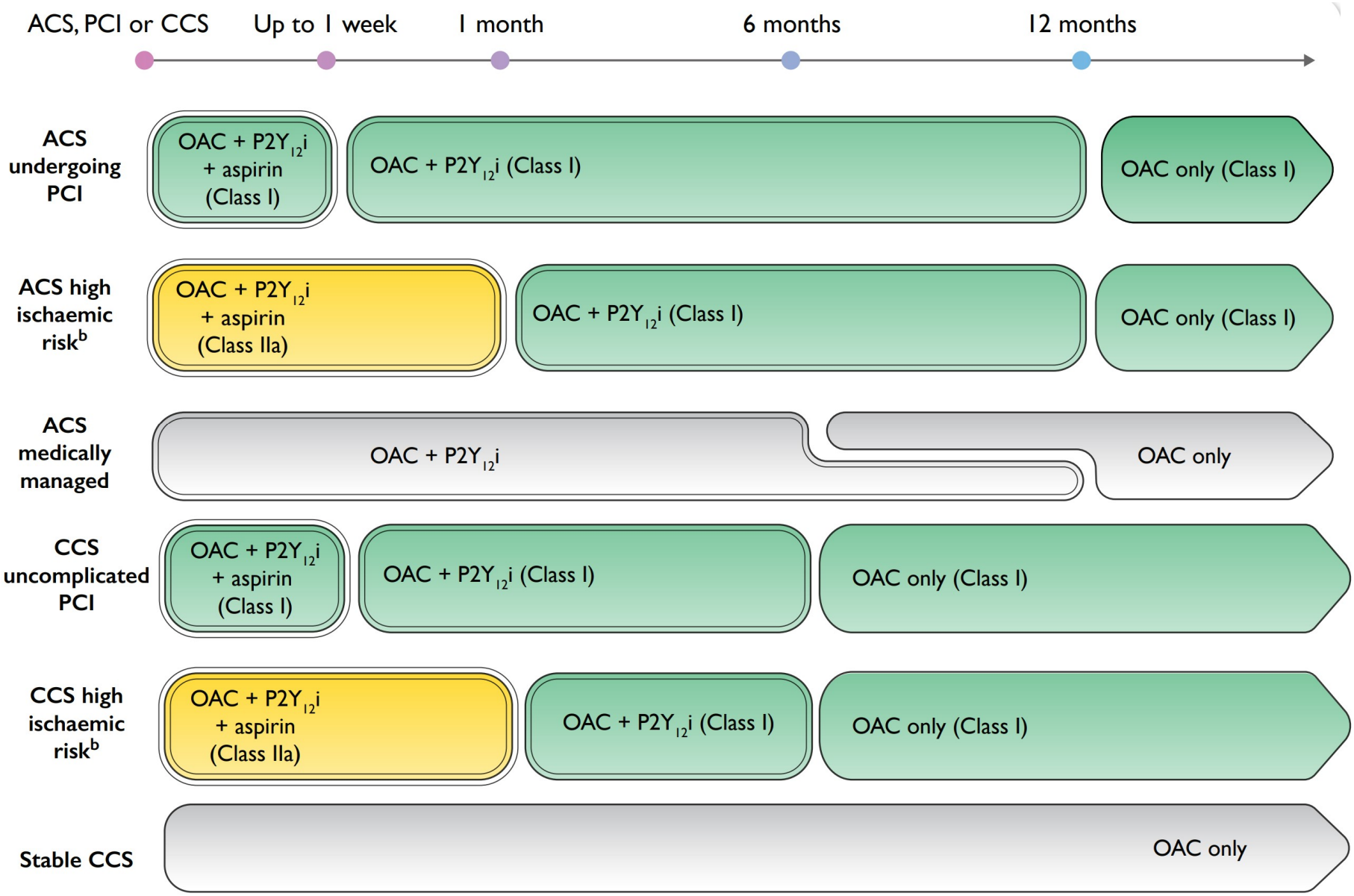
Riziko krvácení



DM

STEMI

Trobóza

Komplexní výkony

Prolongova nestabilní s

dogrel preferovaný.

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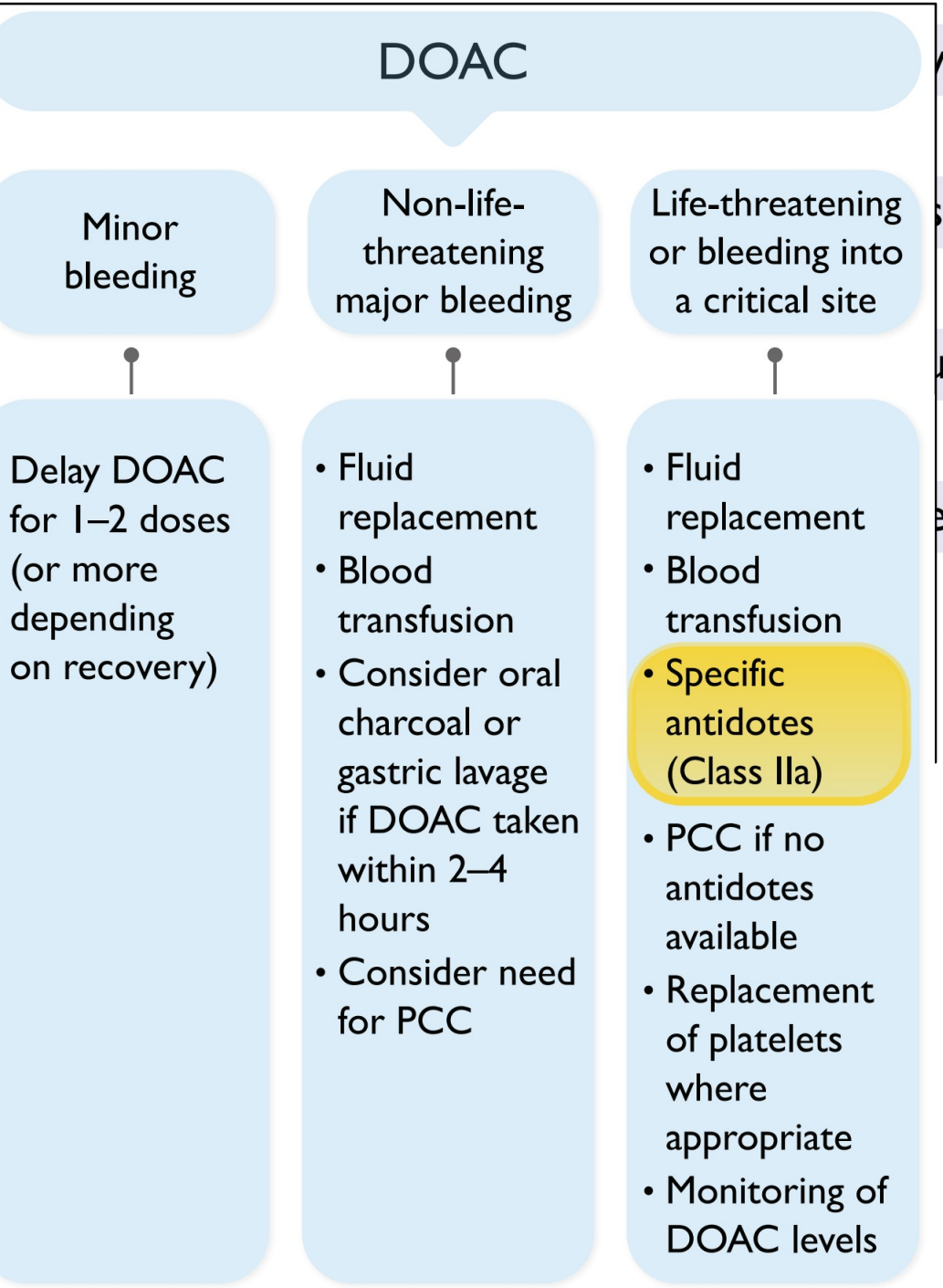


with active bleeding

sites mechanically, if accessible

ulation parameters, blood count and kidney function

e of last OAC and all co-medications

Dabigatran

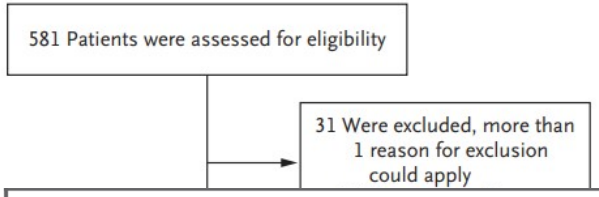
- Idarucizumab (2-4 hod)
- Dialýza může snížit hladiny dabigatranu

Inhibitory Xa

- Andexanet alfa – rekombinantní inaktivní forma lidského faktoru Xa ychytávající anti-Xa molekuly.

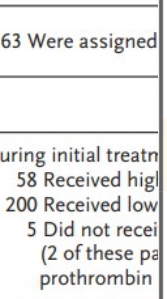
ESC guidelines for AFIB 2024. EHJ 2024.

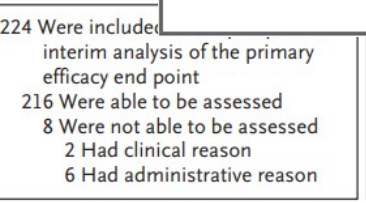
Andexanet alfa u nemocných s intracerebrální hemorhag

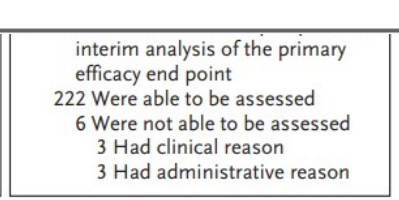


Characteristic	Andexanet (N=224)	Usual Ca (N=228
Age — yr	78.9±8.5	78.9±8.5
Female sex — no. (%)	94 (42.0)	113 (49.

End Point	Andexanet (N=224)	Usual Care (N=228)	Adjusted Difference per 100 Patients (95% CI)*	P Value
	no./total no. (%)		*percentage points*	
Hemostatic efficacy	150/224 (67.0)	121/228 (53.1)	13.4 (4.6 to 22.2)	0.003
Hematoma volume change ≤35%†	165/215 (76.7)	137/212 (64.6)	12.1 (3.6 to 20.5)	
NIHSS score change <7 points	188/214 (87.9)	181/218 (83.0)	4.6 (–2.0 to 11.2)	
No receipt of rescue therapy between 3 hr and 12 hr	218/224 (97.3)	213/228 (93.4)	3.8 (0.0 to 7.6)	
Hematoma volume increase ≥12.5 ml‡	24/216 (11.1)	36/214 (16.8)	–5.6 (–12.0 to 0.8)	
Hemostatic efficacy, excluding patients nonevaluable for administrative reasons	150/218 (68.8)	121/225 (53.8)	14.5 (5.7 to 23.4)	







Subdural	13 (5.8)	4 (1.8)

Connolly SJ. NE

Reduce symptoms by rate and rhythm control

See patient pathways for:

First-diagnosed AF | Paroxysmal AF | Persistent AF | Permanent AF

Consider:

ntrol drugs | Cardioversion | Antiarrhythmic drugs | Catheter ablation | Endoscopic/hybrid ablation | Surgical ablation | Ablate ar

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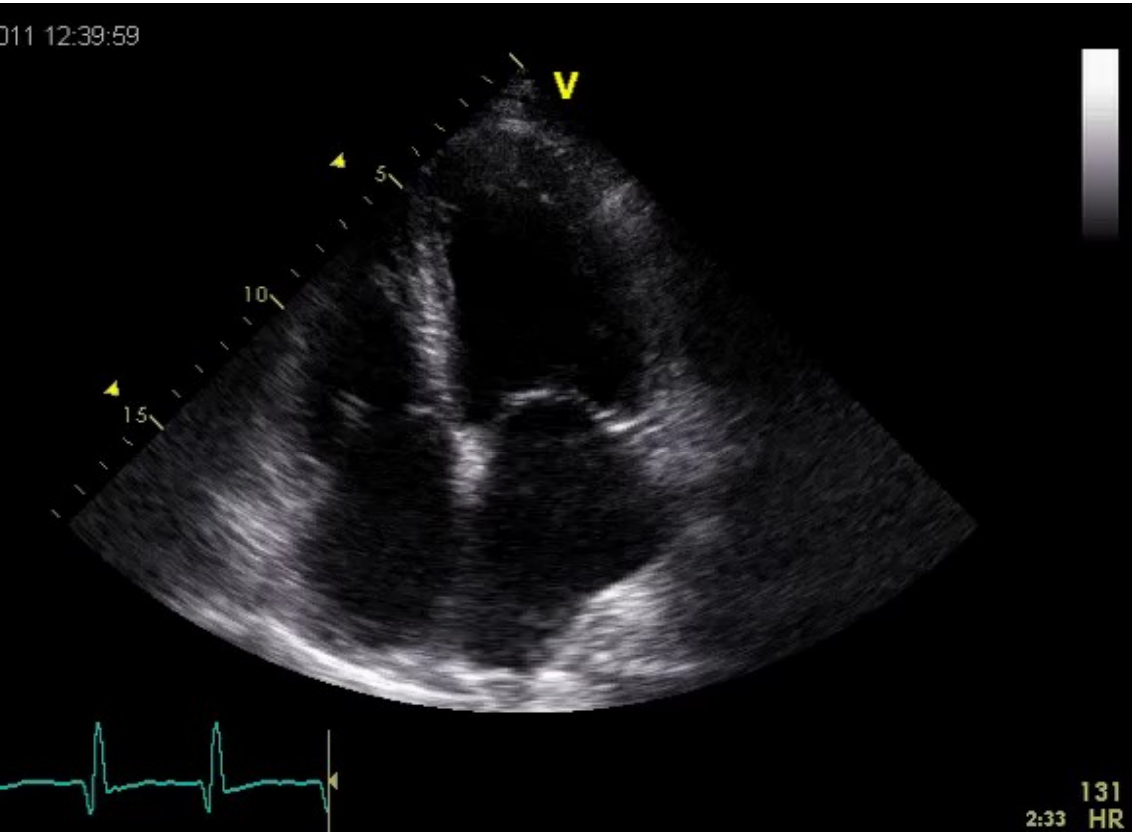
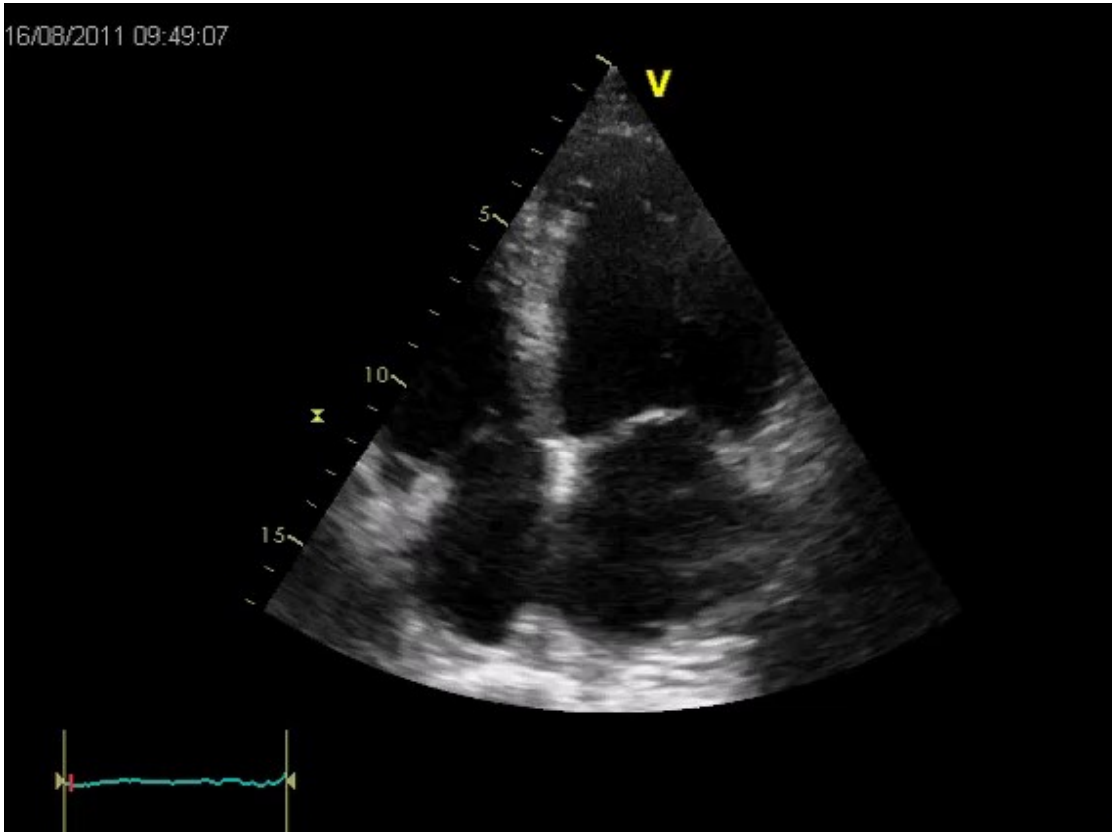
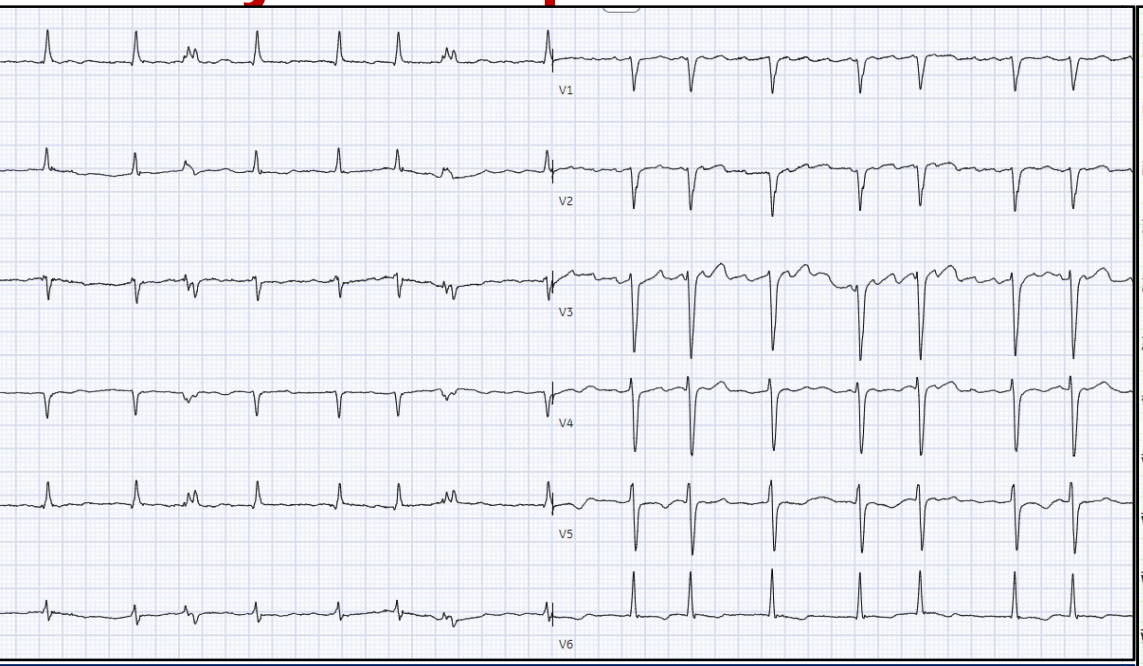
ECHO při přijetí a za 30 dní

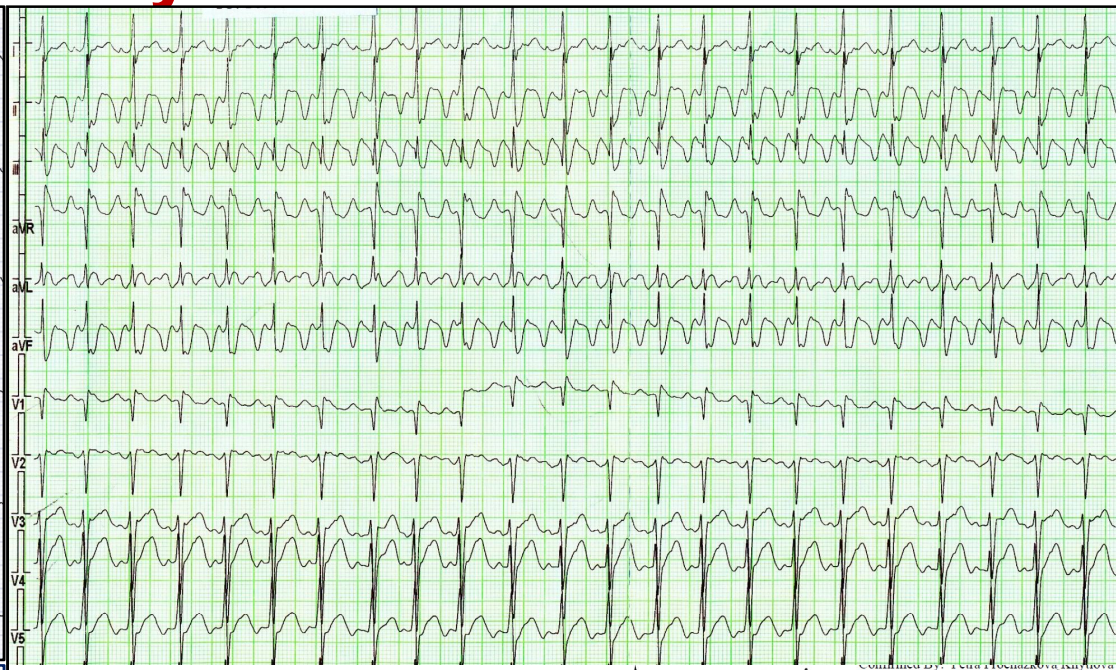


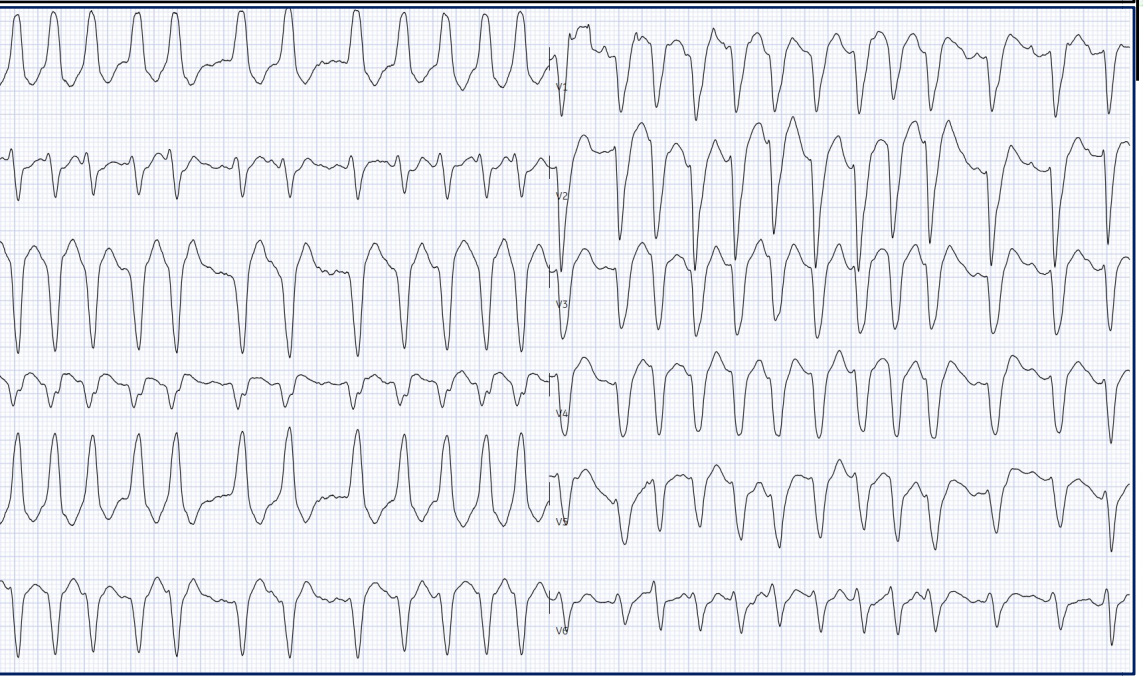


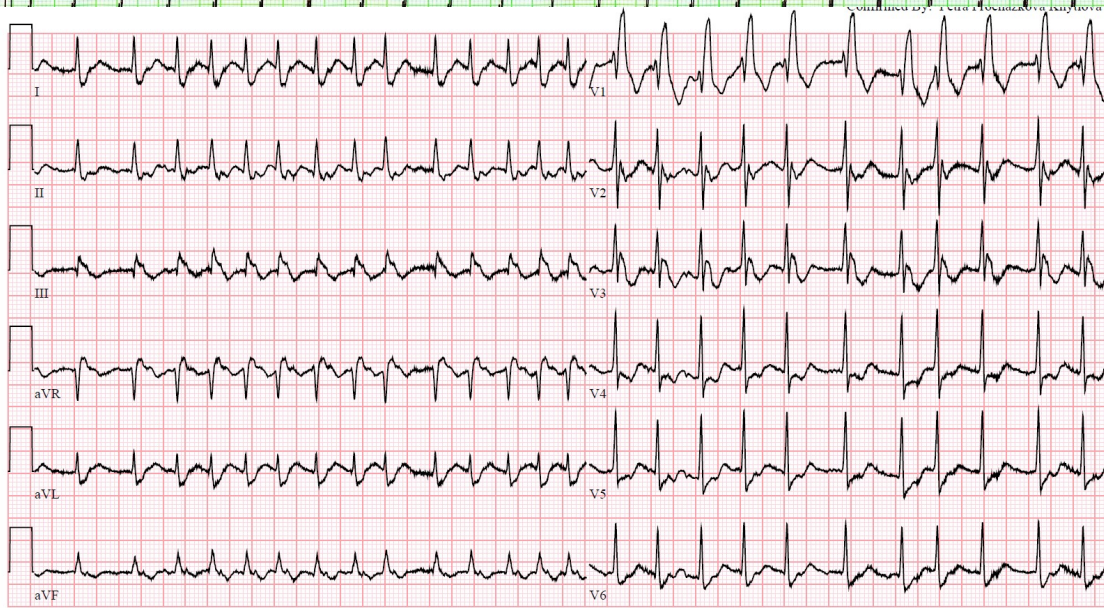
Zdroj: Archiv II.interní kliniky

Rychlé supraventrikulární tachykardie – fibrilace síní









Zdroj: Archiv II. interní klini

ntrola srdeční frekvence

control therapy is recommended in patients AF, as initial therapy in the acute setting, an ct to rhythm control therapies, or as a sole ment strategy to control heart rate and reduce toms.[458–460]	I	B
-blockers, diltiazem, verapamil, or digoxin are mmended as first-choice drugs in patients with nd LVEF >40% to control heart rate and reduce toms.[48,461,462]	I	B
-blockers and/or digoxin are recommended in nts with AF and LVEF ≤40% to control heart and reduce symptoms.[40,185,463–465]	I	B
venous amiodarone, digoxin, esmolol, or olol may be considered in patients with AF who haemodynamic instability or severely depressed to achieve acute control of heart rate.[472,473]	IIb	B
Combination rate control therapy should be considered if a single drug does not control symptoms or heart rate in patients with AF, providing that bradycardia can be avoided, to control heart rate and reduce symptoms.	IIa	
Lenient rate control with a resting heart rate of < 110 b.p.m. should be considered as the initial target for patients with AF, with stricter control reserved for those with continuing AF-related symptoms.[459,460,466]	IIa	
Atrioventricular node ablation in combination with pacemaker implantation should be considered in patients unresponsive to, or ineligible for, intensive rate and rhythm control therapy to control heart rate and reduce symptoms.[467–469]	IIa	
Atrioventricular node ablation combined with cardiac resynchronization therapy should be considered in severely symptomatic patients with permanent AF and at least one hospitalization for HF to reduce symptoms, physical limitations, recurrent HF hospitalization, and mortality.[470,471]	IIa	

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Léky pro rate control strategii I

	Intravenous administration	Usual range for oral maintenance dose	Contraindicated
lockers[b]			
olol	2.5–5 mg bolus over 2 mins; up to 15 mg maximal cumulative dose	25–100 mg twice daily	In case of asthma, non-selective beta-blockers should be avoided. Contraindicated in acute HF and hi severe bronchospasm.
olol XL te)	N/A	50–200 mg once daily	
lol	N/A	1.25–20 mg once daily	
l[c]	N/A	25–100 mg once daily	
	500 µg/kg i.v. bolus over 1 min; followed by 50–300 µg/kg/min	N/A	
l	100 µg/kg i.v. bolus over 1 min; followed by 10–40 µg/kg/min	N/A	
ol	N/A	2.5–10 mg once daily	
lol	N/A	3.125–50 mg twice daily	

Léky pro rate control strategii II

	Intravenous administration	Usual range for oral maintenance dose	Contraindicated
ihydropyridine calcium channel antagonists			
mil	2.5–10 mg i.v. bolus over 5 min	40 mg twice daily to 480 mg (extended release) once daily	Contraindicated if LVEF ≤40%. Adapt doses in hepatic and renal impairment.
m	0.25 mg/kg i.v. bolus over 5 min, then 5–15 mg/h	60 mg three times daily to 360 mg (extended release) once daily	
is glycosides			
	0.5 mg i.v. bolus (0.75–1.5 mg over 24 h in divided doses)	0.0625–0.25 mg once daily	High plasma levels associated with events. Check renal function before starti digoxin and adapt dose in CKD pa
n	0.4–0.6 mg	0.05–0.1 mg once daily	
rone[d]	300 mg i.v. diluted in 250 mL 5% dextrose over 30–60 min (preferably via central venous cannula), followed by 900–1200 mg i.v. over 24 h diluted in 500–1000 mL via a central venous cannula	200 mg once daily after loading Loading: 200 mg three times daily for 4 weeks, then 200 mg daily or less as appropriate (reduce other rate control drugs according to heart rate)	Contraindicated in iodine sensitivit Serious potential adverse effects (i pulmonary, ophthalmic, hepatic, ar thyroid). Consider numerous drug interactions.

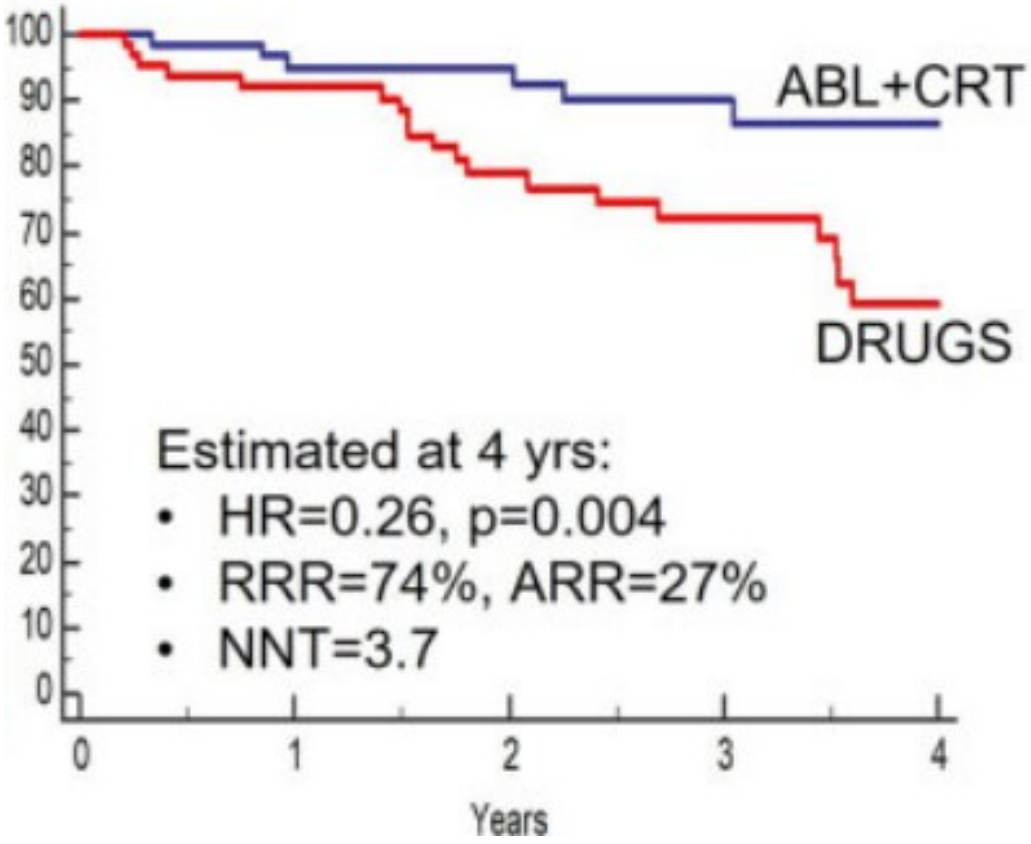
Ablace AV junkce a CRT bez LBBB

PAF – CRT

33 pacientů s permanentní FS
zkými QRS
rdeční selhání (hospitalizace pro HF)
andomizováni:

- **Standardní rate control strategie**
- **Zavedení CRT a ablace AV uzlu**

pts with: ermanent AF arrow QRS HF hospitalization evere symptoms	**63** Rate control **ABL+CRT**	HR = **70** bpm	**11%** (7 pts)
	70 Rate control **DRUGS**	HR = **82** bpm	**29%** (20 pts)



mární endpoint – celková mortalita

udie předčasně ukončena pro jednoznačný benefit CRT + ablace AV junkce
ůměrné sledování 29M.

Brignole M, et al. EHJ 2021

Akutní stav, nestabilní pacient – řešení dle ESC guideline

1. Elektrická kardioverze

– Výhoda – rychlá a účinná

– Nevýhoda – vysoké procento časných relapsů

2. Amiodarone

– Nevýhoda – mírně oddálený účinek

3. Landiolol

– Nevýhoda – pouze rate control

Landiolol

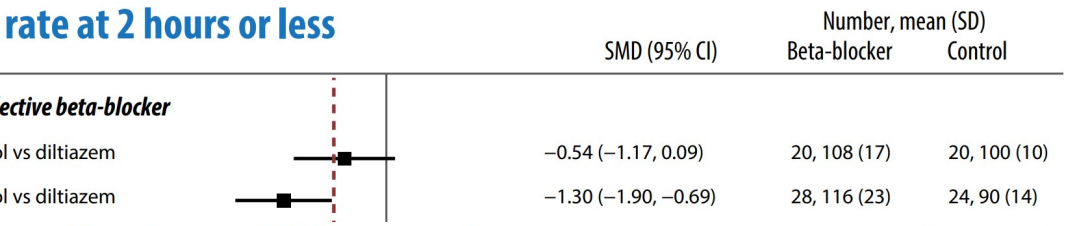
- i.v. betablokátor
- Snižuje komorovou odpověď, nízké rizil prohloubení hypotenze
- Ultra-krátký BB (poločas 4 minuty)
- Vysoká ß1 selektivita (ß1/ ß2 ≈ 250)

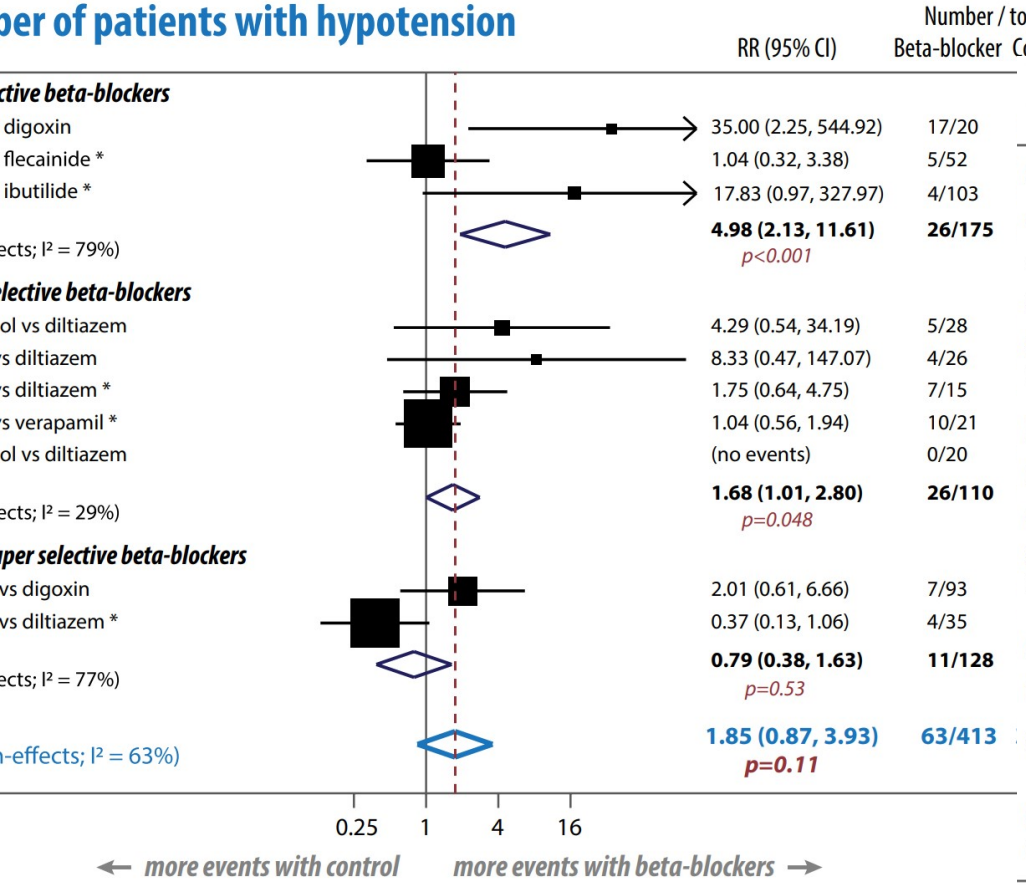
Problémem jsou časté a časné recidivy

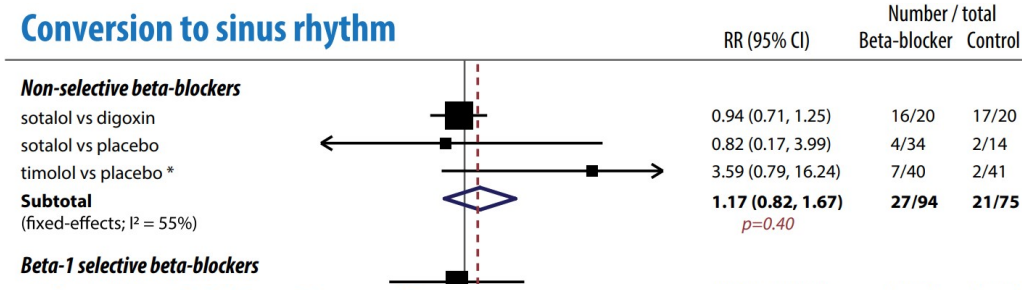
Spontánní terminace FS u nestabilních pacientů ~ 83% v průběhu 48h

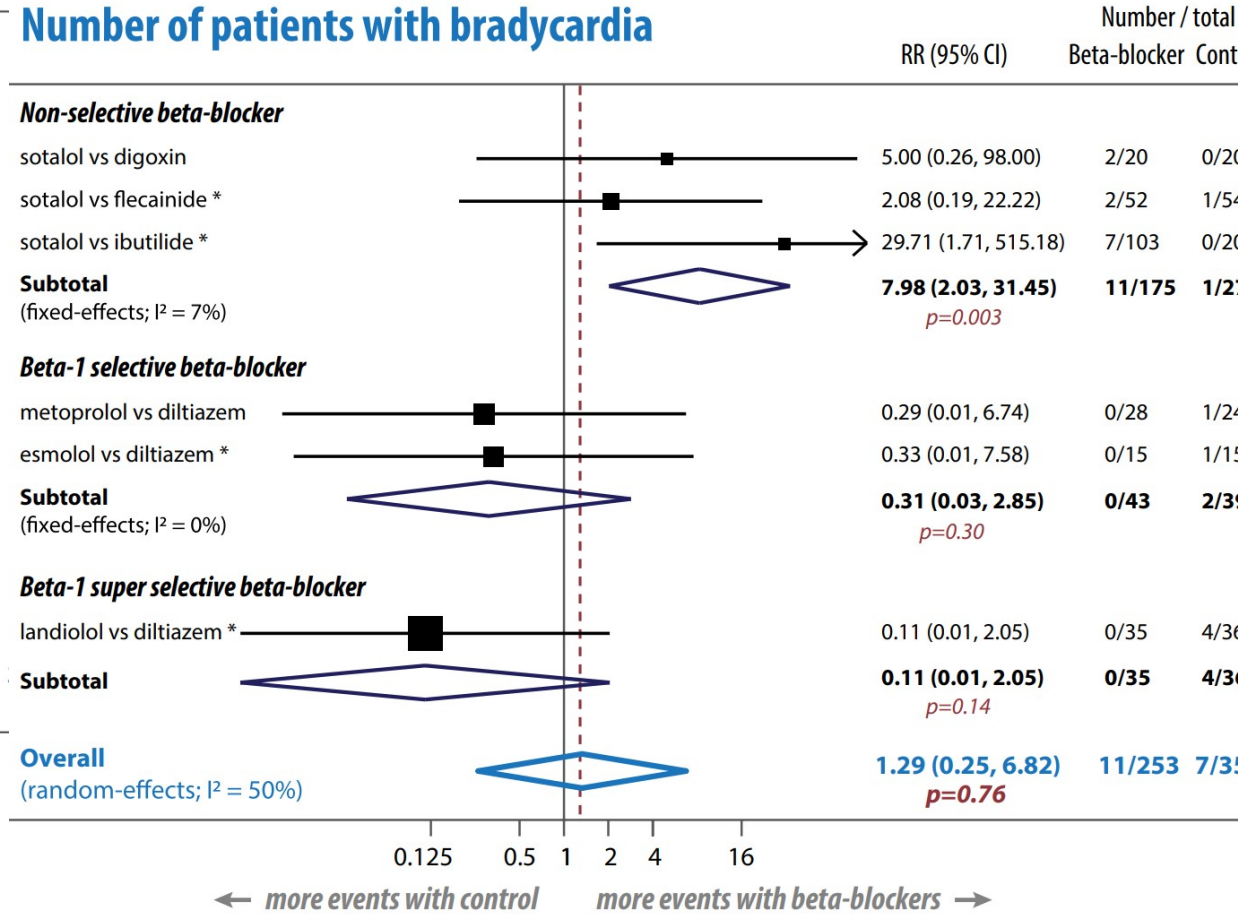
ESC guidelines for AFIB 2024. EHJ 2024. 00:1-101. Shiga T. Eeur Heart J Su

Rate control a β1 selektivita u FS









Perrett M, et al. Clin Res Cardio

Ablace SVT na MCS

4 patients (3 males, median age 73 years [67; 78])

Medical history:

– HFrEF 3 /4

– CAD 1 /4

Arrhythmias:

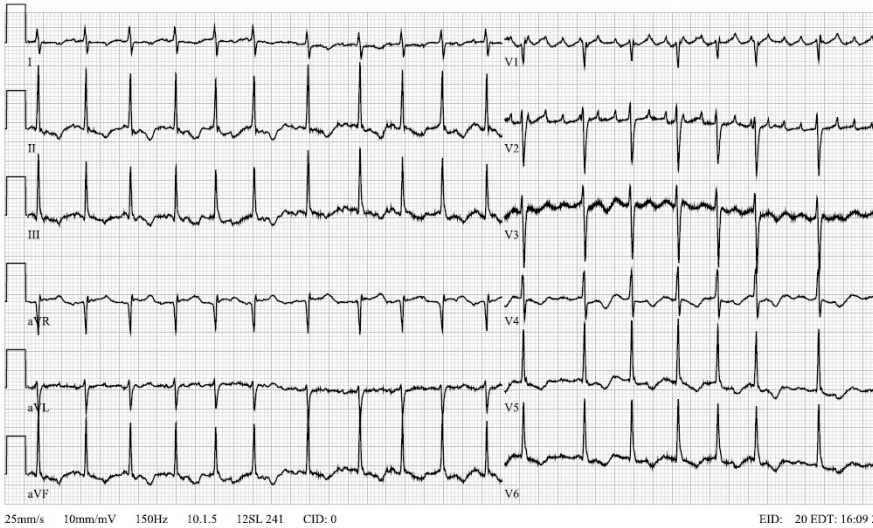
– AFib with rapid ventricular response 3 /4

– Focal atrial tachycardia 1 /4

Median **LVEF** at the time of CA:

28% (IQR 23; 33%)

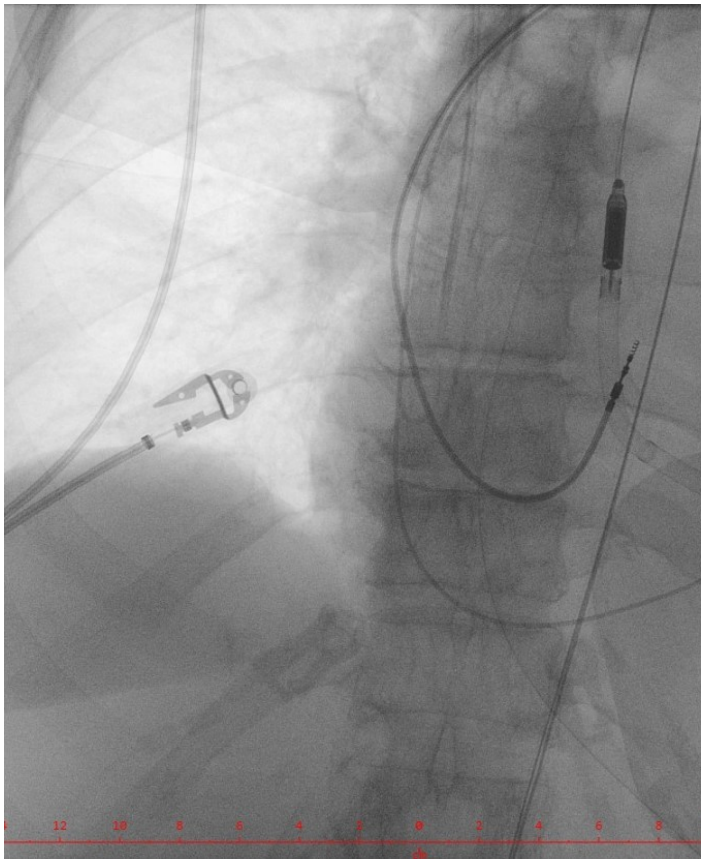
MCS type	
Impella CP	2 patients
VA ECMO	1 patients
Impella 5.5	1 patient

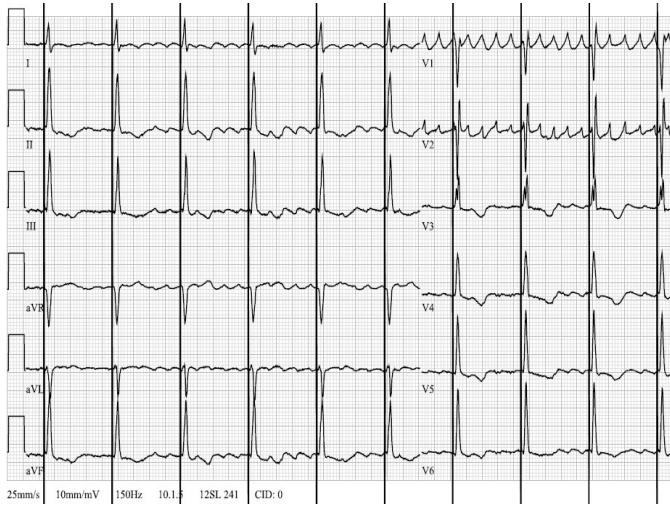


Prezentováno se svolením dr. Milana Dusíka

SVT ablations

- Procedure:
  - 3x non-selective AV node RF ablation
    (CRT pacing 2x, CSP pacing 1x)
  - 1x Atrial tachycardia RFA
- Arrhythmia recurrence: 0 /4
- Successful MCS weaning: 4 /4
  - Median MCS duration 13 days (IQR 9; 20)
- 30-day mortality: 0 /4





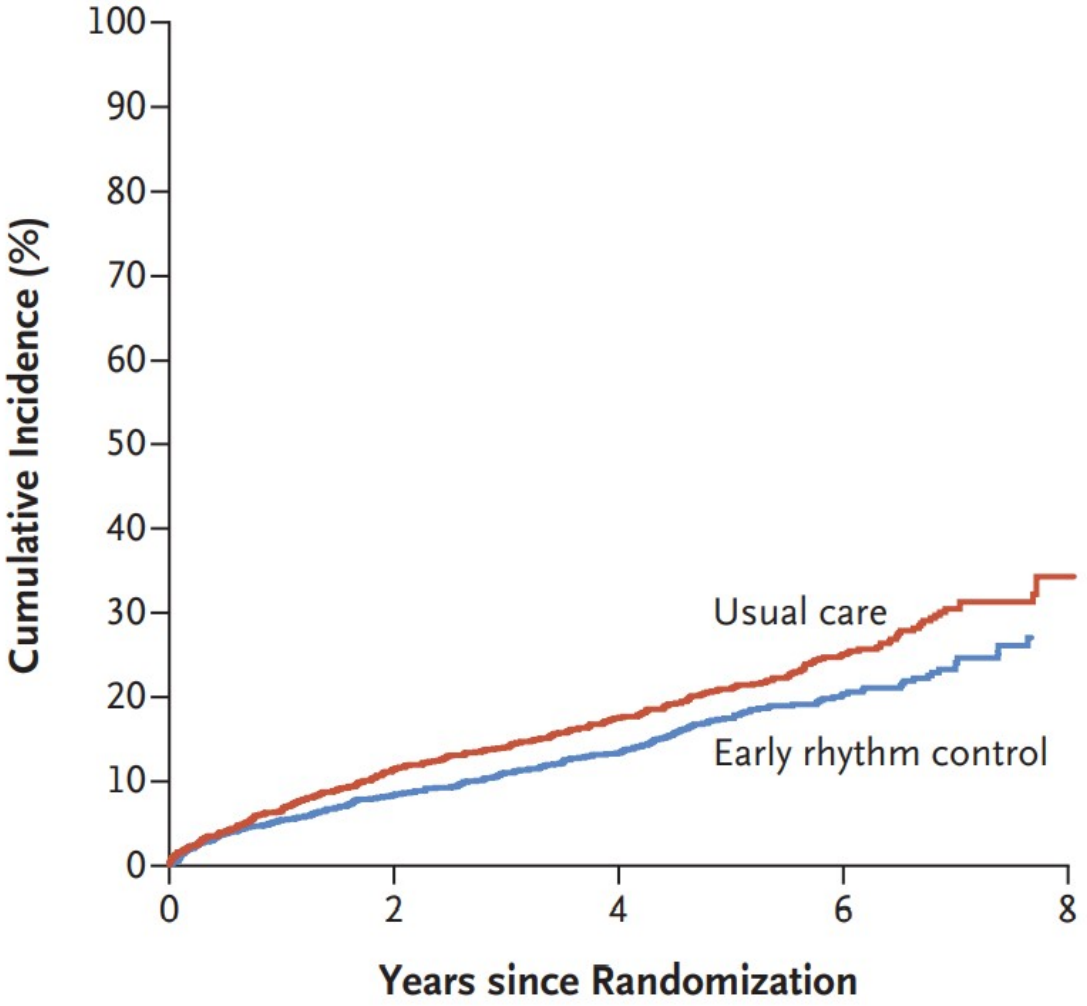
Prezentováno se svolením dr. Milana Dusíka

Je časná kontrola rytmu výhodná?
Studie EAST

udijní populace
FS < 1 rok
Věk > 75 let
CMP / SE
Nebo 2 z AHY, > 65let, SS, DM, ICHS,
renální insuficience

andomizace
Zvyklá léčba
Časná kontrola rytmu (AA, Ablace)

rimární endpoint
KV mortalita, CMP, hospitalizace
ro SS, AKS)



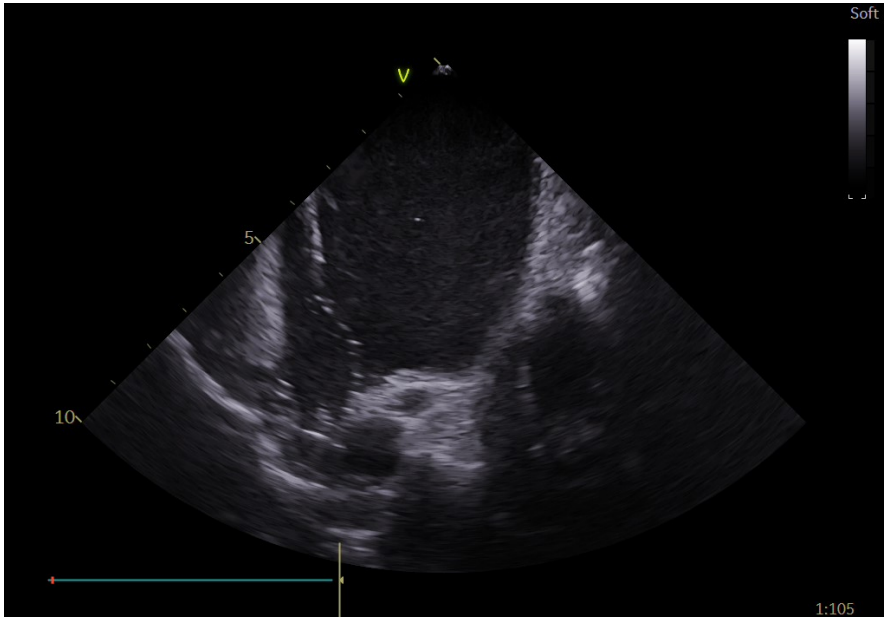
95 Were assigned to early rhythm control

1394 Were assigned to usual care

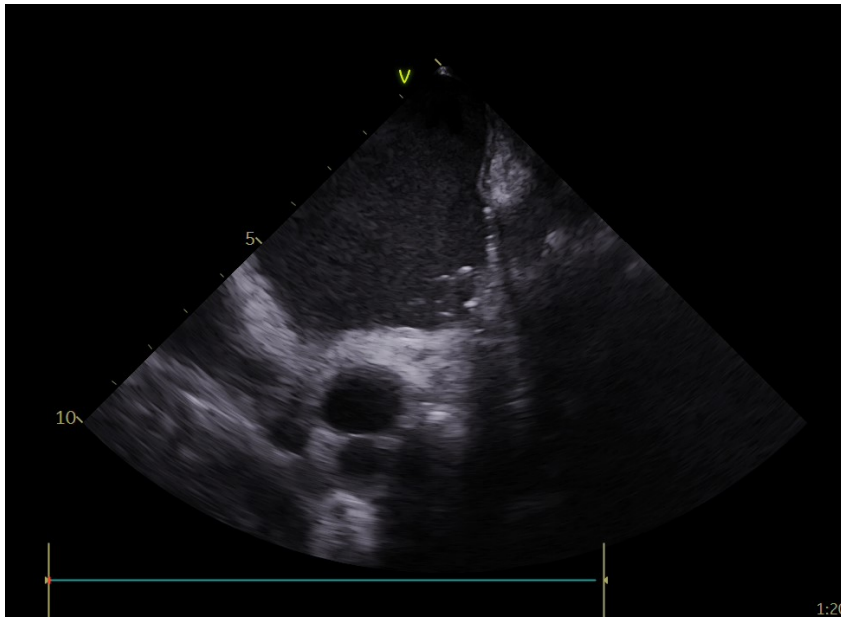
Kirchhof P. NE

Some aspects of catheter ablation

RSPV



LIPV



Surce: General Universtity H

Catheter ablation

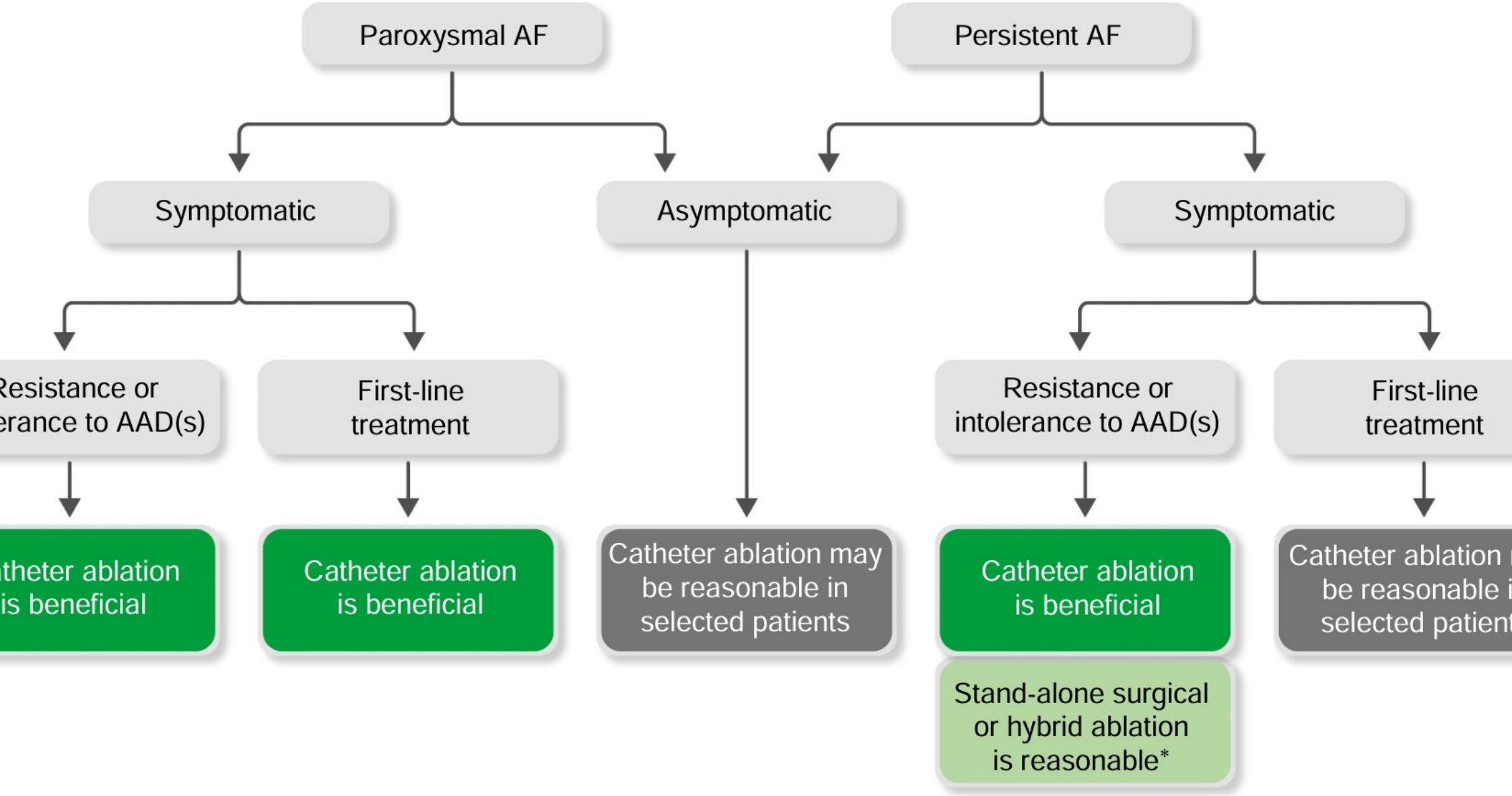
AF patients resistant or intolerant to antiarrhythmic drug therapy

Catheter ablatic
paroxysmal or p
to antiarrhythmi
recurrence, and

First-line rhythm control therapy		
Catheter ablation is recommended as a first-line option within a shared decision-making rhythm control strategy in patients with paroxysmal AF, to reduce symptoms, recurrence, and progression of AF.[16,591–594]	I	A
Catheter ablation may be considered as a first-line option within a shared decision-making rhythm control strategy in selected patients with persistent AF to reduce symptoms, recurrence, and progression of AF.	IIb	C

ESC guidelines for AFIB 2024. EHJ 2024.

Catheter ablation II



Expert consensus. Europace 2024; 2

Catheter ablation III

tients with heart failure

catheter ablation is recommended in patients th AF and HFrEF with high probability of chycardia-induced cardiomyopathy to reverse left ntricular dysfunction.[604,611]	I	B
catheter ablation should be considered in ected AF patients with HFrEF to reduce HF spitalization and prolong survival.[4,513,514,604,610,612]	IIa	B

ESC guidelines for AFIB 2024. EHJ 2024.

CASTLE AF

- **Paroxysmální / perzistentní FS**
- **Ablační výkon** 179 nemocných
- **Konzervativní postup** 184 nemocných
- NYHA II-IV, EF LK ≤ 35%
- ICD / CRT-D
- Strate

- Ø počet ablací:1,3 / pacient
- Změna EF LK (baseline Ø 32,5%)
  - Ablační: ~ 8%
  - Konzervativní: 0
- SR na konci sledování

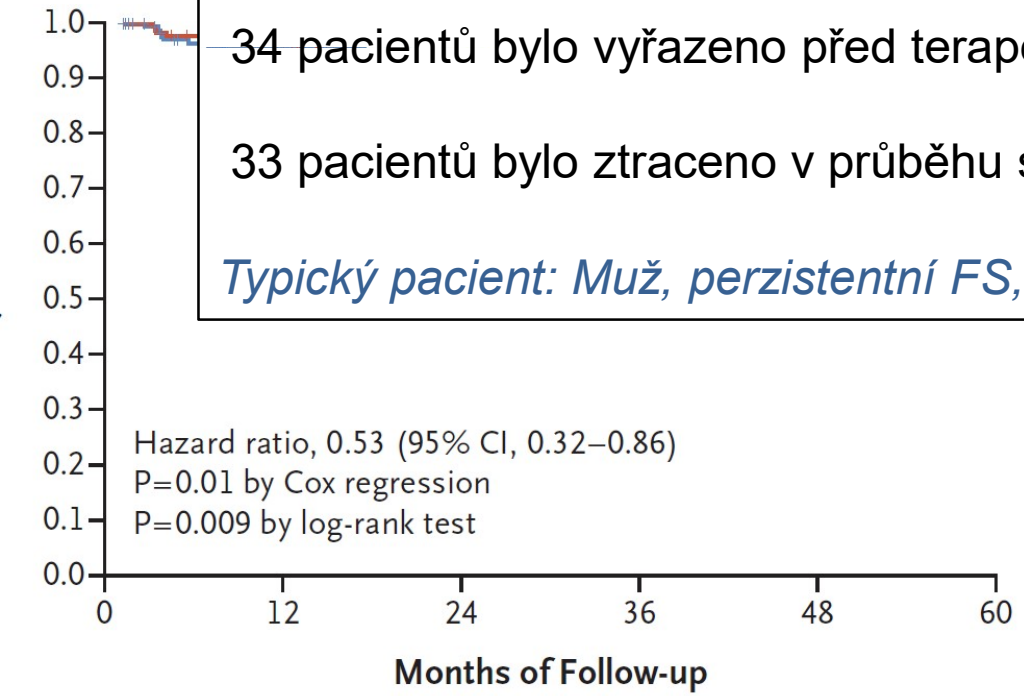
10x více pacientů screenovaných než zařazených

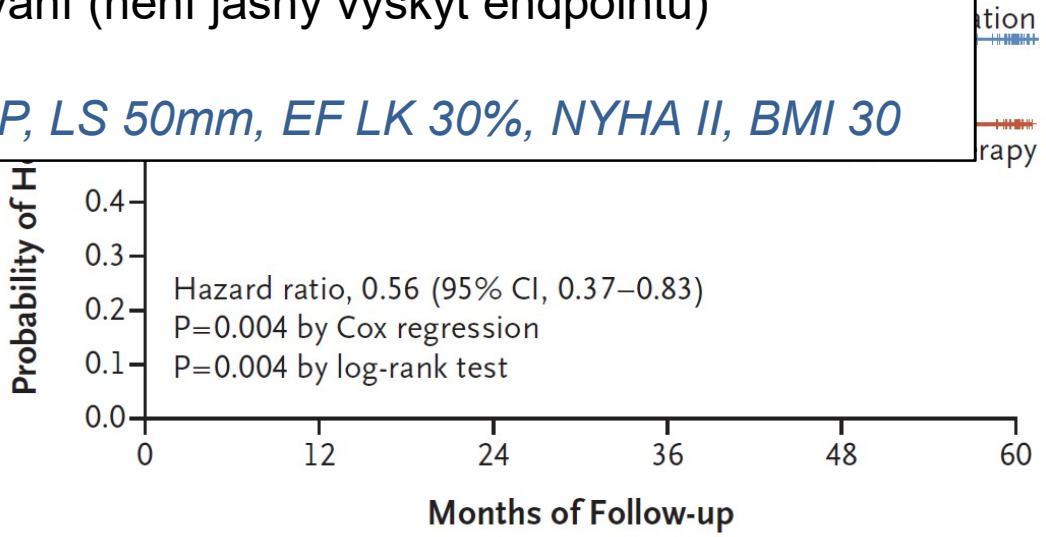
Rozdíl v počtu endpointů mezi skupinami: 31 nemocných (51 vs 82)

34 pacientů bylo vyřazeno před terapeutickou intervencí

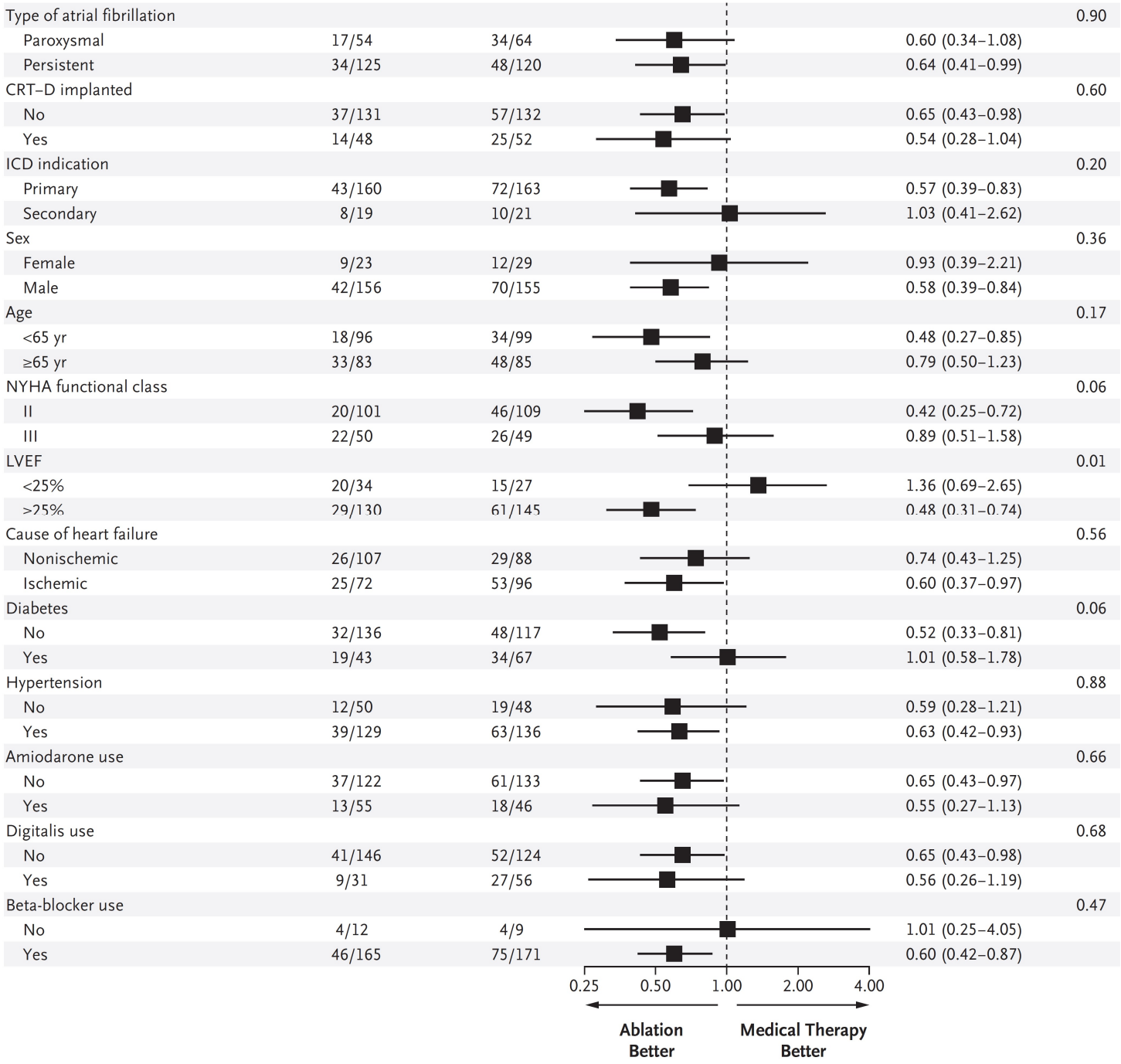
33 pacientů bylo ztraceno v průběhu sledování (není jasný výskyt endpointu)

Typický pacient: Muž, perzistentní FS, DKMP, LS 50mm, EF LK 30%, NYHA II, BMI 30





Marrouche NF, et al. NEJM 2018; 378:



CASTLE AF

Marrouche N. NEJ

CASTLE-HTx

Unicentrická, open-label, randomizovaná, investigator-initiated, superiority studie

Pacienti:
- **„End-stage“ srdeční selhání a symptomatická fibrilace síní**
- Vhodní k zařazení do transplantačního programu / zavedení levostranné podpory
- NYHA ≥ II; EF LK < 35%
- ICD
- Pacienti ve stabilizovaném stavu

Randomizace 1:1
- Katetrizační ablace
- Zvyklá farmakologická léčba

Sohns C, et al. NEJM 2023; 389

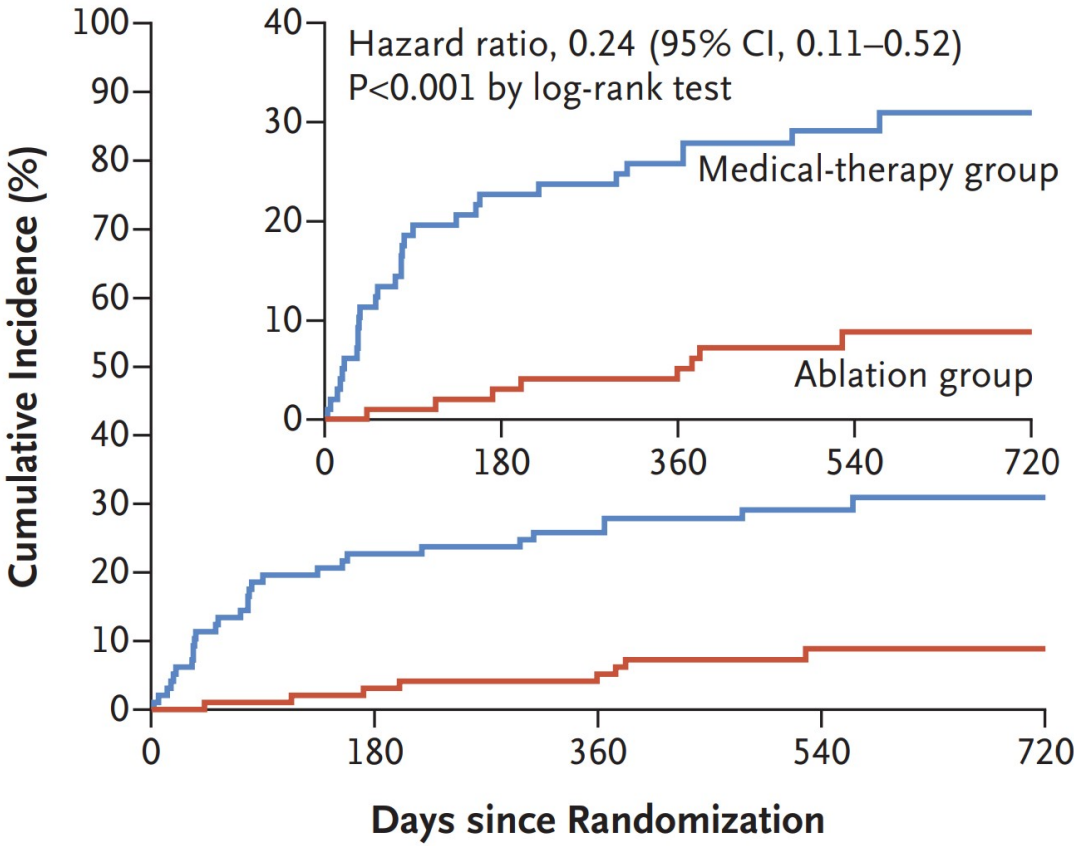
CASTLE-HTx

Characteristic	Ablation Group (N=97)	Medical-Therapy Group (N=97)
Age — yr	62±12	65±10
Male sex — no. (%)	85 (88)	72 (74)
NYHA functional class — no. (%)‡		
II	33 (34)	28 (29)
III	52 (54)	54 (56)
IV	12 (12)	15 (15)
Left ventricular ejection fraction — %	29±6	25±6
6-Min walk test		
Test performed — no. (%)	26 (27)	24 (25)
Distance — m	308±69	299±66
N-terminal pro-BNP level		
No. of patients evaluated (%)	46 (47)	52 (54)
Value — pg/ml	3852±3261	4461±5191

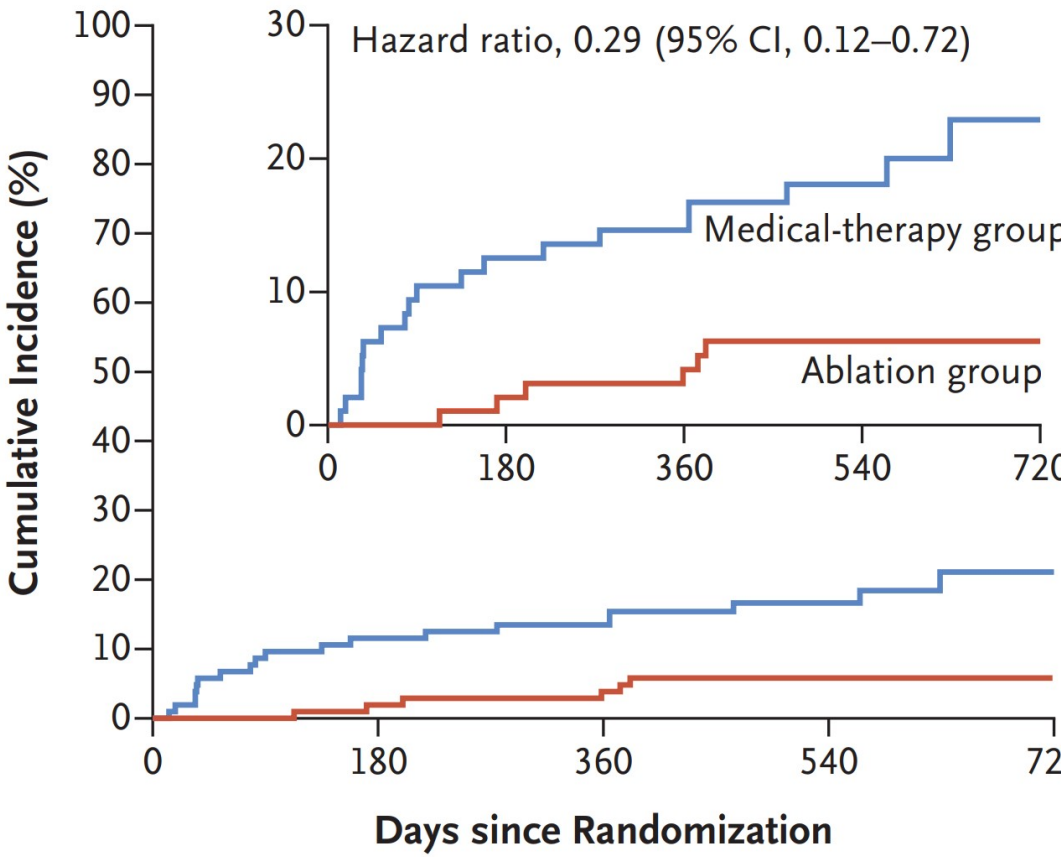
Sohns C, et al. NEJM 2023; 389

CASTLE-HTx

Primární endpoint



Celková mortalita



Primární endpoint: celková mortalita, transplantace, zavedení podpory

Sohns C, et al. NEJM 2023; 389

CASTLE-HTx

oint	Ablation Group (N=97)	Medical-Therapy Group (N=97)	Hazard Ratio (95% CI)*	P
	no. (%)			
ry end point‡	8 (8)	29 (30)	0.24 (0.11 to 0.52)	<
dary end points				
ath from any cause	6 (6)	19 (20)	0.29 (0.12 to 0.72)	
Cardiovascular	5 (5)	18 (19)	0.25 (0.09 to 0.68)	
Cerebrovascular	0	1 (1)		
Cancer	1 (1)	0		
Death after nonfatal primary end point	0	5 (5)		
plantation of left ventricular assist device	1 (1)	10 (10)	0.09 (0.01 to 0.70)	
gent heart transplantation	1 (1)	6 (6)	0.15 (0.02 to 1.25)	

Sohns C, et al. NEJM 2023; 389

CASTLE-HTx – vývoj systolické dysfunkce levé komory

End Point	Ablation Group	Medical-Therapy Group	Mean Between-Group Difference (95% CI)†
Left ventricular ejection fraction			
At baseline			
No. of patients evaluated	97	97	
Value — %	29.0±6.4	27.7±6.3	
At 6 mo			
No. of patients evaluated	92	74	
Baseline value — %	29.4±6.2	28.7±5.9	
Value at 6 mo — %	36.2±8.7	29.9±7.1	
Improvement — percentage points	6.7±6.5	1.2±6.4	5.5 (3.5 to 7.5)
At 12 mo			
No. of patients evaluated	92	70	
Baseline value — %	29.4±6.2	28.7±6.0	
Value at 12 mo — %	37.2±9.1	30.1±8.0	
Improvement — percentage points	7.8±7.6	1.4±7.2	6.4 (4.1 to 8.7)

Sohns C, et al. NEJM 2023; 389

CASTLE-HTx – vývoj arytmické zátěže

End Point	Ablation Group	Medical-Therapy Group	Mean Between-Group Difference (95% CI)†
Atrial fibrillation burden			
At baseline			
No. of patients evaluated	97	97	
Value — %	50.2±31.9	49.3±34.4	
At 6 mo			
No. of patients evaluated	90	71	
Baseline value — %	50.8±31.0	50.7±34.7	
Value at 6 mo — %	20.0±28.3	42.4±35.2	
Reduction — percentage points	30.8±33.3	8.3±25.2	22.5 (13.1 to 31.9)
At 12 mo			
No. of patients evaluated	89	66	
Baseline value — %	50.9±31.2	52.4±35.2	
Value at 12 mo — %	19.6±28.0	43.7±36.2	
Reduction — percentage points	31.4±33.3	8.6±26.3	22.7 (13.0 to 32.5)

Sohns C, et al. NEJM 2023; 389

Závěr

Akutní komplikace fibrilace síní

- **Tromboembolické komplikace**
  - Prevence je lepší než likvidace následků
  - Problematika restartu antikoagulační léčby
- **Krvácivé komplikace**
  - K dispozici antidota
- **Akutní srdeční selhání**
  - Prevence bradykadrizující léčbou
  - Akutní řešení příčiny
  - Farmakologické postupy
  - Nefarmakologické postupy
    - Ablace AV uzlu a selektivní ablace

Děkuji za pozornost!