KDY UVAŽOVAT O ABLACI FS U SRDEČNÍHO SELHÁNÍ ?

Martin Fiala

Centrum kardiovaskulární péče, Neuron Medical, Brno

Interní kardiologická klinika FN Brno a LFUP v Brně

2020 ESC Guidelines

First-line therapy		
AF catheter ablation:		
• Is recommended to reverse LV dysfunction in AF patients when tachycardia-induced cardiomyopathy is highly probable, independent of their symptom status.[666,675,676]	I	B
• Should be considered in selected AF patients with HF with reduced LVEF to improve survival and reduce HF hospitalization.[612,659,662–666,668–671,817–826]	IIa	B

2024 EHRA/HRS/APHRS/LAHRS Expert Consensus Statement

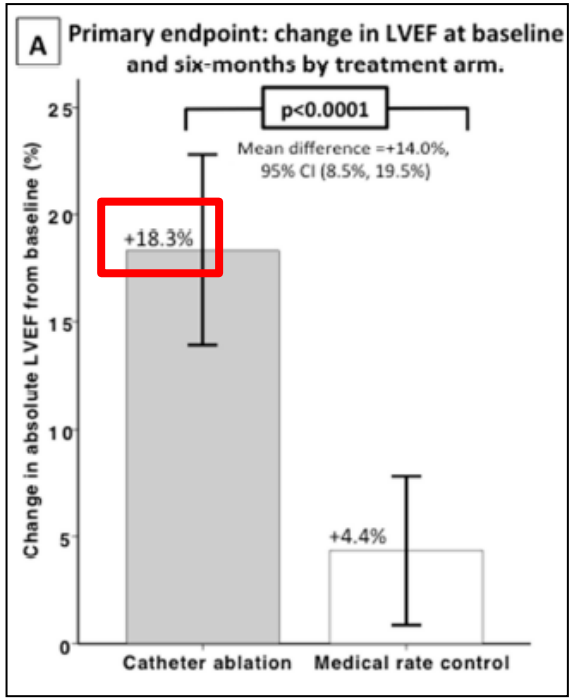
Indications for catheter ablation of atrial fibrillation	Category of advice	Type of evidence
Patients with AF and heart failure		
Catheter ablation is beneficial in patients with AF and left ventricular systolic dysfunction, suspected to be related to arrhythmia-mediated cardiomyopathy, to improve left ventricular function	Advice TO DO	META[250–254]
It is reasonable to perform catheter ablation in selected patients with AF and heart failure with reduced ejection fraction to reduce cardiovascular hospitalizations and prolong survival, regardless of previous antiarrhythmic drug failure or intolerance	May be appropriate to DO	META[254–260]

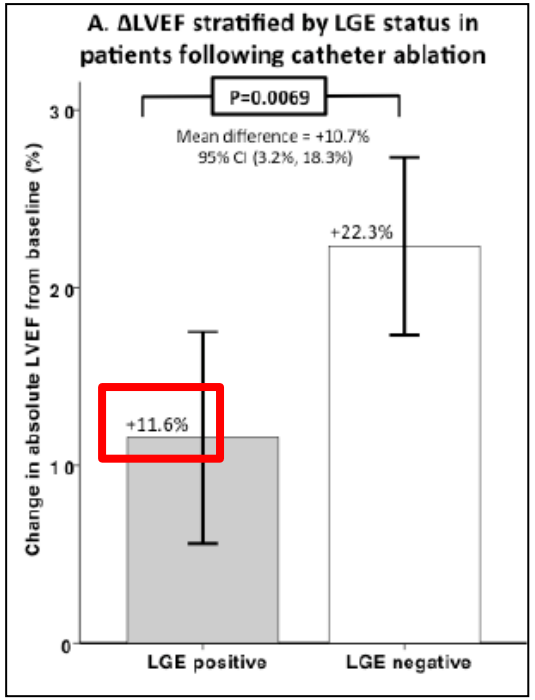
CAMERA-MRI

N = 66
Persistentní FS, DKMP s EF ≤45%
CMR: EF & LGE

Normalizace EF (≥50%)
58% vs 9%, p=0,0002.

Normalizace EF po ablaci dle LGE
73% vs 29%, p=0,0093.



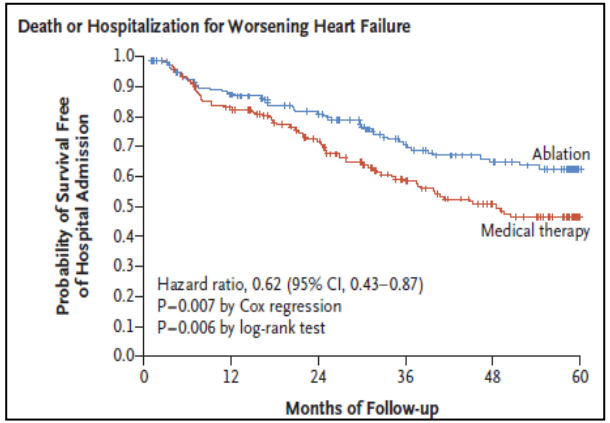


Prabhu S. JACC DOI: 10.1016/j.jacc.2017.08.041

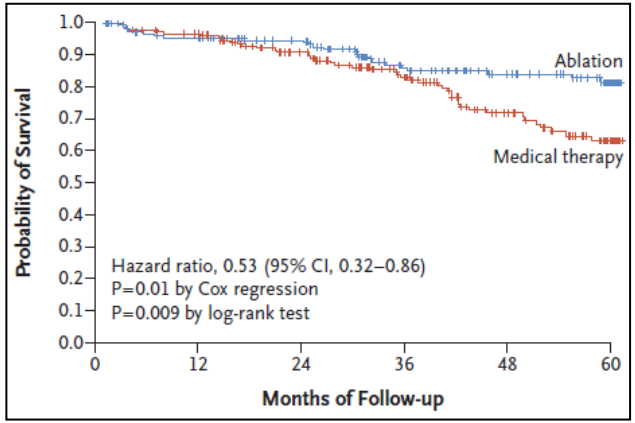
CASTLE AF

(Par/Perz FS, NYHA ≥II, LVEF <35%, ICD, AA neúčinné, netolerované, nechtěli)

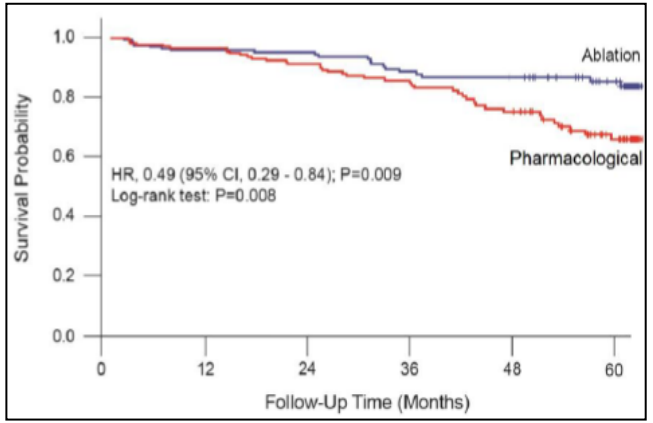
Smrt / hospitalizace pro SS



Smrt ze všech příčin



Smrt z KV příčiny



ABL	28,5%	13,4%	11,2%
MED	44,5%	25,0%	22,3

Marrouche NF, et **al**. CASTLE-AF. NEJM 2018 378:417

Parameter	Ablation Group	Pharmacological Group	P value
Change from Baseline to 12 Months			
LVEF – %, absolute change	7.9 ± 1.0, n=146	2.5 ± 1.0, n=162	0.001
Patients with paroxysmal AF	5.0 ± 1.3, n=41	4.0 ± 1.6, n=54	0.65
Patients with persistent AF	8.7 ± 1.3, n=105	2.6 ± 1.2, n=108	0.001
Change from Baseline to 36 Months			
LVEF – %, absolute change	6.1 ± 1.5, n=86	2.6 ± 1.4, n=90	0.091
Paroxysmal AF	3.2 ± 2.5, n=24	1.2 ± 2.4, n=34	0.54
Persistent AF	7.4 ± 1.9, n=62	3.5 ± 1.7, n=56	0.13
Change from Baseline to 60 Months			
LVEF – %, absolute change	8.7 ± 1.9 , n=51	-1.0 ± 3.1, n=37	0.011
Paroxysmal AF	7.7 ± 2.2, n=14	4.7 ± 5.9, n=11	0.60
Persistent AF	9.2 ± 2.3, n=37	-1.7 ± 3.0, n=26	0.007

Marrouche NF, et al. CASTLE-AF. NEJM 2018 378:417

Benefit ablace FS

AATAC (ablace vs. amiodarone)
Prospektivní RCT – pacienti s ICD/CRT-D a s perzistentní FS a HFrEF (LVEF < 40%)
katetrová ablace signifikantně snížila mortalitu ze všech příčin

CASTLE HTx (ablace+medikace vs. medikace u end-stage HFrEF referovaných k OTS)
katetrová ablace + optimální medikace signifikantně snížila smrt ze všech příčin + implantaci LVD + urgentní OTS HR, 0.24; $P < 0.001$)

Di Biase L, et al. Circulation 2016;113:1637-44
Sohns C, et al. N Eng J Med 2023;389:1380-9

Selekce pacientů k maximalizaci benefitu

Characteristics	Evidence
Lower NYHA class	Lower NYHA Class (I and II) at presentation is a predictor of significant LVEF recovery following AF ablation when compared with higher NYHA Class (III and IV) in patients with HFrEF[256]
Non-ischemic etiology	Non-ischemic HF etiology is a significant predictor of LVEF improvement after AF ablation in patients with HFrEF[256]
Persistent AF	Persistent AF is an independent predictor of LVEF improvement and left ventricular reverse remodelling after AF ablation in patients with impaired LVEF[307–310]
Narrow QRS	Narrow QRS (≤120 ms) is an independent predictor of LVEF recovery after AF ablation in patients with impaired LVEF[307,308]
Absence of CMR-detected atrial fibrosis	Extent of atrial fibrosis is inversely correlated to LVEF response following AF catheter ablation in patients with HFrEF[311]
Absence of CMR-detected ventricular fibrosis	Absence of ventricular fibrosis is an independent predictor of LVEF normalization after AF catheter ablation in patients with non-ischemic cardiomyopathy and persistent AF[250]
Post-cardioversion EF and NYHA improvement	Improvement in functional status and/or LVEF after cardioversion is indicative of underlying tachyarrhythmia-mediated cardiomyopathy and a favourable response to catheter ablation in HFrEF patients
Absence of severe atrial dilatation	Absence of severe atrial dilatation (LAVI ≤ 50 mL/m^2) is an independent predictor of LVEF recovery after AF ablation in patients with impaired LVEF[307,308]
AF preceding HF or simultaneous AF and HF diagnosis	Patients with simultaneous AF and HF diagnosis or AF history preceding HF diagnosis are more likely to present normalization of LVEF and resolution of HF symptoms following catheter ablation[252,312]

Selekce pacientů k maximalizaci benefitu

Absenci zotavení EFLK lze očekávat:

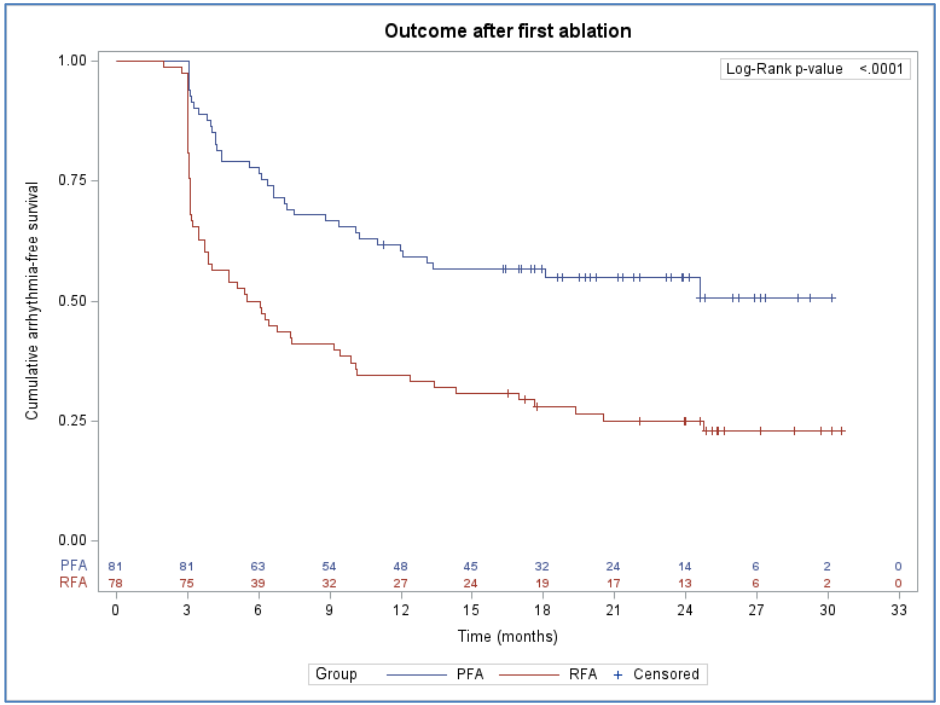
- Vyšší třída NYHA (III/IV)
- Ischemická etiologie srdečního selhání
- Prodloužený QRS komplex (>120 ms)
- Těžká dilatace LS (LAVI >50 ml/m^2)
- Paroxysmální typ FS

The Antwerp Score (široký QRS, známá etiologie srdečního selhání, těžká dilatace síní, paroxysmální FS)
predikuje zotavení systolické funkce LK po ablaci FS u pacientů se srdečním selháním

Parkash R, et al. Circulation 2922;145:1693-704
Sohns C, et al. Circ Arrhythm Electrophysiol 2020;13:e008461
Bergonti M, et al. the ANTWOORD Study. *Int J Cardiol* 2022;**358**:45-50
Okada M, et al J Cardiol 2021;77:500-8
Kirstein B, et al. Europace 2020;22:1812-21
Ishiguchi H et al. ESC heart Fail 2022;9:3505-18

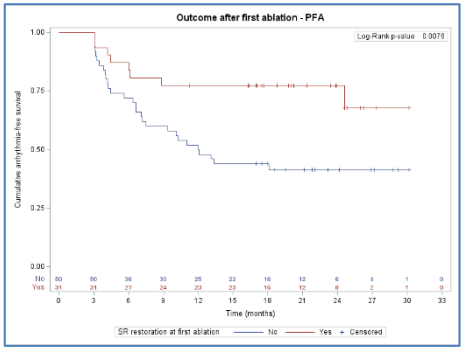
Úspěšná ablace (nikoli její pouhé provedení) je podmínkou benefitu

PFA vs. RFA u dlouhodobé perzistentní FS

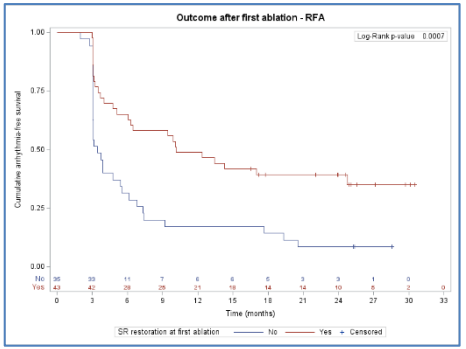


Obnovení SR ablací

PFA



RFA



Závěr

- Zhodnocení dynamiky změn EFLK v čase, základního SPS a dalších klinických parametrů
- U pacientů s HFpEF zhodnotit klinické symptomy srdečního selhání, (NT-pro)BNP, EKV
- Kontraindikace ablace/ závažné komorbidity interferující s proveditelností výkonu / CA při PFA
- Rozhodující není skutečnost, že se ablace provedla, ale jaký má výsledek, benefit se pojí se SR
- Výsledek ablace je složen z mnoha faktorů, z nichž technologie i éře PFA zůstává pouze jedním z nich

Parkash R, et al. Circulation 2922;145:1693-704
Sohns C, et al. Circ Arrhythm Electrophysiol 2020;13:e008461
Bergonti M, et al. the ANTWOORD Study. *Int J Cardiol* 2022;**358**:45-50
Okada M, et al J Cardiol 2021;77:500-8
Kirstein B, et al. Europace 2020;22:1812-21
Ishiguchi H et al. ESC heart Fail 2022;9:3505-18

Antverpské skóre predikuje zotavení systolické funkce LK po ablaci FS u pacientů se srdečním selháním)
(široký QRS komplex, známá etiologie srdečního selhání, závažná dilatace síní, paroxysmální FS

Bergonti M, et al. the ANTWOORD Study. *Int J Cardiol* 2022;**358**:45–50.

Katetrová ablace

U pacientů se srdečním selháním a sníženou EFLK - redukce celkové mortality a hospitalizací (CASTLE-AF, analýza podskupin CABANA)

U pacientů s HFrEF lze indikovat ablaci s cílem zlepšit QoL, funkci LK, toleranci zátěže, a snížit hospitalizace a potenciálně i mortalitu.

Kdy neindikovat - kontraindikace ablace

Riziko komplikací ablace

- Trombus v oušku levé srdeční síně (vysoké riziko TE komplikace)
- Kontraindikace/intolerance antikoagulační léčby
- Závažné komorbidity a faktory interferující s proveditelností výkonu
- Nespolupráce pacienta

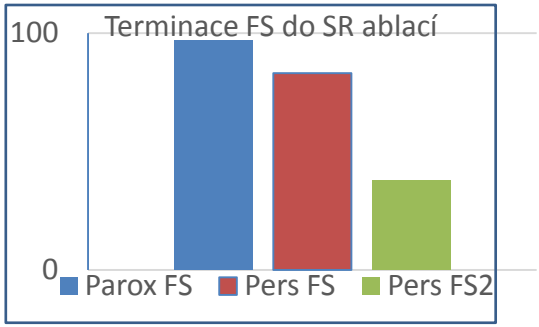
Riziko absence benefitu z ablace

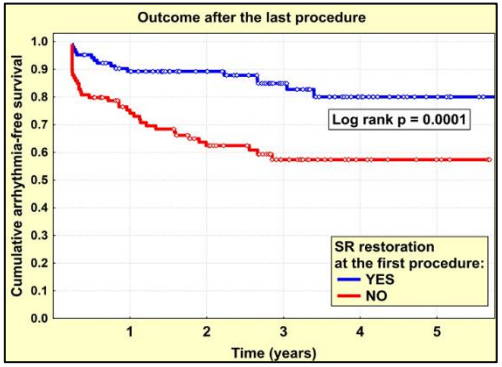
- Závažné extrakardiální komorbidity a faktory zpochybňující benefit
- Závažné strukturální postižení srdce nezávislé na FS zpochybňující benefit

PFA sice neřeší absenci elektrofyziologické znalosti – staré problémy nikam nezmizely a schématické ablace a jejich výsledky budou dále narážet na limity extražilních zdrojů, ale je nadějí pro širší spektrum pacientů, kteří by měli být posuzováni a konzultováni s ohledem na svůj potenciální hemodynamický, funkční (a mortalitní?) benefit

Ablace paroxysmální v.s. (dlouhodobé) perzistentní FS

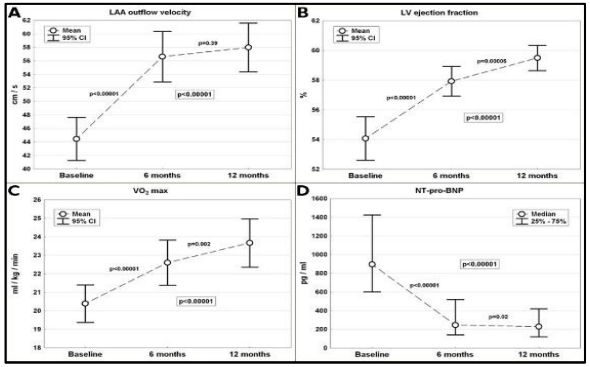
Brno ČKS 2001 - 2006



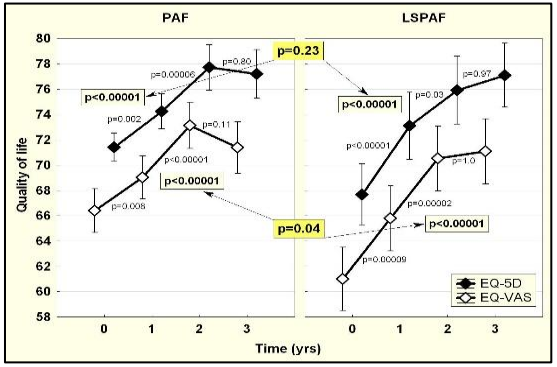


Fiala M, et al. Cor et Vasa 2001; 43:11-16
Fiala M, et al. PACE 2008; 31:985-997.

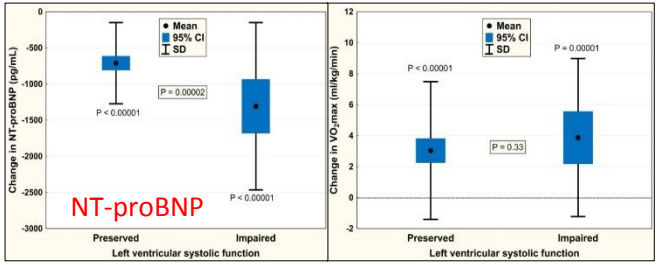
Brno ČKS 2008



Brno ČKS 2012

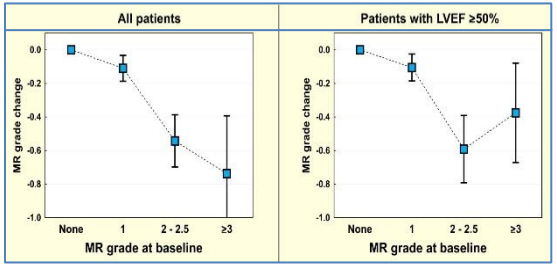


Brno ČKS 2014



Fiala M, et al. Heart Rhythm 2015; 12:687-698.
Fiala M, et al. Europace 2017; 19:1781-1789

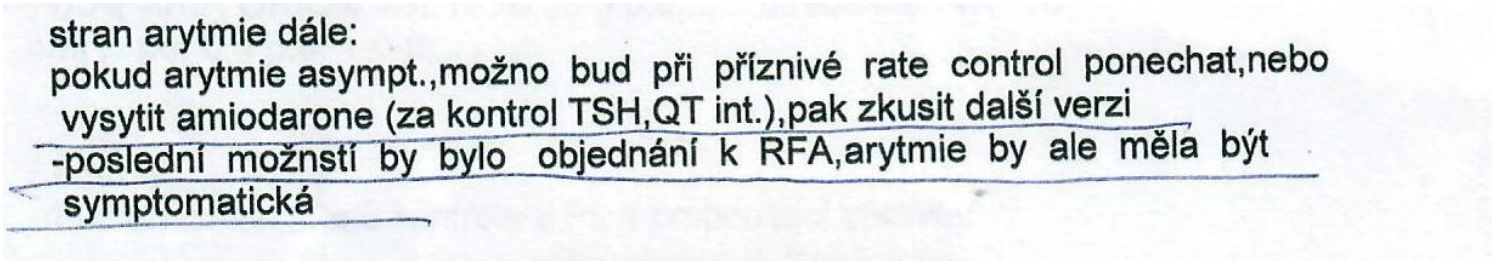
Brno ČKS 2015



Fiala M, et al. Europace 2014; 16:15-25
Bulková V, et al. JAHA 2014; 3. pii: e000881.

M 72 let – od 2020 námahová dušnost, nevýkonnost, únava, pocení
Vyšetřen na plicním oddělení!!!! - s negativním nálezem - zjištěna FS, dušnost trvá
Doposud hypertenze (perindopril 4 mg) / Echo LS 52 mm, EFLK 52%
EKV 3x200 J bez SR, trvá FS 90/min, bušení srdce neguje


Průběh:
68 letý kardiak,


stran arytmie dále:
pokud arytmie asympt.,možno bud při příznivé rate control ponechat,nebo vysytit amiodarone (za kontrol TSH,QT int.),pak zkusit další verzi
-poslední možnstí by bylo objednání k RFA,arytmie by ale měla být symptomatická

9/2022 PFA dlouhodobé perzistentní FS
NT-proBNP 1586 pg/ml před ablací

4/2023 „Subj. cítí se dobře, arytmii nevnímal, už se nezadýchává a ani se nepotí“
SR, NT-proBNP 126 pg/ml, po příští monitoraci a TEE se vysadí OAK

Jaké mohou být důvody?

- Ignorance symptomů a mortalitních důsledků perzistentní FS
  - dušnost a nevýkonnost mohou být symptomy FS i při normální EFLK (BNP)
  - zhoršení mortalitních prediktorů v důsledku perzistentní FS (a zlepšení při že SR)

- Letitá tvrzení o ablaci perzistentní FS
  - ablace se nemá dělat, protože FS není symptomatická (palpitace)
  - nízká sebedůvěra v úspěšnost ablace (d) perzistentní FS

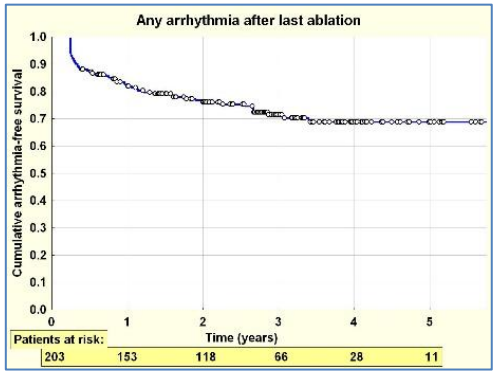
- Míra úsilí a poznání zdrojů FS

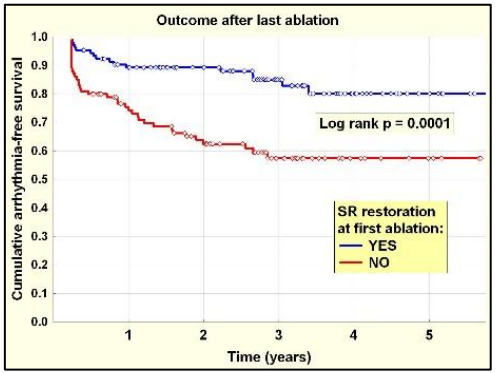
↓

Strategie + end-pointy výkonu

↓

Odkaz RFA pro PFA





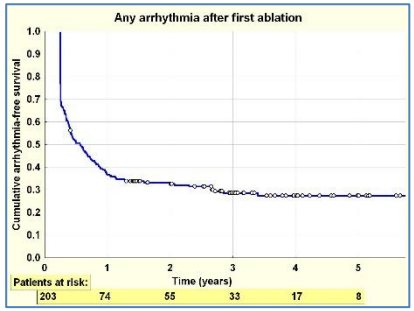
Fiala M, et al. Heart Rhythm 2015; 12:687-698.

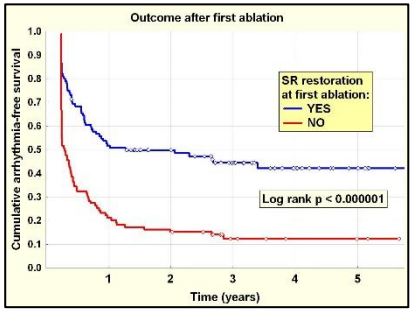
Pulzní ablace D-perzistentní FS

D-Perz FS n=205 (2006-11) (RFA)

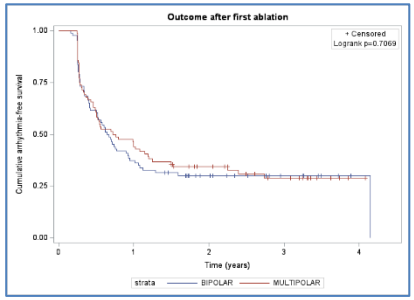
D-Perz FS n=172 (2019-21) (RFA)

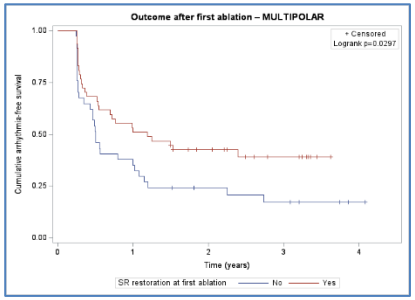
D-Perz FS n=160 (2006-11) PFA vs. RFA

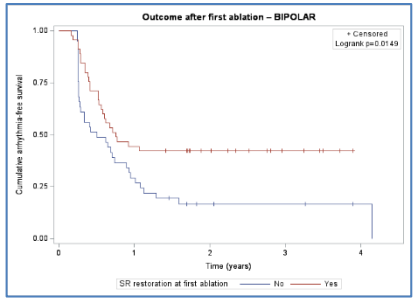


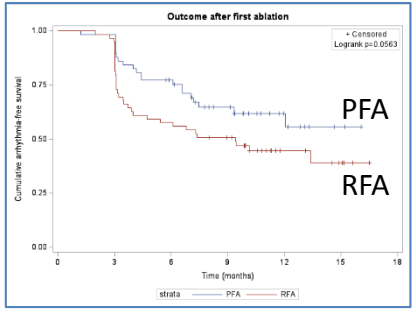


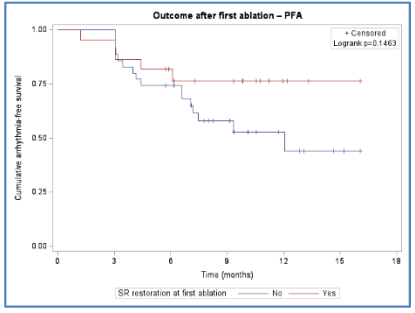
Terminace FS do SR ablací

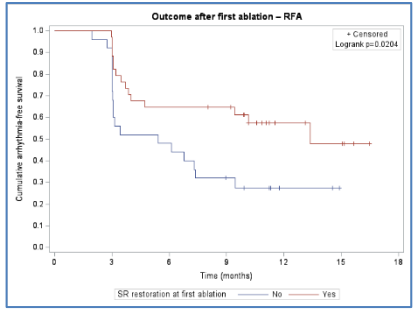












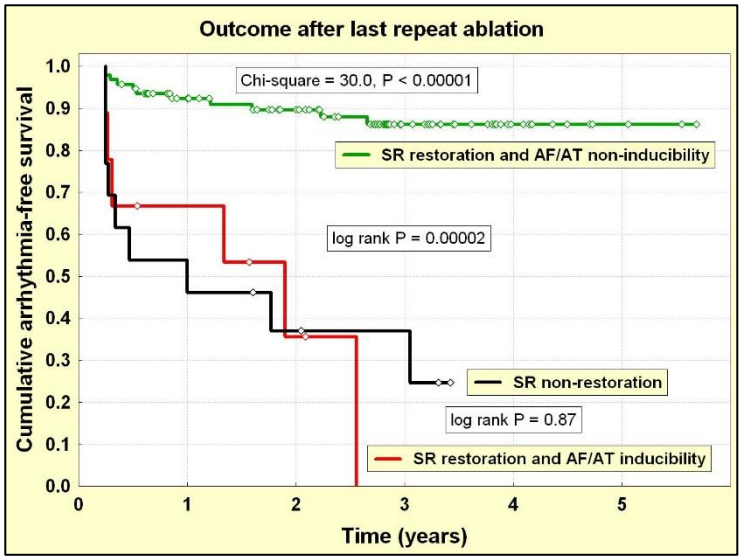
Komplexní zdroje – recidivy FS / AT z mimožilních zdrojů

Zdroje po izolaci PŽ – makroreentry + lokalizované zdroje FS/AT - vyžadují přesné mapování
Lze narazit pouze na vlastní neschopnost pochopit zdroj nebo anatomickou bariéru RFA **(role PFA?)**

Oblast mylných názorů z neznalosti zdrojů

- Ablace (schématická) perzist. FS, ale reablace AT ne
- Kardioverze + schématická ablace (míjí skutečné zdroje)
- Reablace jedině chirurgická (která nic nemapuje)
- Ablace AV uzlu s PM (pro reziduální AT - cíl nadohled)

Cílové momenty ablace – terminace + neinducibilita



Fiala M, et al. Heart Rhythm 2015; 12:687-698.

Pulzní ablace – staré problémy se nikam nevytratily

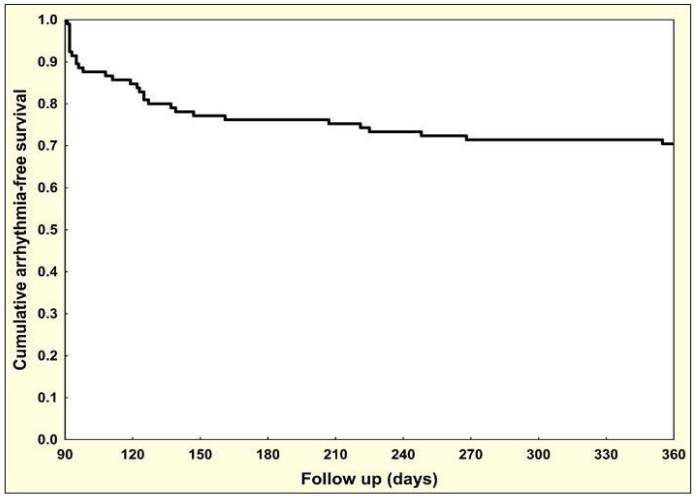
MANIFEST PF (Přehled PFA - 24 center)

n=1758
188 pacientů s ≥6 měsíčním FU

Bez recidivy FS/AT	Parox FS / Perzis FS
Sledování ≥6M	87% / 79%
Sledování ≥12M	73% / 58%

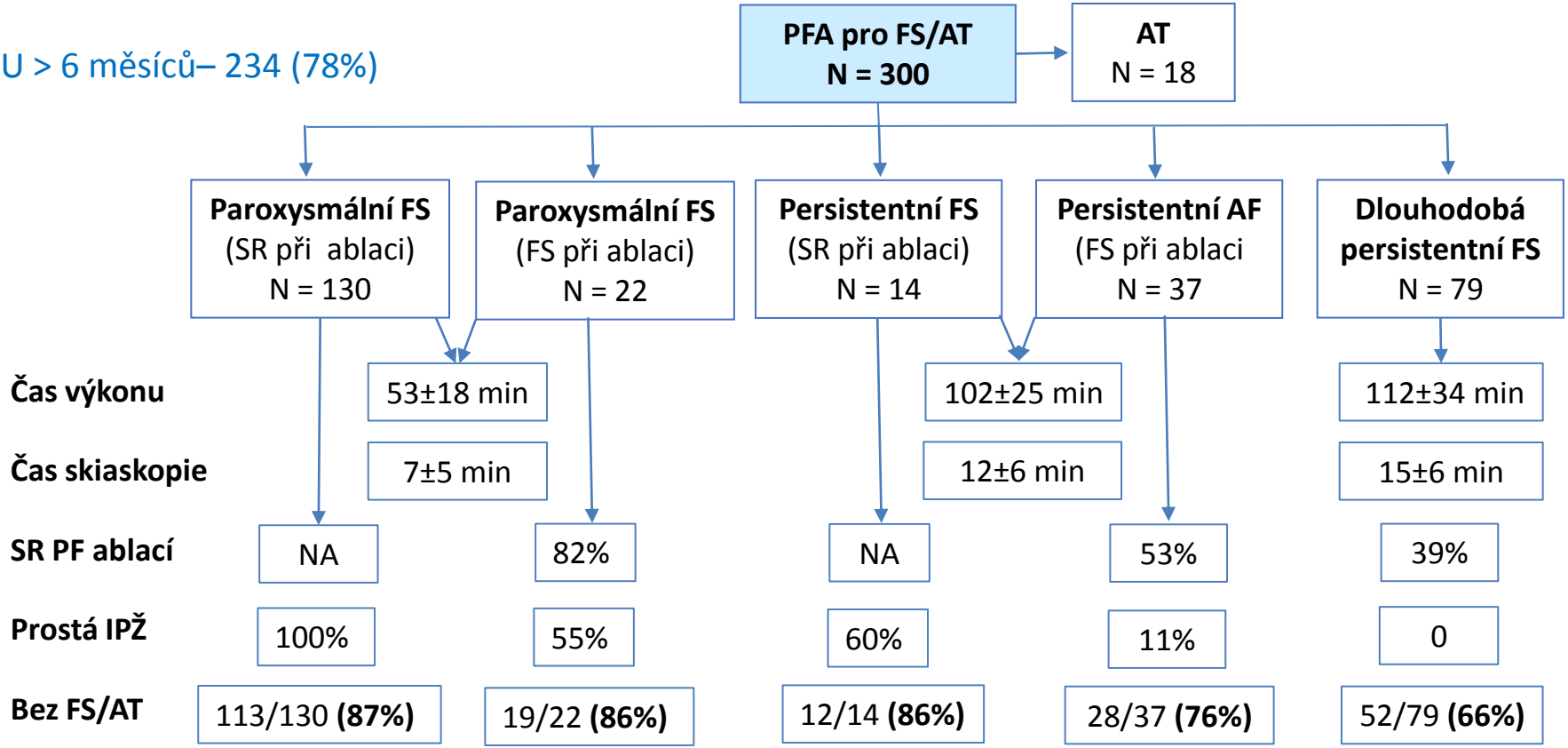
RFA s denní monitorací EKG / 1 rok

n=100 (2010-11)



Pulzní ablace – staré problémy se nikam nevytratily

FU > 6 měsíců– 234 (78%)



Indications for catheter ablation of atrial fibrillation	Category of advice	Type of evidence
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It is reasonable to perform catheter ablation in selected patients with AF and heart failure with reduced ejection fraction to reduce cardiovascular hospitalizations and prolong survival, regardless of previous antiarrhythmic drug failure or intolerance	May be appropriate to DO	META[254–260]

Indications for catheter ablation of atrial fibrillation	Category of advice	Type of evidence
Patients with AF and other risk factors or diseases		
It is reasonable to use similar indications for AF ablation in older (>75 years of age) patients with AF as in younger patients after taking into account comorbidities and patient preferences	May be appropriate to DO	OBS[270–272]
Catheter ablation of AF is reasonable in patients with hypertrophic cardiomyopathy after careful consideration of anticipated clinical benefit, associated risk of procedural complications, and potential need for more than one procedure	May be appropriate to DO	OBS[273–279]

Indications for catheter ablation of atrial fibrillation	Category of advice	Type of evidence

Patients with AF and heart failure		
Catheter ablation is beneficial in patients with AF and left ventricular systolic dysfunction, suspected to be related to arrhythmia-mediated cardiomyopathy, to improve left ventricular function	Advice TO DO	META[250–254]
It is reasonable to perform catheter ablation in selected patients with AF and heart failure with reduced ejection fraction to reduce cardiovascular hospitalizations and prolong survival, regardless of previous antiarrhythmic drug failure or intolerance	May be appropriate to DO	META[254–260]

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AF catheter ablation after failure of drug therapy		
AF catheter ablation for PVI is recommended for rhythm control after one failed or intolerant class I or III AAD, to improve symptoms of AF recurrences in patients with[235–238,247,605–609,612,613,615–617,654,677,678,680,682,685,758,779,780,815]:	I	
• Paroxysmal AF, or		A
• Persistent AF without major risk factors for AF recurrence, or		A
• Persistent AF with major risk factors for AF recurrence.		B
AF catheter ablation for PVI should be considered for rhythm control after one failed or intolerant to beta-blocker treatment to improve symptoms of AF recurrences in patients with paroxysmal and persistent AF.[246]	IIa	B

First-line therapy		
AF catheter ablation for PVI should/may be considered as first-line rhythm control therapy to improve symptoms in selected patients with symptomatic:		
• Paroxysmal AF episodes,[240–242,614,615] or	IIa	B
• Persistent AF without major risk factors for AF recurrence.[253–255,264,598–601,609,610,633,636,641,724,745,746,832]	IIb	C
as an alternative to AAD class I or III, considering patient choice, benefit, and risk.		
AF catheter ablation:		
• Is recommended to reverse LV dysfunction in AF patients when tachycardia-induced cardiomyopathy is highly probable, independent of their symptom status.[666,675,676]	I	B
• Should be considered in selected AF patients with HF with reduced LVEF to improve survival and reduce HF hospitalization.[612,659,662–666,668–671,817–826]	IIa	B
AF catheter ablation for PVI should be considered as a strategy to avoid pacemaker implantation in patients with AF-related bradycardia or symptomatic pre-automaticity pause after AF conversion considering the clinical situation.[816–818]	IIa	C

Patients with AF and other risk factors or diseases		
It is reasonable to use similar indications for AF ablation in older (>75 years of age) patients with AF as in younger patients after taking into account comorbidities and patient preferences	May be appropriate to DO	OBS[270–272]
Catheter ablation of AF is reasonable in patients with hypertrophic cardiomyopathy after careful consideration of anticipated clinical benefit, associated risk of procedural complications, and potential need for more than one procedure	May be appropriate to DO	OBS[273–279]

Indications for catheter ablation of atrial fibrillation	Category of advice	Type of evidence
Patients with AF-related symptoms		
Catheter ablation of AF is beneficial in symptomatic patients with recurrent paroxysmal or persistent AF resistant or intolerant to previous treatment with at least one Class I or III antiarrhythmic drug	Advice TO DO	META[236–242]
Catheter ablation of AF is beneficial as first-line treatment in symptomatic patients with recurrent paroxysmal AF	Advice TO DO	META[243–249]
Catheter ablation of AF may be reasonable as first-line treatment in symptomatic patients with persistent AF	Area of uncertainty	OPN

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Catheter ablation of AF is beneficial as first-line treatment in symptomatic patients with recurrent paroxysmal AF	Advice TO DO	META[243–249]
Catheter ablation of AF may be reasonable as first-line treatment in symptomatic patients with persistent AF	Area of uncertainty	OPN
Patients with AF and heart failure		
Catheter ablation is beneficial in patients with AF and left ventricular systolic dysfunction, suspected to be related to arrhythmia-mediated cardiomyopathy, to improve left ventricular function	Advice TO DO	META[250–254]
It is reasonable to perform catheter ablation in selected patients with AF and heart failure with reduced ejection fraction to reduce cardiovascular hospitalizations and prolong survival, regardless of previous antiarrhythmic drug failure or intolerance	May be appropriate to DO	META[254–260]
Patients without AF-related symptoms		
Catheter ablation of AF may be reasonable in selected asymptomatic patients with recurrent paroxysmal or persistent AF following thorough discussion of potential risks and associated benefits	Area of uncertainty	OPN
Patients with AF and coexistent rhythm disorders		
Catheter ablation of supraventricular tachycardia alone is reasonable in patients with supraventricular tachycardia and AF when the former is considered the main trigger of the latter	May be appropriate to DO	OBS[261–264]
Catheter ablation of AF is reasonable in patients with AF and symptomatic bradycardia or prolonged sinus pauses upon AF termination to avoid pacemaker implantation	May be appropriate to DO	OBS[265,266]
Cavotricuspid isthmus ablation with documentation of bidirectional block is reasonable in patients undergoing AF ablation in case of prior history or intraprocedural induction of cavotricuspid isthmus-dependent flutter	May be appropriate to DO	OBS[267–269]
Patients with AF and other risk factors or diseases		
It is reasonable to use similar indications for AF ablation in older (>75 years of age) patients with AF as in younger patients after taking into account comorbidities and patient preferences	May be appropriate to DO	OBS[270–272]
Catheter ablation of AF is reasonable in patients with hypertrophic cardiomyopathy after careful consideration of anticipated clinical benefit, associated risk of procedural complications, and potential need for more than one procedure	May be appropriate to DO	OBS[273–279]