XXXIII. Výroční sjezd ČKS

Prevencia fibrilácie predsiení

Ďakujem za pozvanie

MUDr. Adrian Bystriansky

Oddelenie arytmií SÚSCCH Banská Bystrica
Stredoslovenský ústav srdcových
a cievnych chorôb, a.s. Banská Bystrica

Epidemiológia fibrilácie predsiení

Figure 2 (1) Epidemiology of AF: prevalence

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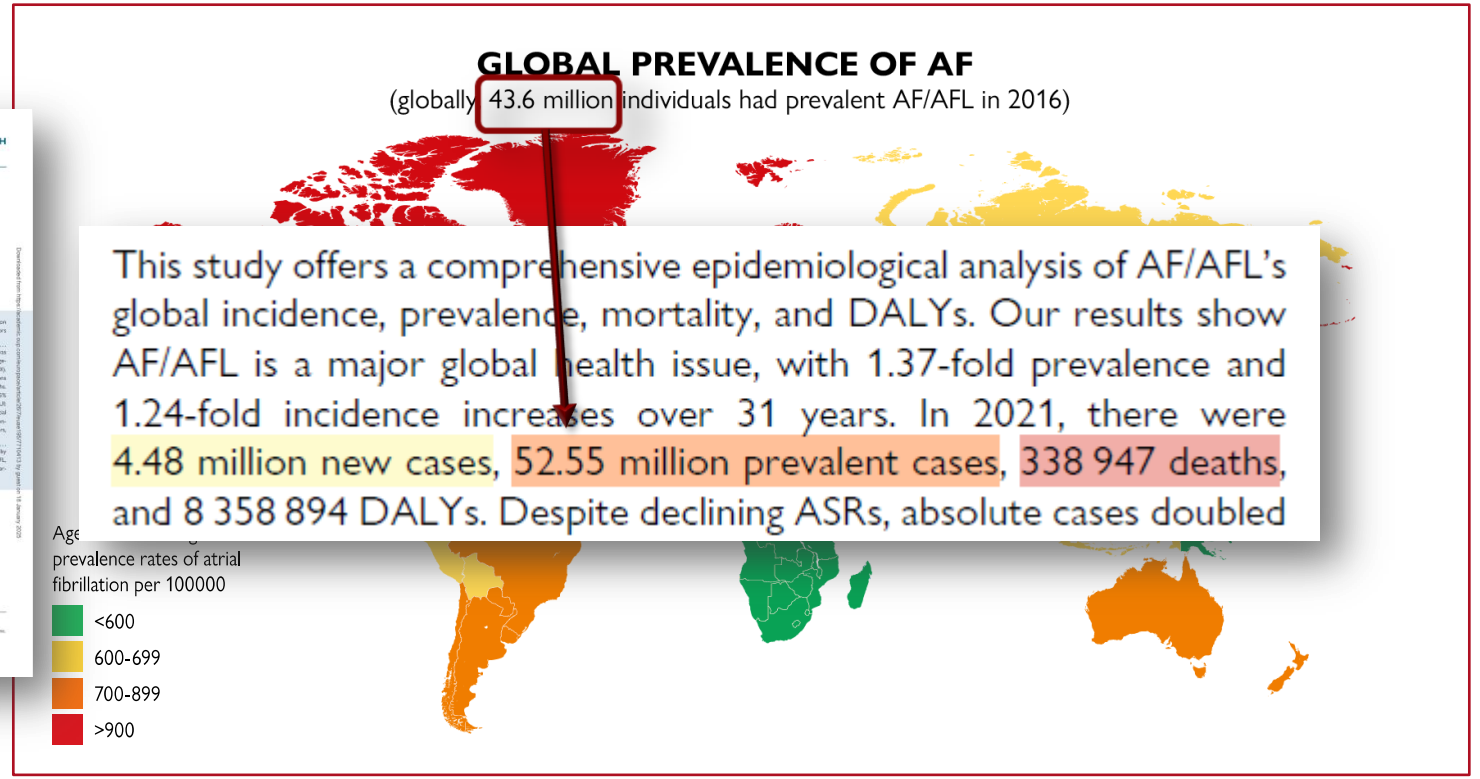

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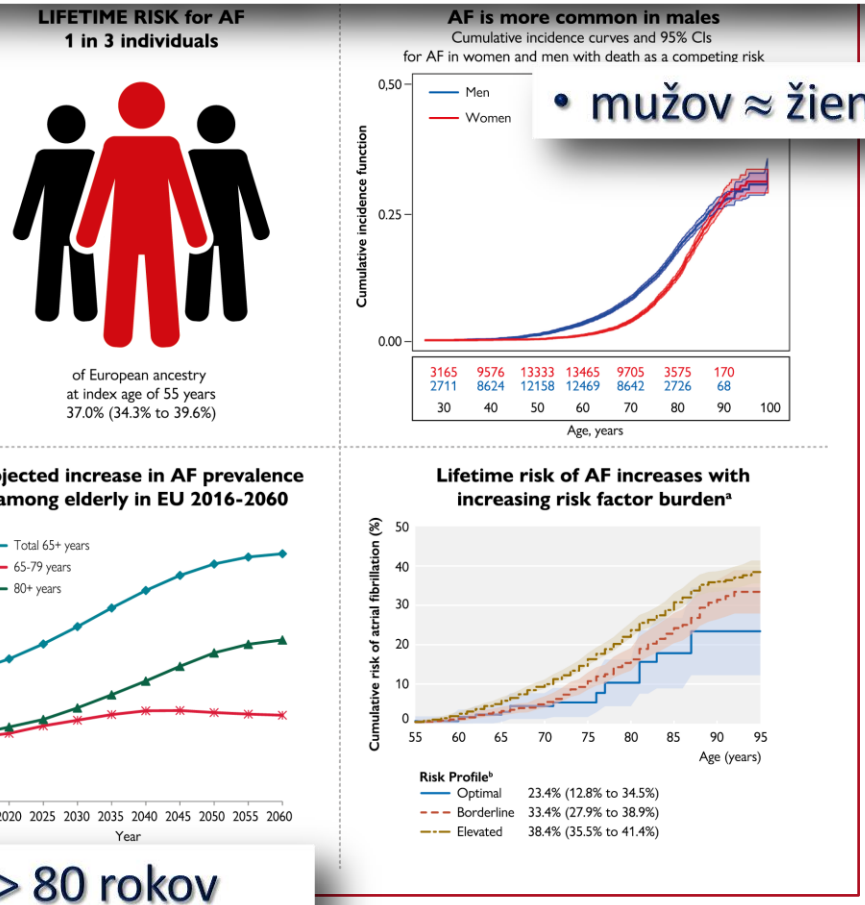
2020 ESC Guidelines for the diagnosis and management of atrial fibrillation
(European Heart Journal 2020-doi/10.1093/eurheartj/ehaa612)

Hindricks, G. et al. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation. Eur Heart J. 2020; 00: 1-125
Cheng, S., et al. (2024). Global burden of atrial fibrillation/atrial flutter and its attributable risk factors from 1990 to 2021. 26(7), 195.

Predikcia „vývoja“ fibrilácie predsiení

- **1 z 3 má** alebo **bude mať FP** („šanca“ je 1:2)



- mužov ≈ žien
- > 80 rokov

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Figure 2 (2)
Epidemiology of AF: lifetime risk and projected rise in the incidence and

- **starnutie** populácie
- úspešnejšia **liečba IM a SZ**
- **komorbidity:**
  - hypertenzia
  - metabolický sy.
  - obezita

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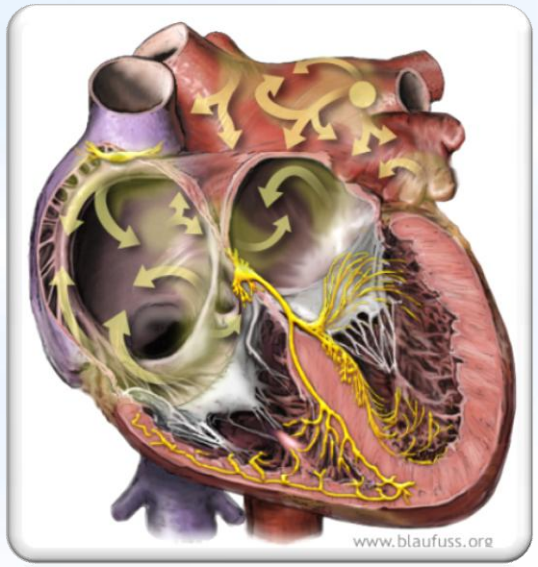
2020 ESC Guidelines for the diagnosis and management of atrial fibrillation
(European Heart Journal 2020-doi/10.1093/eurheartj/ehaa612)

Hindricks, G. et al. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation. Eur Heart J. 2020; 00: 1-125

Klinické riziká fibrilácie predsiení



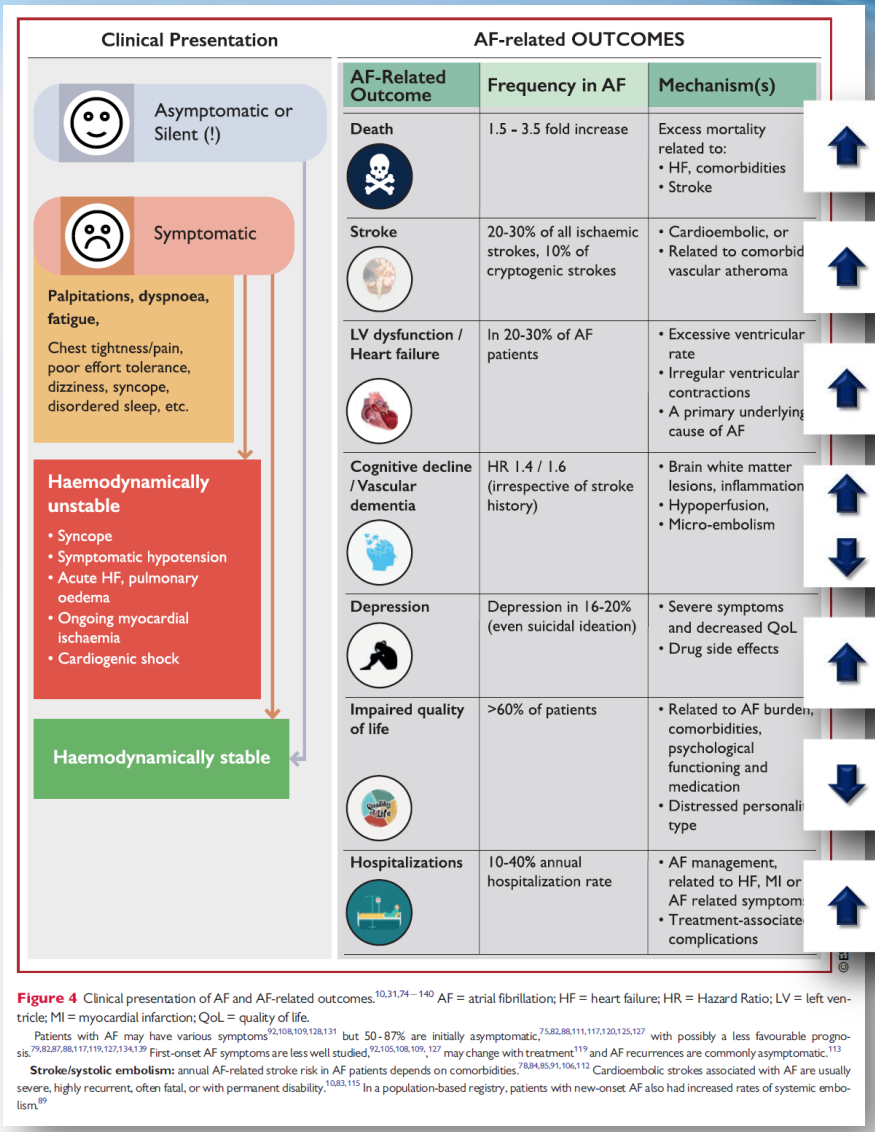


Figure 4 Clinical presentation of AF and AF-related outcomes.[10,31,74–140] AF = atrial fibrillation; HF = heart failure; HR = Hazard Ratio; LV = left ventricle; MI = myocardial infarction; QoL = quality of life.

Patients with AF may have various symptoms[92,108,109,128,131] but 50-87% are initially asymptomatic,[75,82,88,111,117,120,125,127] with possibly a less favourable prognosis.[79,82,87,88,117,119,127,134,139] First-onset AF symptoms are less well studied,[92,105,108,109,127] may change with treatment[119] and AF recurrences are commonly asymptomatic.[113]

Stroke/systolic embolism: annual AF-related stroke risk in AF patients depends on comorbidities.[78,84,85,91,106,112] Cardioembolic strokes associated with AF are usually severe, highly recurrent, often fatal, or with permanent disability.[10,83,115] In a population-based registry, patients with new-onset AF also had increased rates of systemic embolism.[89]

- ⬆ **mortalitu** (SZ, NCMP)
- ⬆ riziko **NCMP**
- ⬆ riziko **srdcového zlyhávania**
- ⬆ riziko **demencie a**
- ⬇ kognitívne funkcie
- ⬆ riziko **depresie**
- ⬇ **kvalitu života**
- ⬆ **hospitalizácie**

Hindricks, G. et al. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation. Eur Heart J. 2020; 00: 1-125

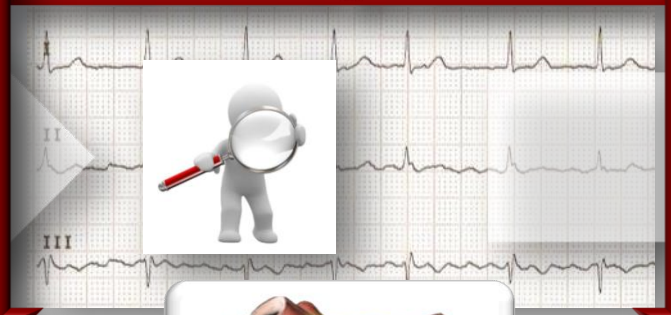
Prevencia fibrilácie predsiení

primárna prevencia

sekundárna prevencia

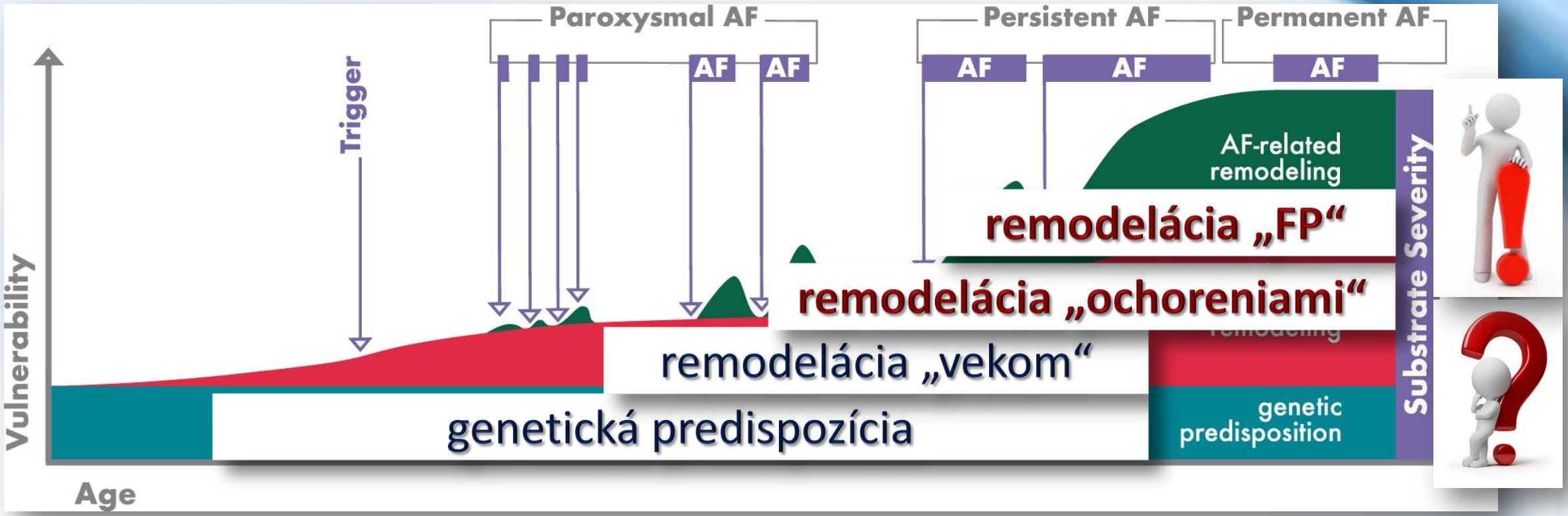
sínusový rytmus

fibrilácia predsiení



sínusový rytmus

Patofyziológia arytmogénneho substrátu FP

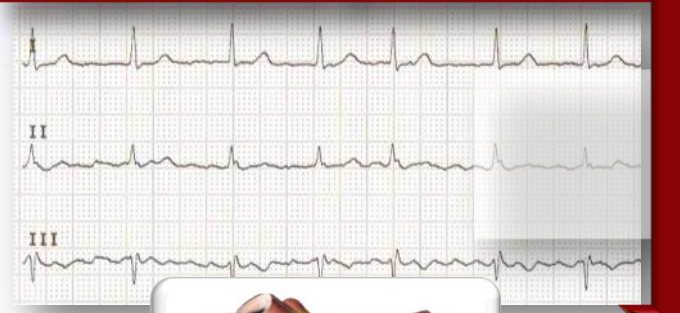


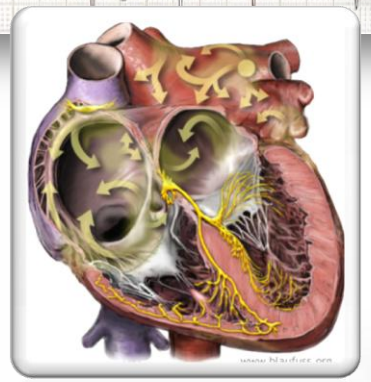
Hindricks, G. et al. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation. Eur Heart J. 2020; 00: 1-125

Prevencia fibrilácie predsiení

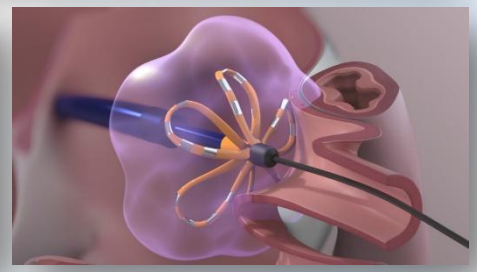
sekundárna
prevencia

fibrilácia predsiení





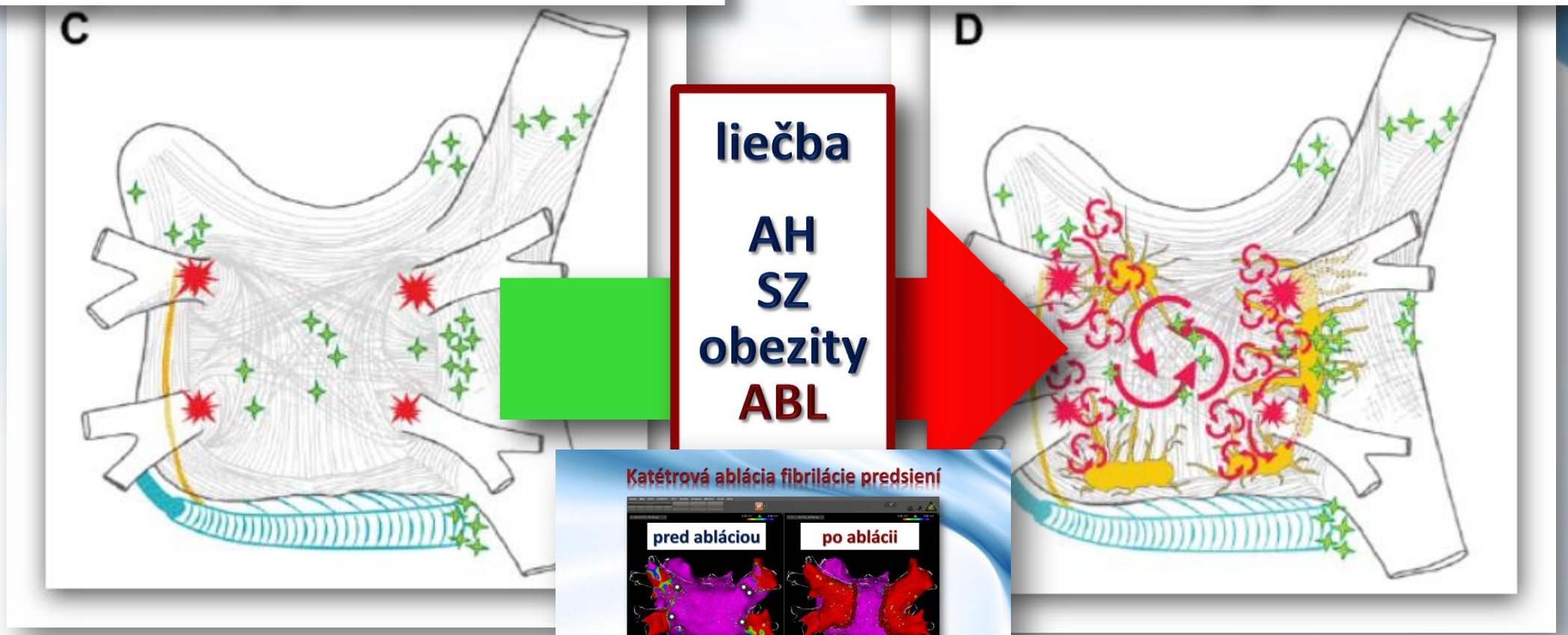
sínusový rytmus



Patofyziológia fibrilácia predsiení

paroxyzmálna FP

perzistujúca FP

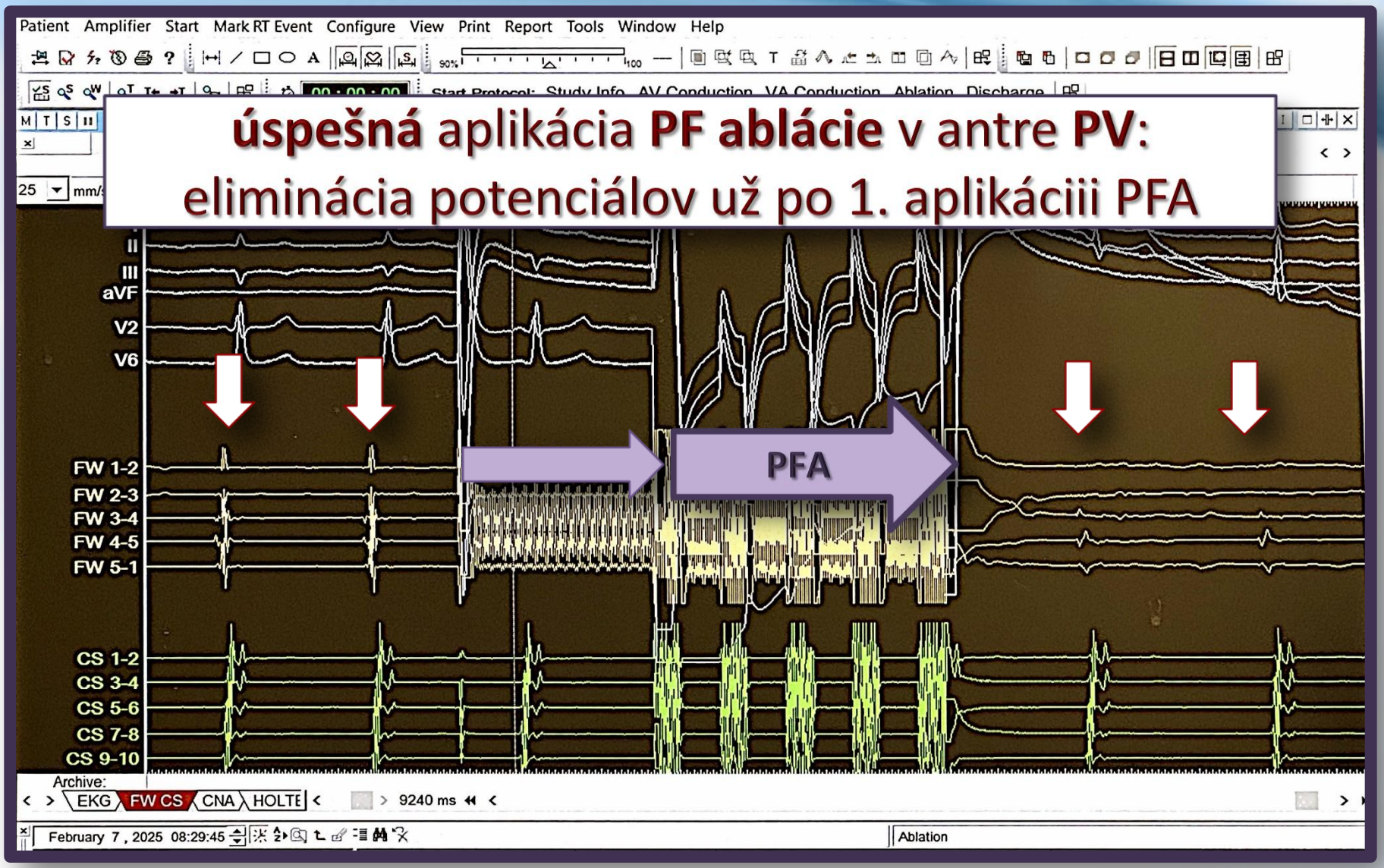


Kirchhof, P., et al. 2016 ESC guidelines for the management of atrial fibrillation developed in collaboration with EACTS.

Katétrová ablácia fibrilácie predsiení

obrazová dokumentácia Odd. arytmií SÚSCCH, a.s. Banská Bystrica

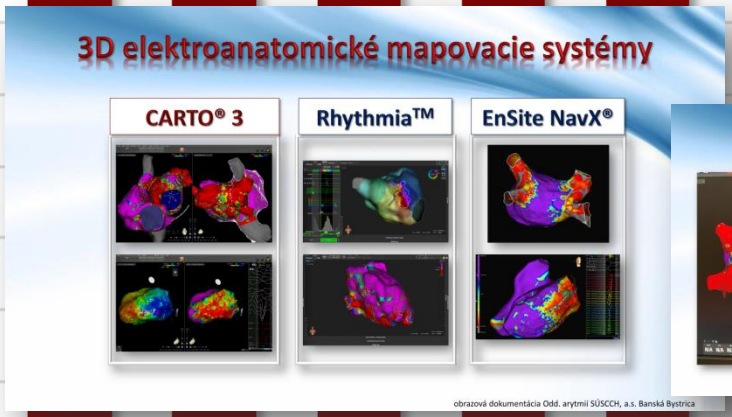
FARAPULSE™ prvý PF ablačný systém: EPS

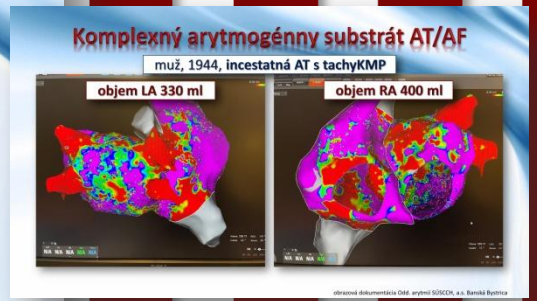


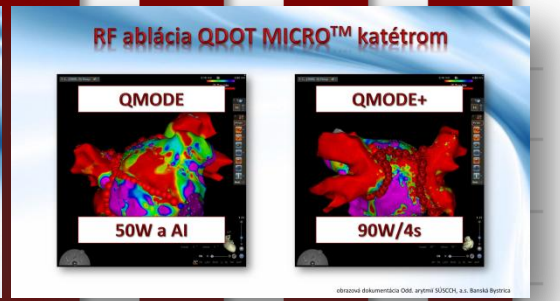
obrazová dokumentácia Odd. arytmií SÚSCCH, a.s. Banská Bystrica

Podiel typov ablácií FP v SÚSCCH BB ☛ 2024

Katétrové ablácie FP v SÚSCCH BB podľa typu ABL v rokoch



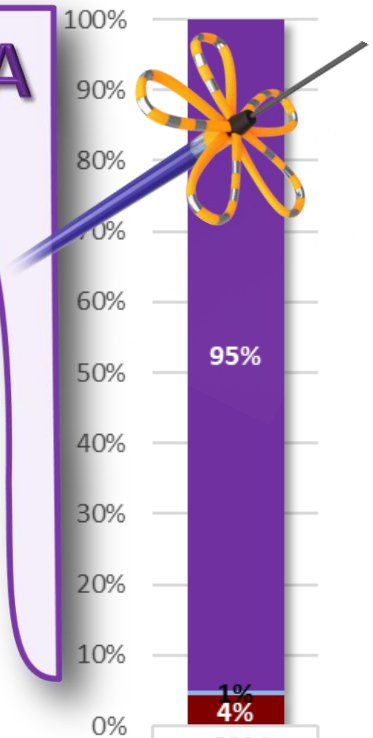




	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PF ablácia	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	16%
CRYO	0%	0%	0%	7%	17%	14%	29%	11%	17%	18%	35%	20%
RF ablácia	100%	100%	100%	93%	83%	86%	71%	89%	83%	82%	65%	64%

2024

PFA

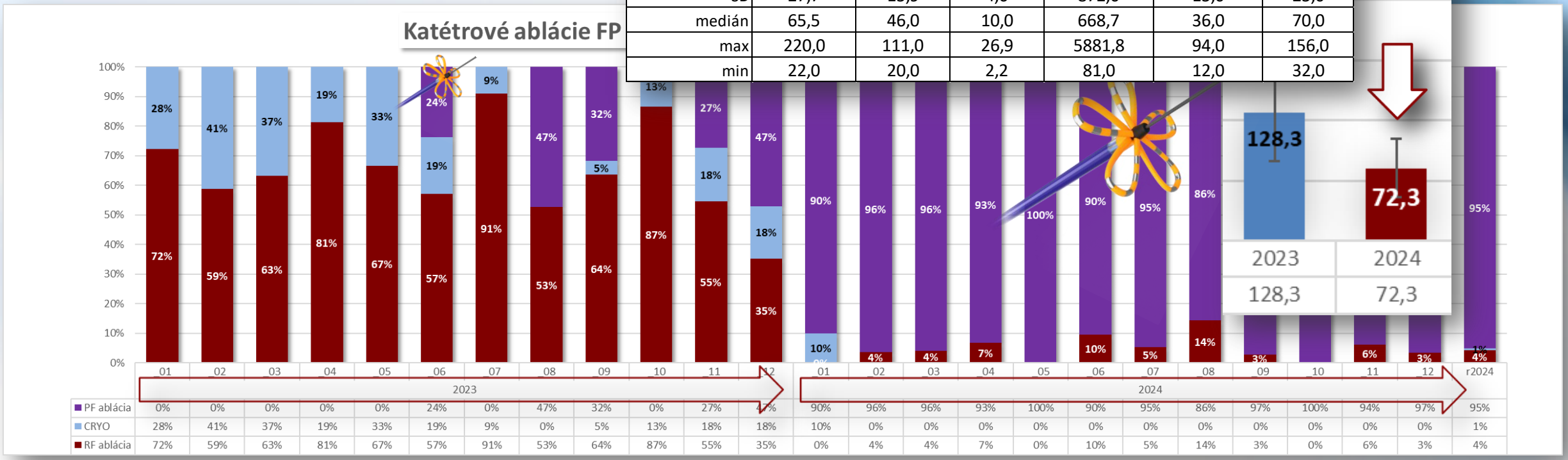


	r2024
PF ablácia	95%
CRYO	1%
RF ablácia	4%

štatistika Odd. arytmií SÚSCCH, a.s. Banská Bystrica

Podiel typov ablácií FP v SÚSCCH BB ☛ 2024

PF ablácie fibrilácie predsiení v SÚSCCH BB						n = 322
n = 322	Výkon čas	IPV čas	RTG čas	RTG dávka	čas v LA	APL
priem.	**70,7**	**48,4**	**10,8**	**937,5**	**38,1**	**74,2**
SD	27,7	15,9	4,6	872,6	15,0	25,0
medián	65,5	46,0	10,0	668,7	36,0	70,0
max	220,0	111,0	26,9	5881,8	94,0	156,0
min	22,0	20,0	2,2	81,0	12,0	32,0



	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	r2024
PF ablácia	0%	0%	0%	0%	0%	24%	0%	47%	32%	0%	27%	47%	90%	96%	96%	93%	100%	90%	95%	86%	97%	100%	94%	97%	95%
CRYO	28%	41%	37%	19%	33%	19%	9%	0%	5%	13%	18%	18%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
RF ablácia	72%	59%	63%	81%	67%	57%	91%	53%	64%	87%	55%	35%	0%	4%	4%	7%	0%	10%	5%	14%	3%	0%	6%	3%	4%

štatistika Odd. arytmií SÚSCCH, a.s. Banská Bystrica

Vývoj katétrových ablácií FP v SÚSCCH BB

Počet ablácií FP v SÚSCCH BB podľa rokov

1 638

Prvých 100 PF ablácií fibrilácie predsiení
Pulsed Field Ablation (FARAPULSE™)
v SÚSCCH Banská Bystrica

Ďalšie míľniky katétrovej ablácie fibrilácie predsiení
Odd. arytmií SÚSCCH Banská Bystrica (09/2024):

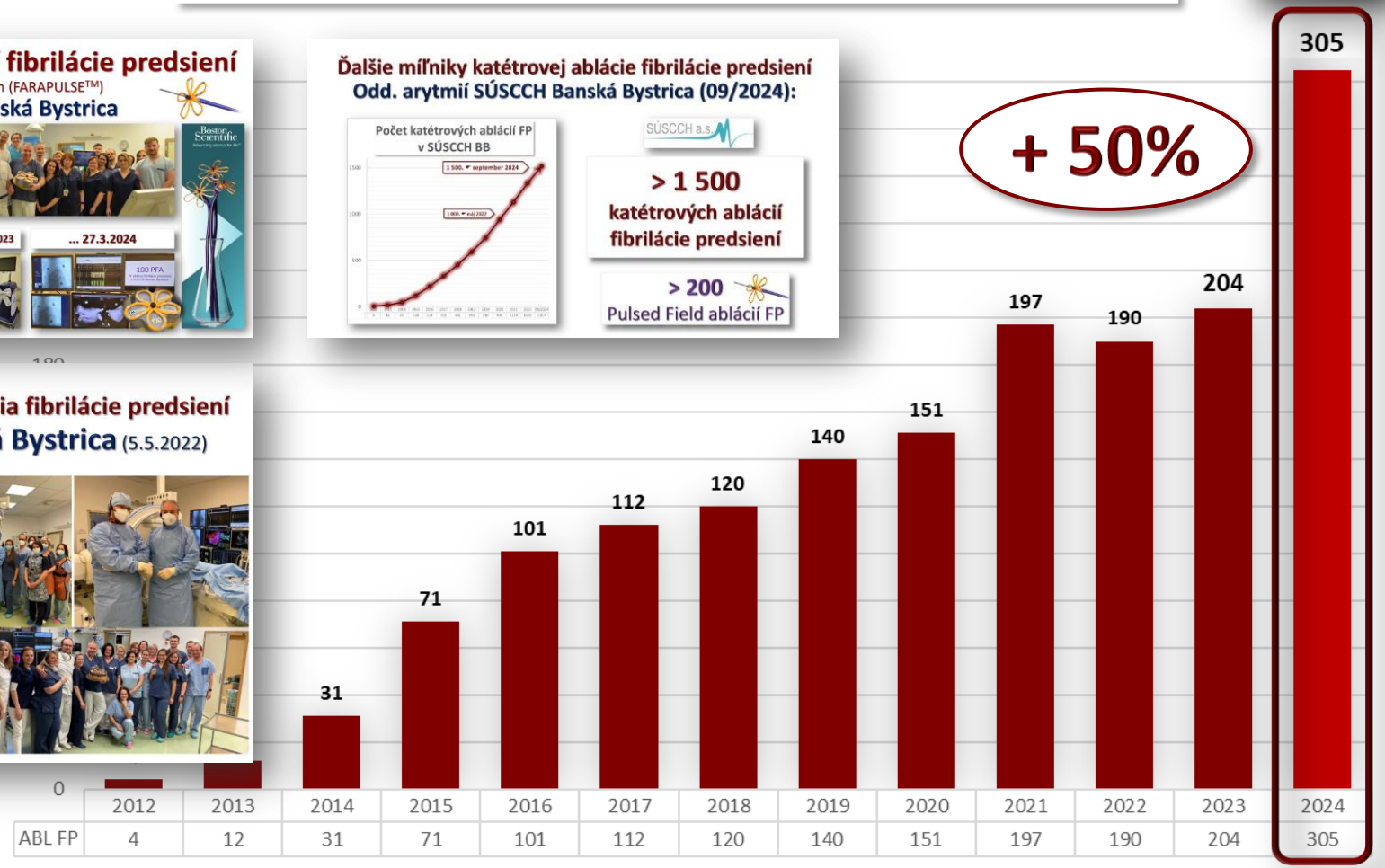
SÚSCCH a.s.

> 1 500
katétrových ablácií
fibrilácie predsiení

> 200
Pulsed Field ablácií FP

1000. katétrová ablácia fibrilácie predsiení
v SÚSCCH Banská Bystrica (5.5.2022)

+ 50%

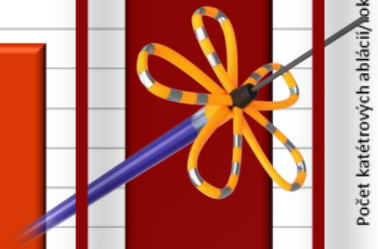


štatistika Odd. arytmií SÚSCCH, a.s. Banská Bystrica

Vývoj katétrových ablácií FP na Slovensku

Katétrové ablácie fibrilácie predsiení v SR

+ 68%



Počet katétrových ablácií/rok

	2019	2020	2021	2022	2023	2024*
fibrilácia predsiení	378	392	445	451	581	976

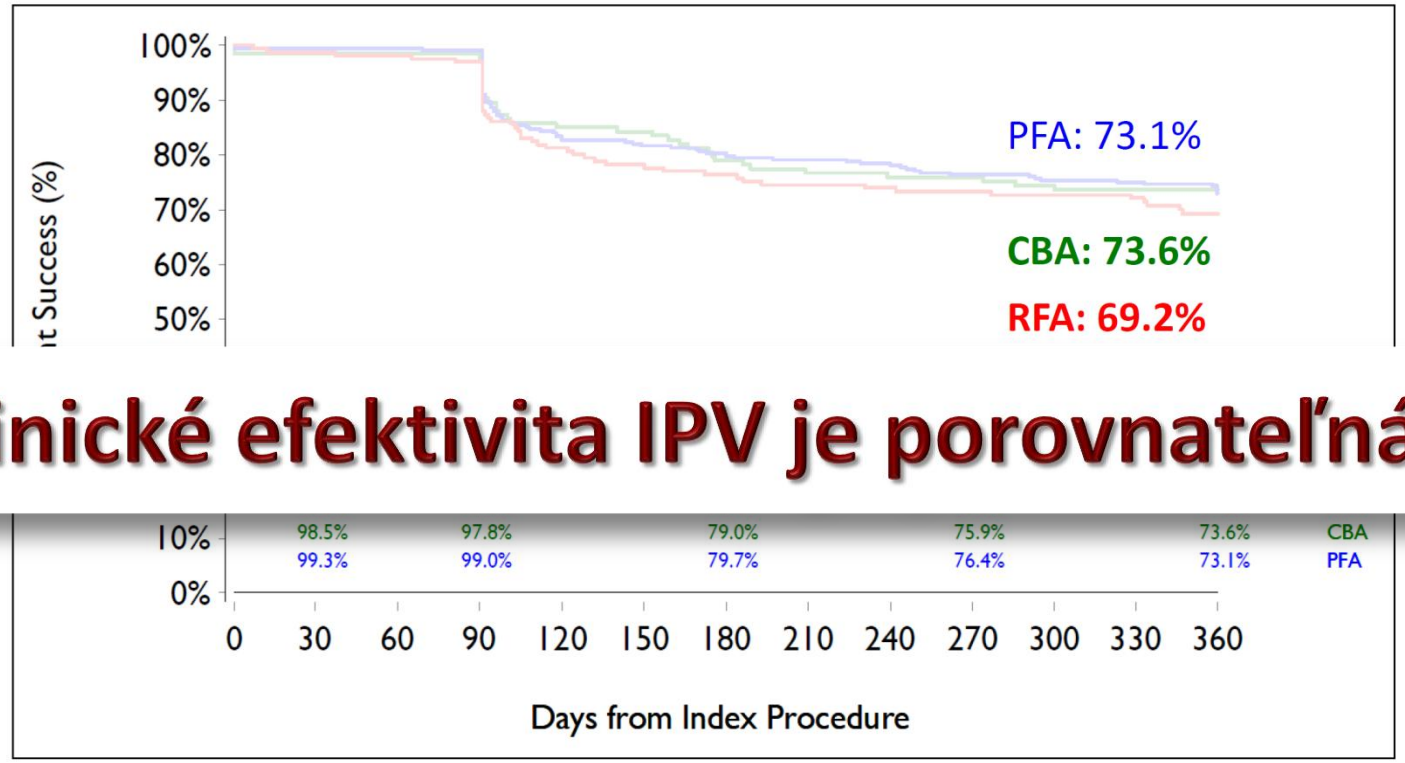
SASA

ablačné centrá SR

*predbežné výsledky registra SlovAblo 2024, SASA

ADVENT: PFA vs. RF/CRYO ?

1-Year Effectiveness by Ablation Modality



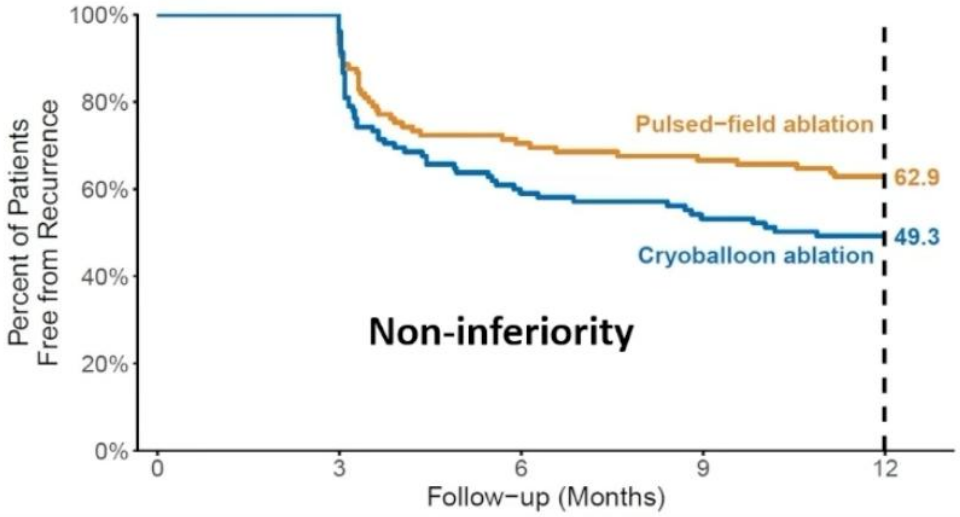
klinické efektivita IPV je porovnateľná

ESC Congress 2023
Amsterdam & Online

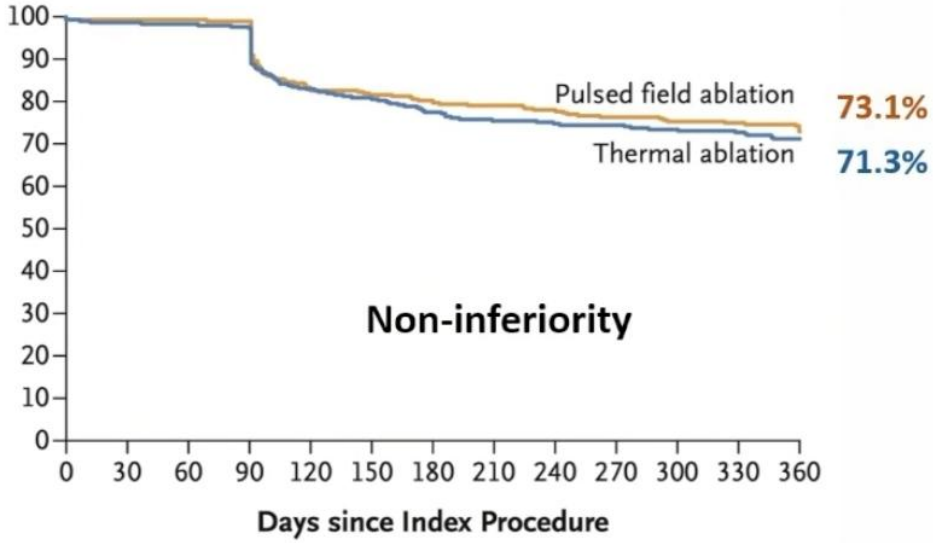
SINGLE SHOT CHANPION: PFA vs. CRYO

Primary Outcome

SINGLE SHOT CHAMPION TRIAL:



ADVENT TRIAL:

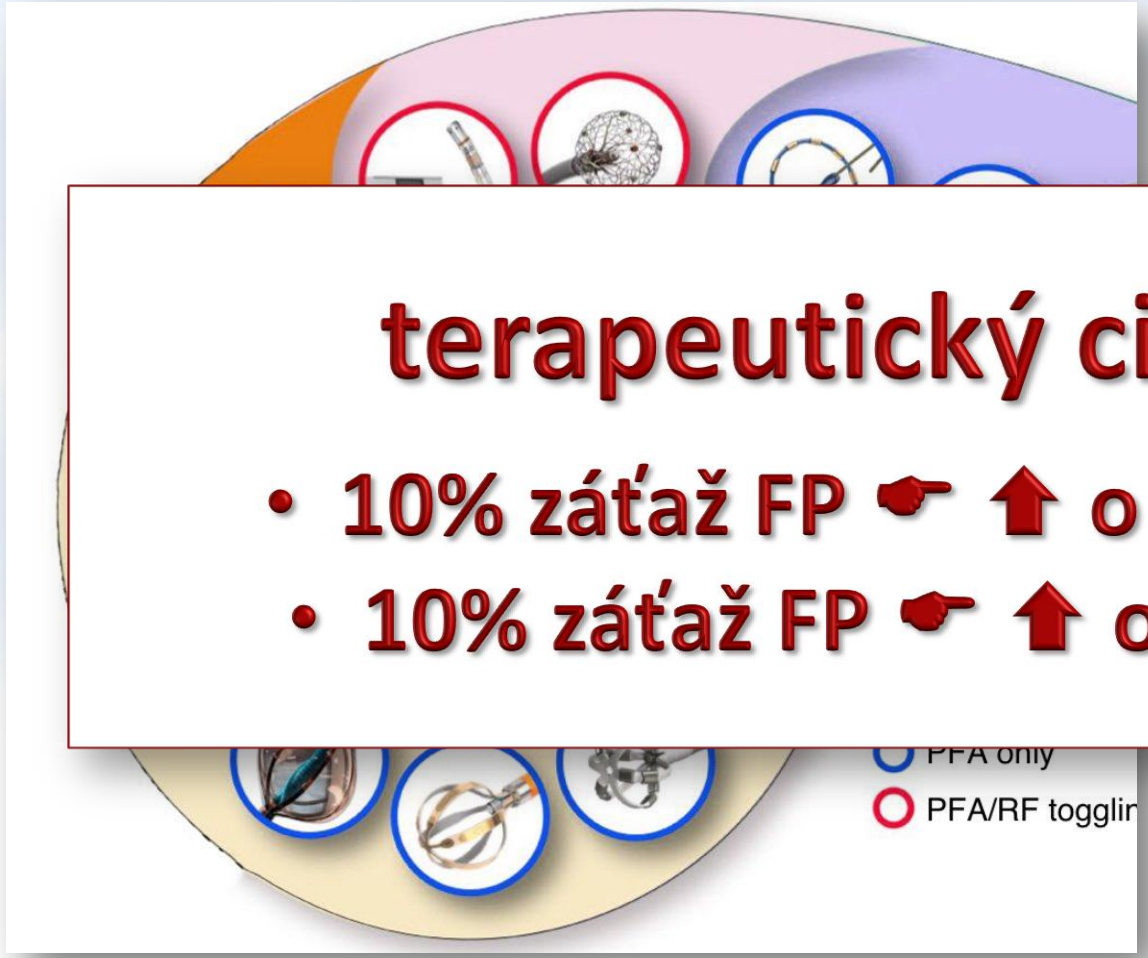


SINGLE SHOT vs. ADVENT TRIALS:

Continuous monitoring vs. intermittent monitoring for 1◦ outcome

EHRA 2025

Perspektívy PF ablácie



terapeutický cieľ: AF burden

- 10% záťaž FP ☛ ⬆ o 9% srdcové zlyhávanie
- 10% záťaž FP ☛ ⬆ o 5% celkovú mortalitu

Steinberg, B. A., et al. (2021). Atrial fibrillation burden and heart failure: Data from 39,710 individuals with cardiac implanted electronic devices. Heart Rhythm, 18(5), 709–716.

„Dostupné“ perspektívy PF ablácie

VariPulse™

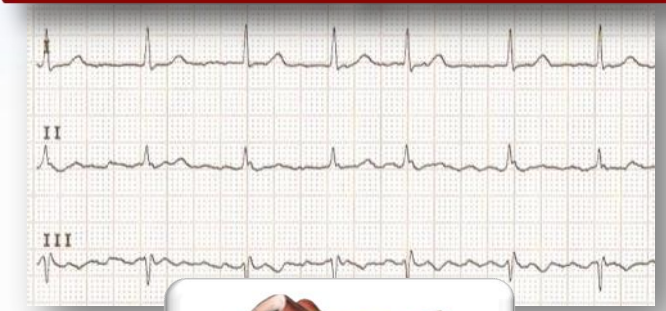
PulseSelect™

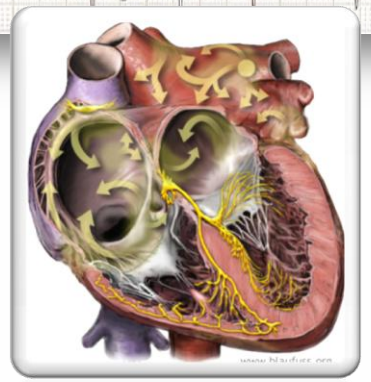
VOLT™

Každý z PFA systémov je jedinečný

Detekcia (včasná) fibrilácie predsienní

fibrilácia predsienní





EKG

Definícia fibrilácie predsení

EKG

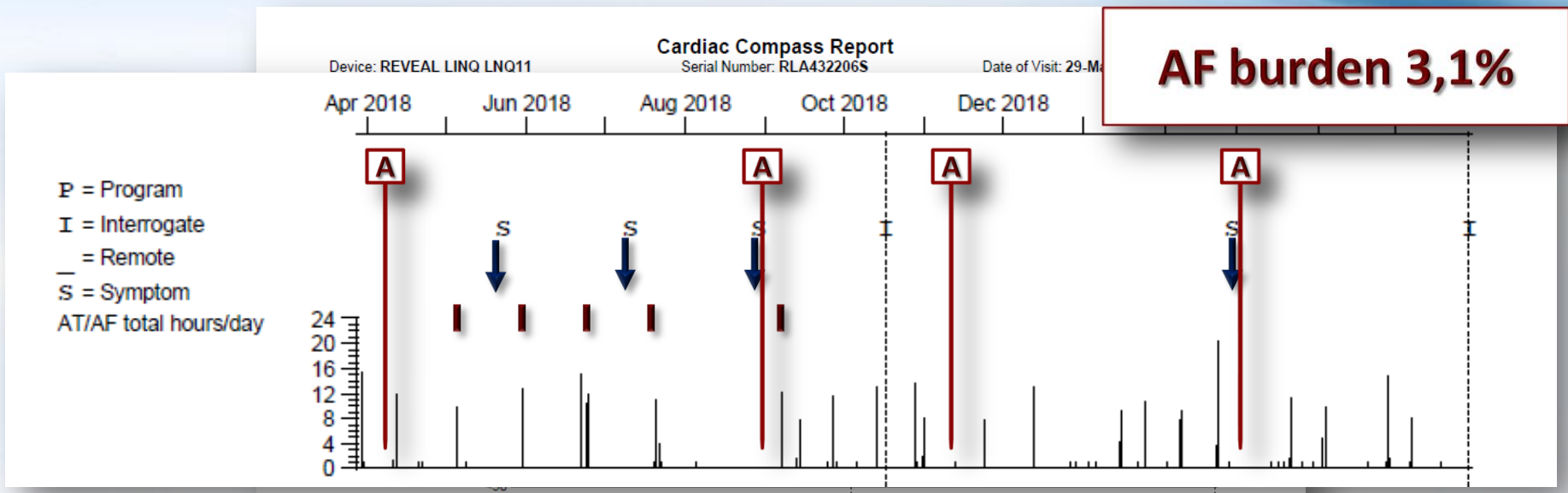
- **fibrilácia predsení s primeraným prevodom na komory**

- fibrilačné vlny = absencia P vĺn
- nepravidelné RR intervaly

trvanie minimálne 10 sekúnd

EKG
archív **A. Bystriansky**
Odd. arytmií SÚSCCH BB

Paroxyzmálna fibrilácia predsiení



AF burden 3,1%

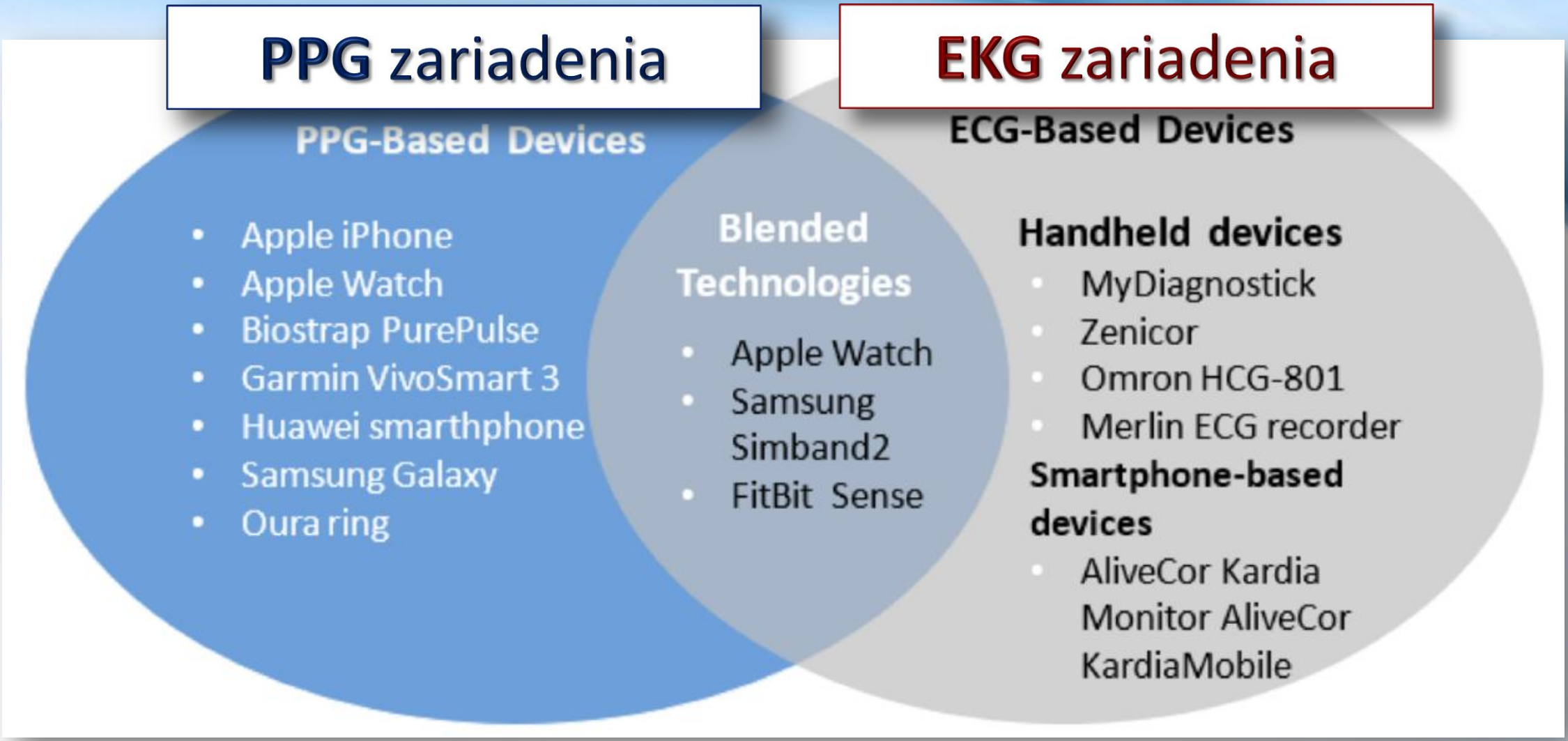
symptómy ≠ parox. FP

amb. EKG = SR (bez FP)

obrazová dokumentácia Odd. arytmií SÚSCCH, a.s. Banská Bystrica

Metódy detekcie fibrilácie predsiení

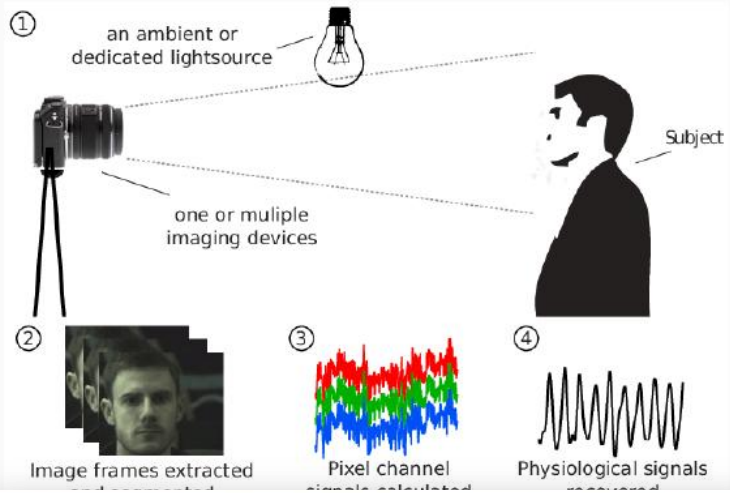
PPG zariadenia

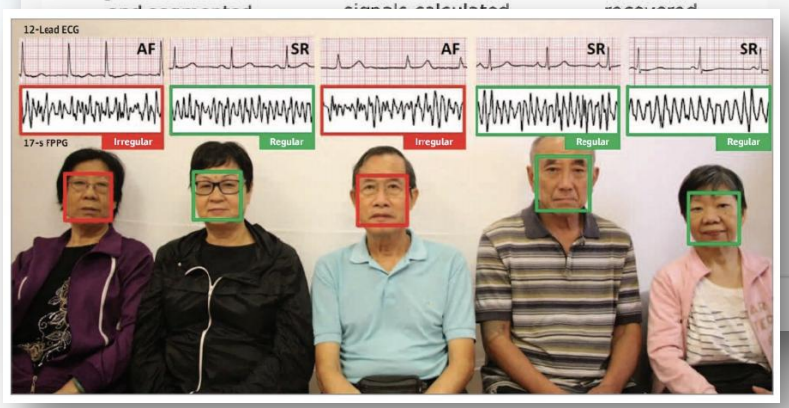


EKG zariadenia

Inovatívne metódy detekcie FP

PPG kamery





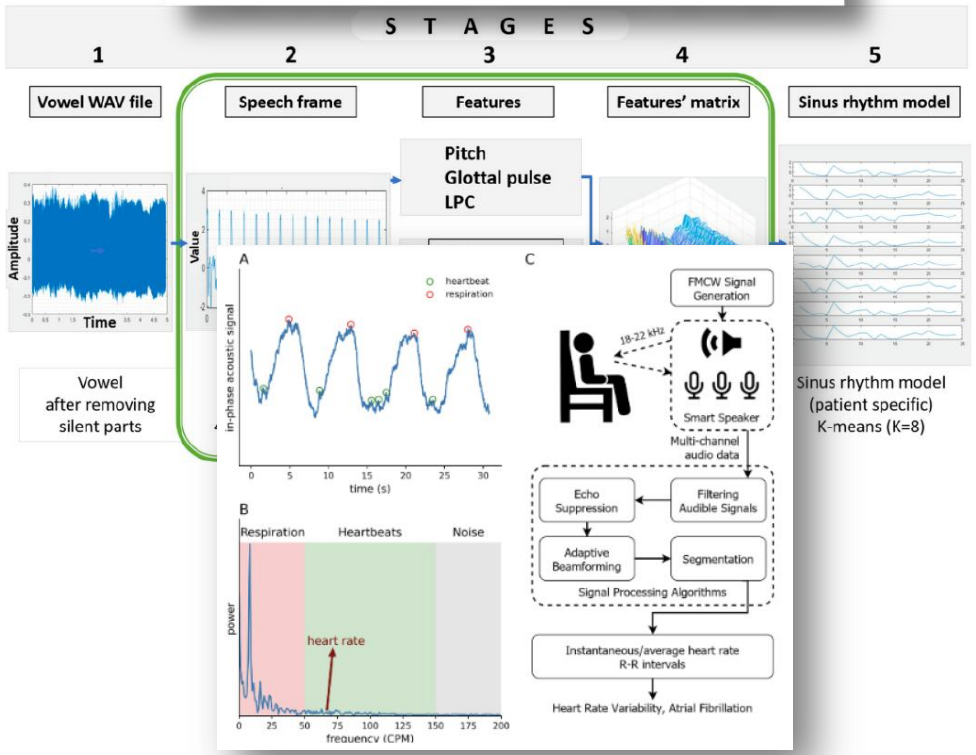
SMART vozíky

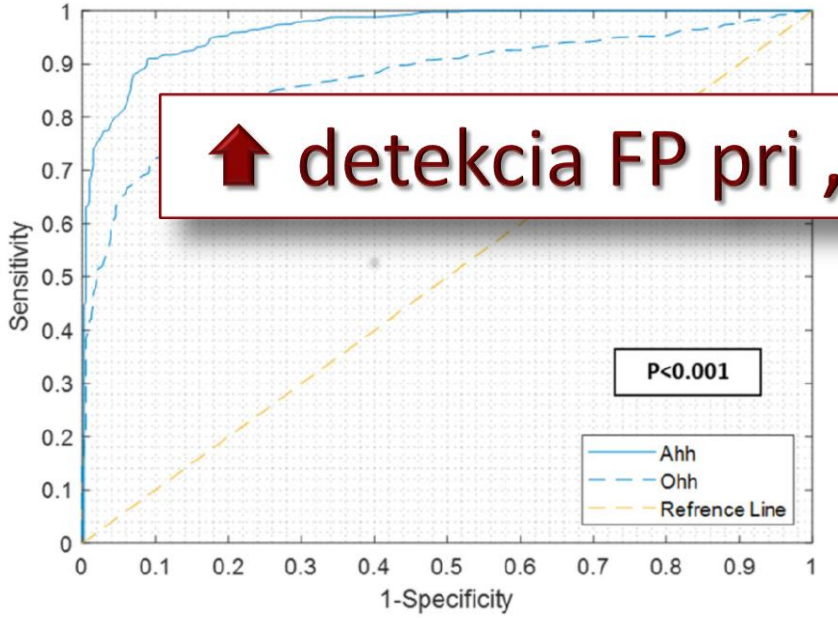
SMART toalety

Je možné fibriláciu predsienení „počuť“

Vocal Feature Analysis to Detect Atrial Fibrillation

SMART mikrofón



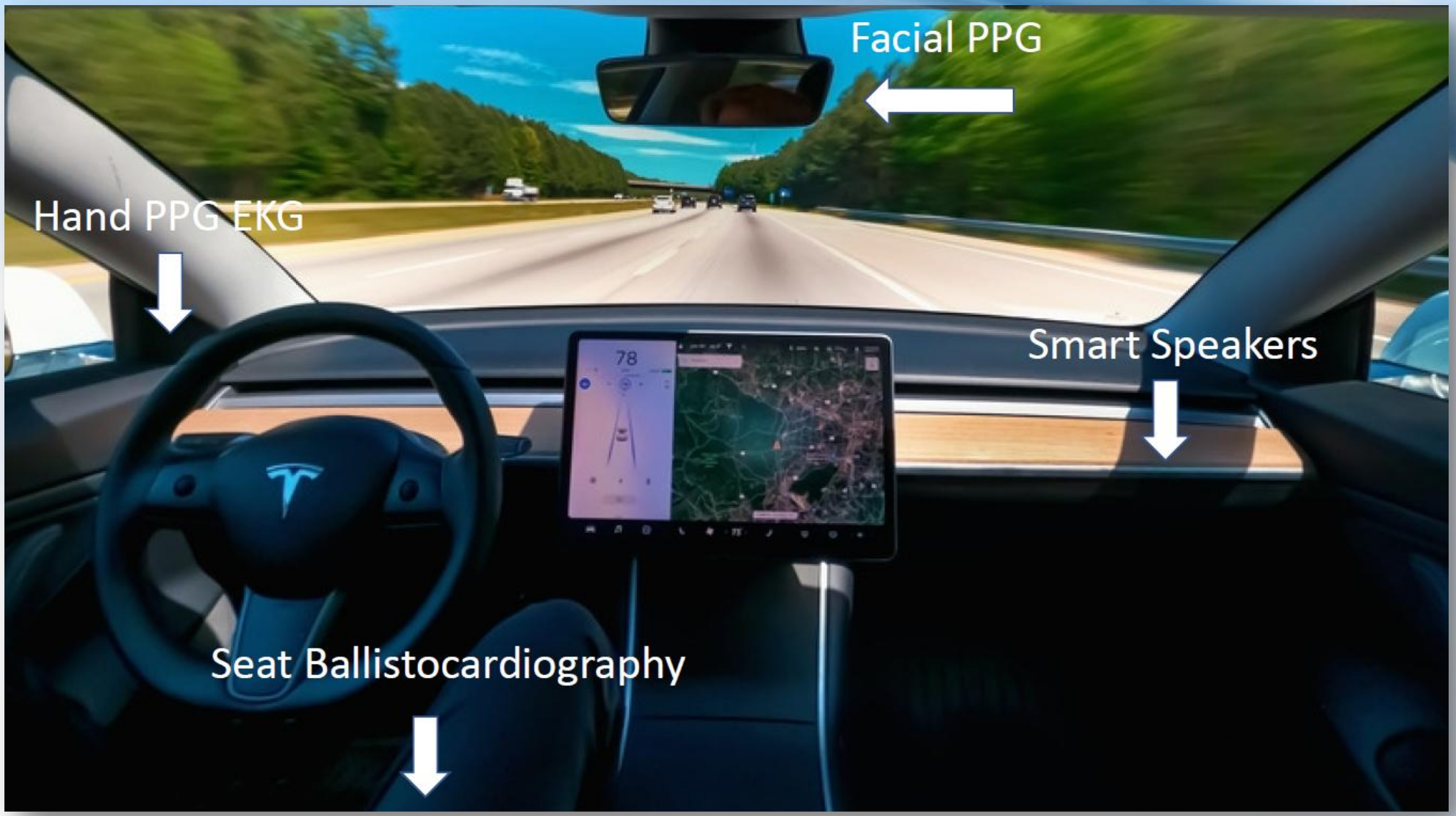


⬆ detekcia FP pri „Ahh“

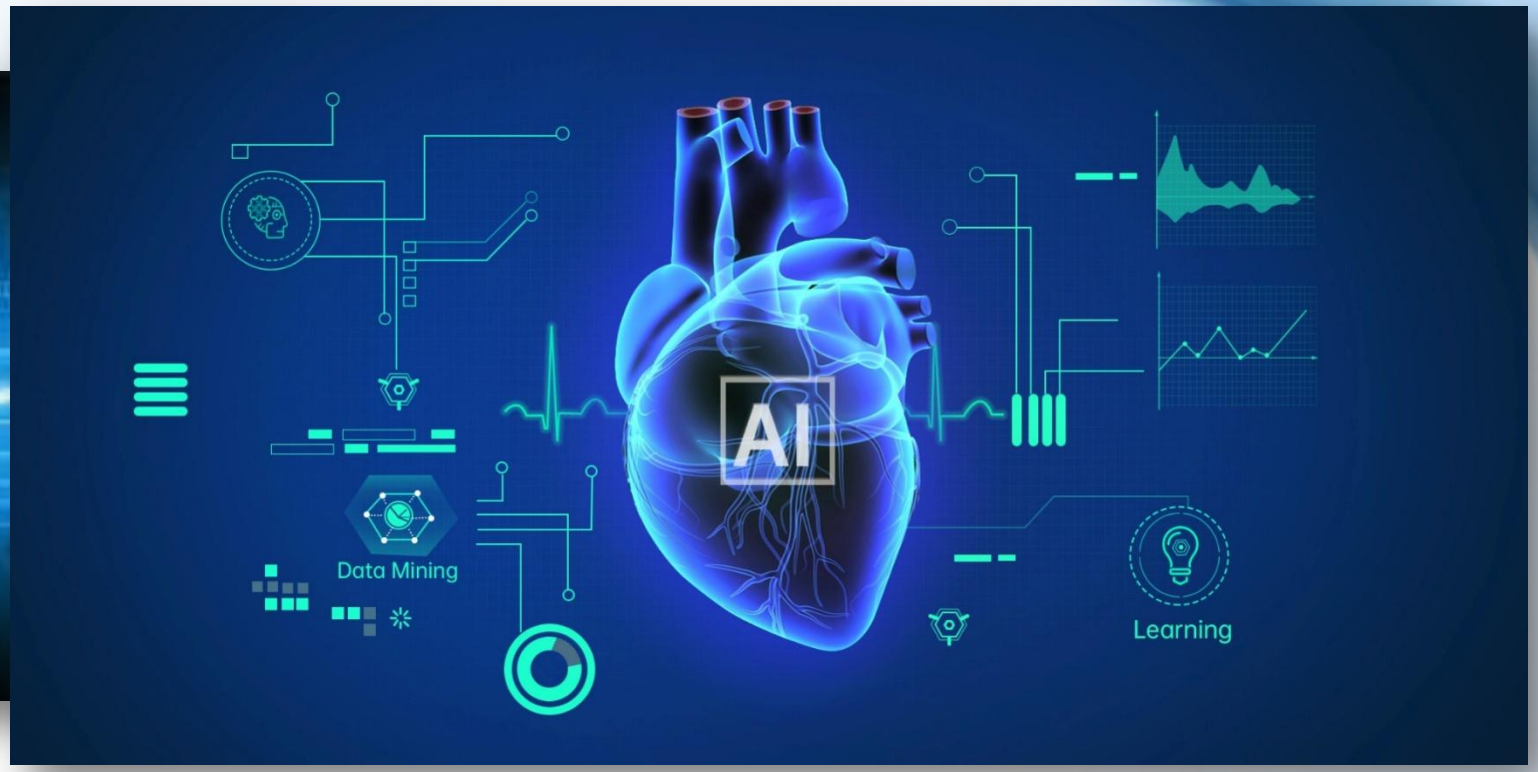
AF detection from voice is feasible with sensitivity 95% and 82% specificity

J Cardiovasc Electrophysiol. 2022;33:1647–1654.

SMART AUTO (-monitorovanie)



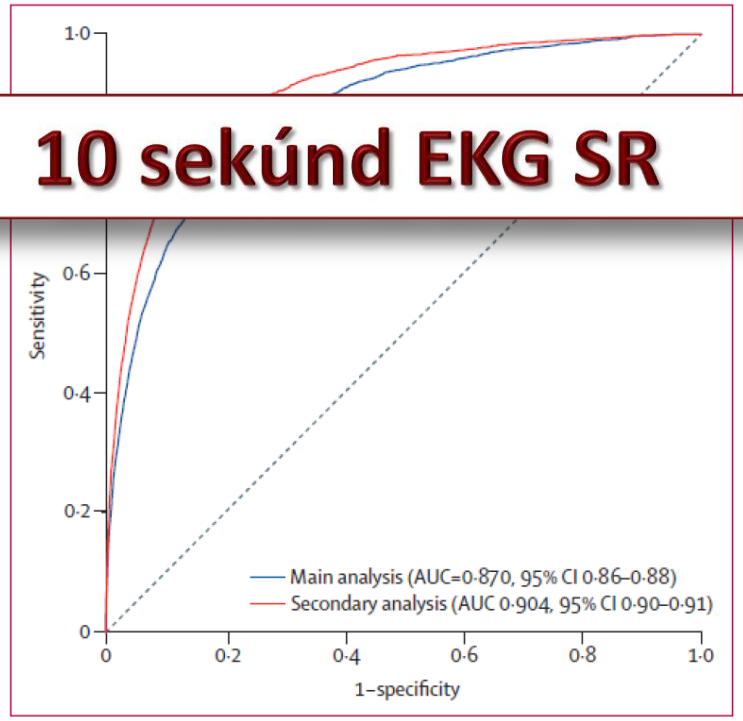
EKG a AI (umelá inteligencia)



Je možné predpovedať vznik FP z EKG SR

ATRIAL FIBRILLATION RISK: from an ECG recorded during Normal Sinus Rhythm

10 sekúnd EKG SR



- **90%**

AREA UNDER
CURVE FOR SIL
AF

AI ECG = 0.9
PERFECT = 1

EKG „vek“

Key Question

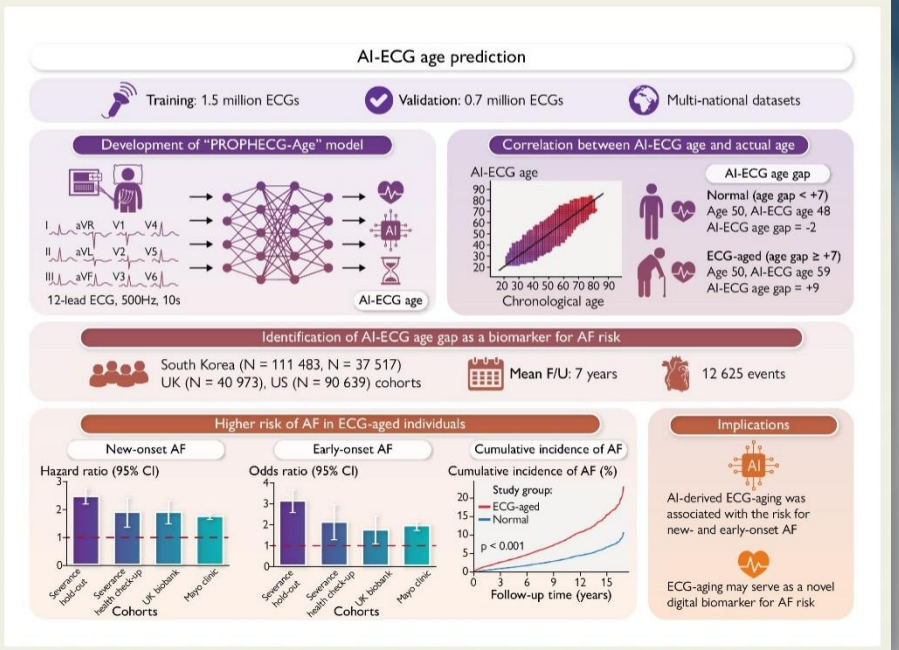
Can a … (AF) risk se…

Key …

In this … demo… early-onset AF.

Take Home Message

The utilization of AI-ECG age prediction could facilitate identification of individuals at risk of AF, thereby enabling the implementation of proactive preventive measures and serving as a benchmark for cardiac health monitoring.

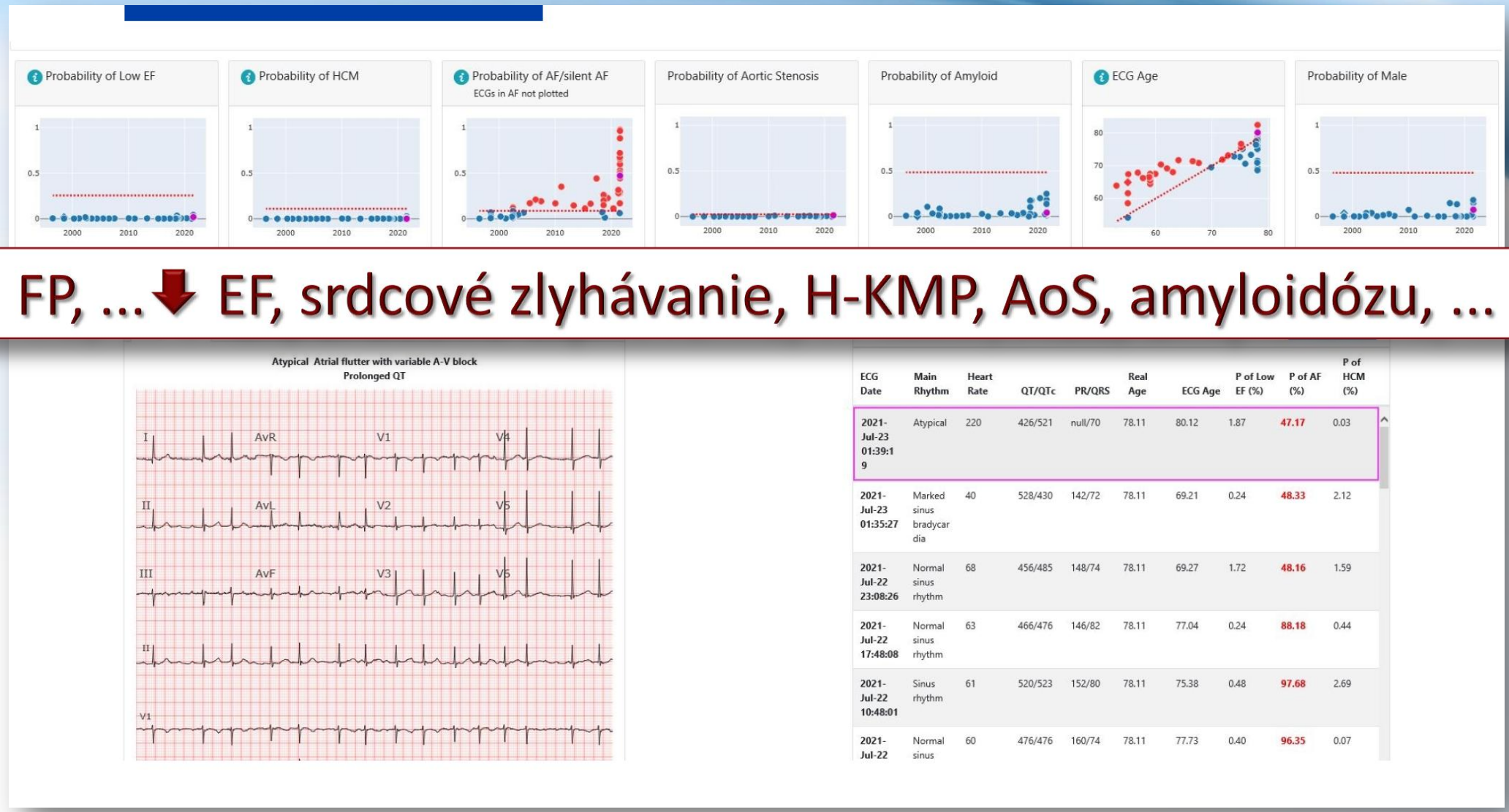


MAYO CLINIC

Attia…Friedman: Lancet Aug 2019

Cho, S., et al. (2025). Artificial intelligence–derived electrocardiographic aging and risk of atrial fibrillation: a multi-national study. European Heart Journal, 46(9), 839–852.

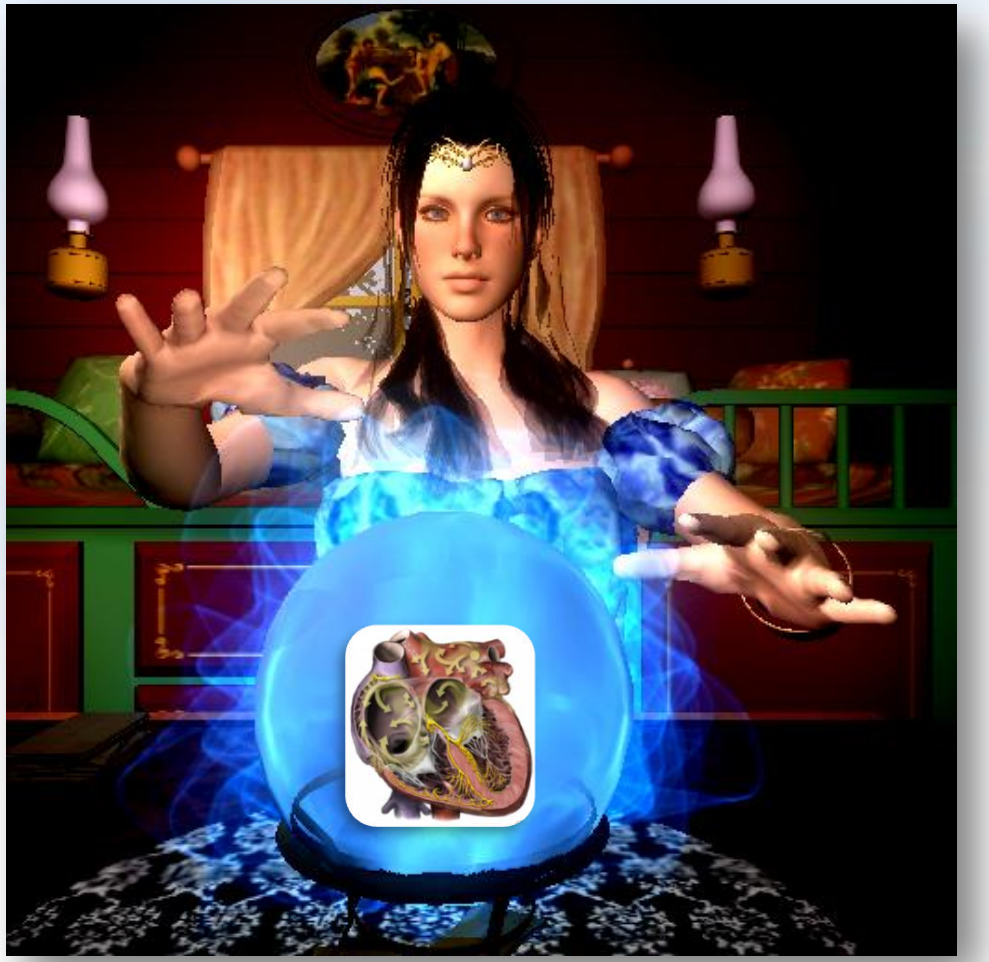
EKG (AI): okrem FP je možné predpovedať ...



FP, ...⬇ EF, srdcové zlyhávanie, H-KMP, AoS, amyloidózu, ...

ECG Date	Main Rhythm	Heart Rate	QT/QTc	PR/QRS	Real Age	ECG Age	P of Low EF (%)	P of AF (%)	P of HCM (%)
2021-Jul-23 01:39:19	Atypical	220	426/521	null/70	78.11	80.12	1.87	47.17	0.03
2021-Jul-23 01:35:27	Marked sinus bradycardia	40	528/430	142/72	78.11	69.21	0.24	48.33	2.12
2021-Jul-22 23:08:26	Normal sinus rhythm	68	456/485	148/74	78.11	69.27	1.72	48.16	1.59
2021-Jul-22 17:48:08	Normal sinus rhythm	63	466/476	146/82	78.11	77.04	0.24	88.18	0.44
2021-Jul-22 10:48:01	Sinus rhythm	61	520/523	152/80	78.11	75.38	0.48	97.68	2.69
2021-Jul-22	Normal sinus	60	476/476	160/74	78.11	77.73	0.40	96.35	0.07

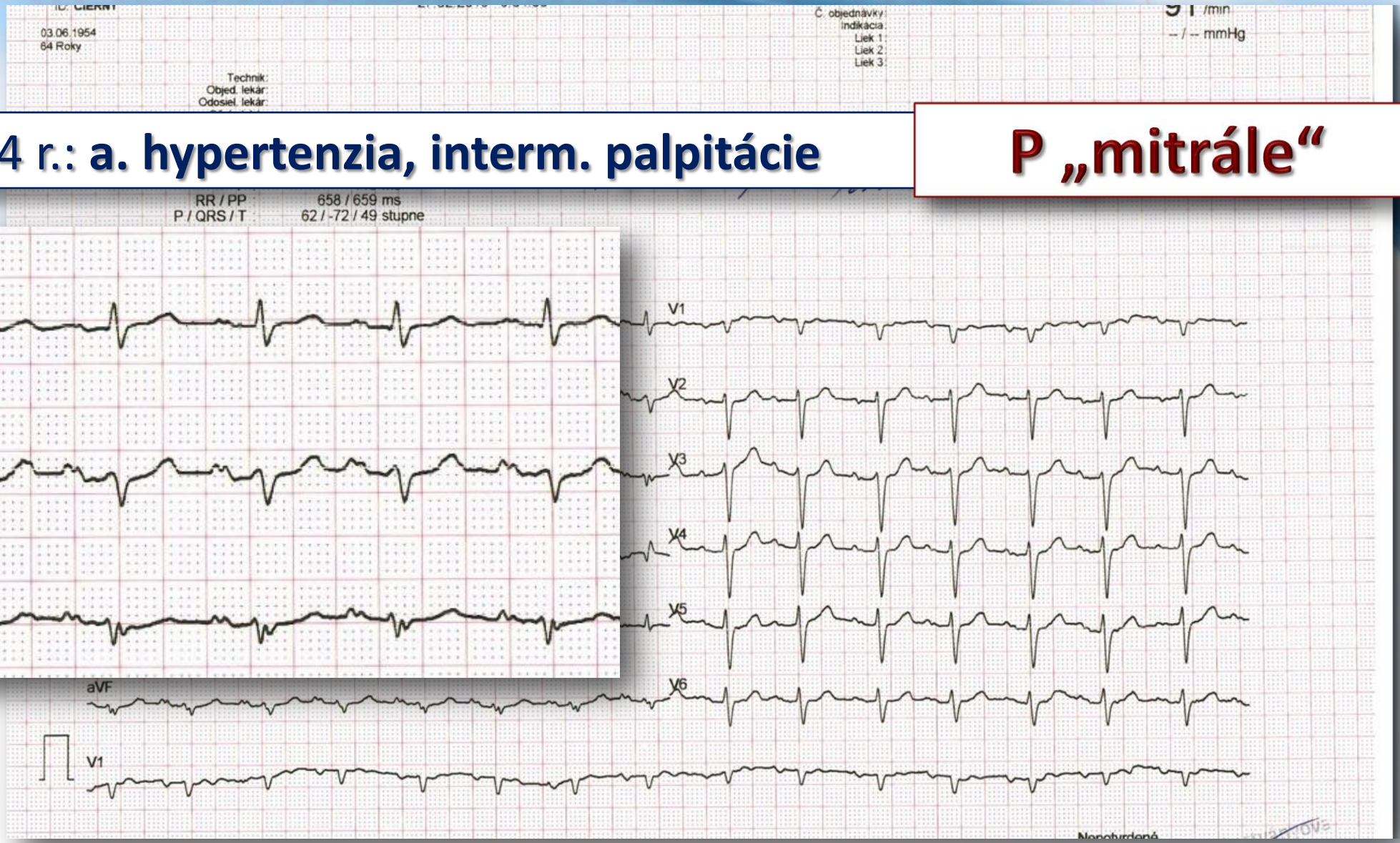
Je možné predpovedať vznik FP z EKG SR ?



Je možné predpovedať vznik FP ?

- muž, 64 r.: **a. hypertenzia, interm. palpitácie**

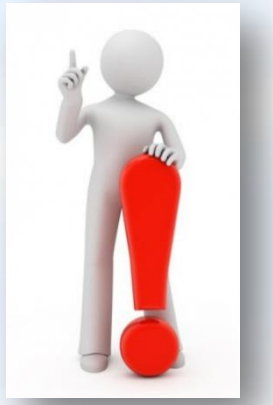
P „mitrále“

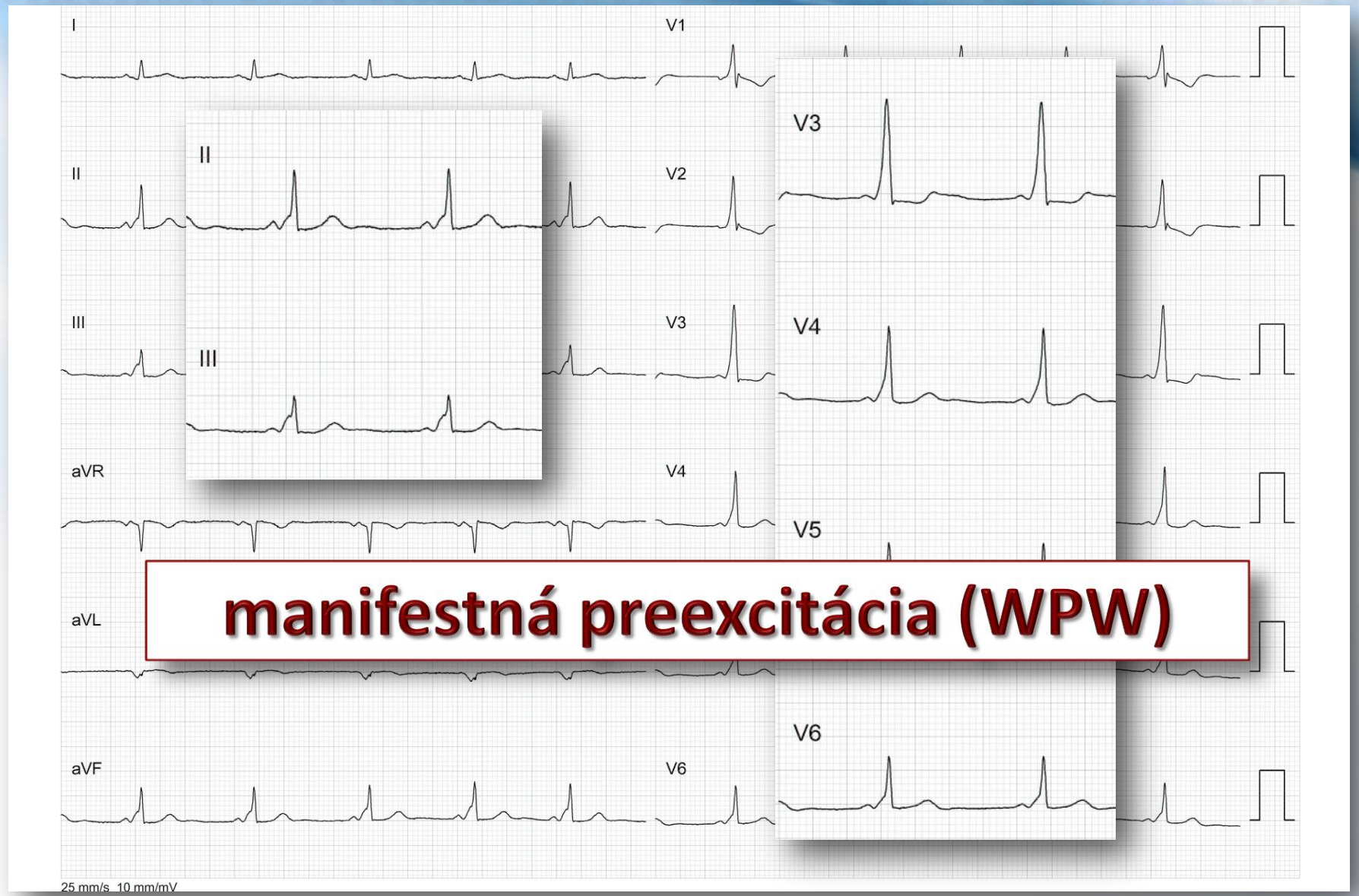


EKG

archív **A. Bystriansky**
Odd. arytmií SÚSCCH BB

Rizikový pacient pre fibriláciu predsení





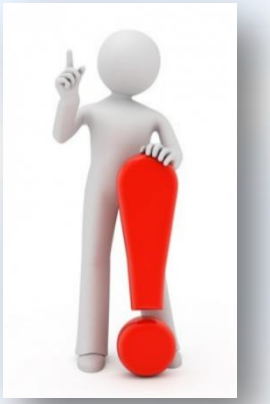
manifestná preexcitácia (WPW)

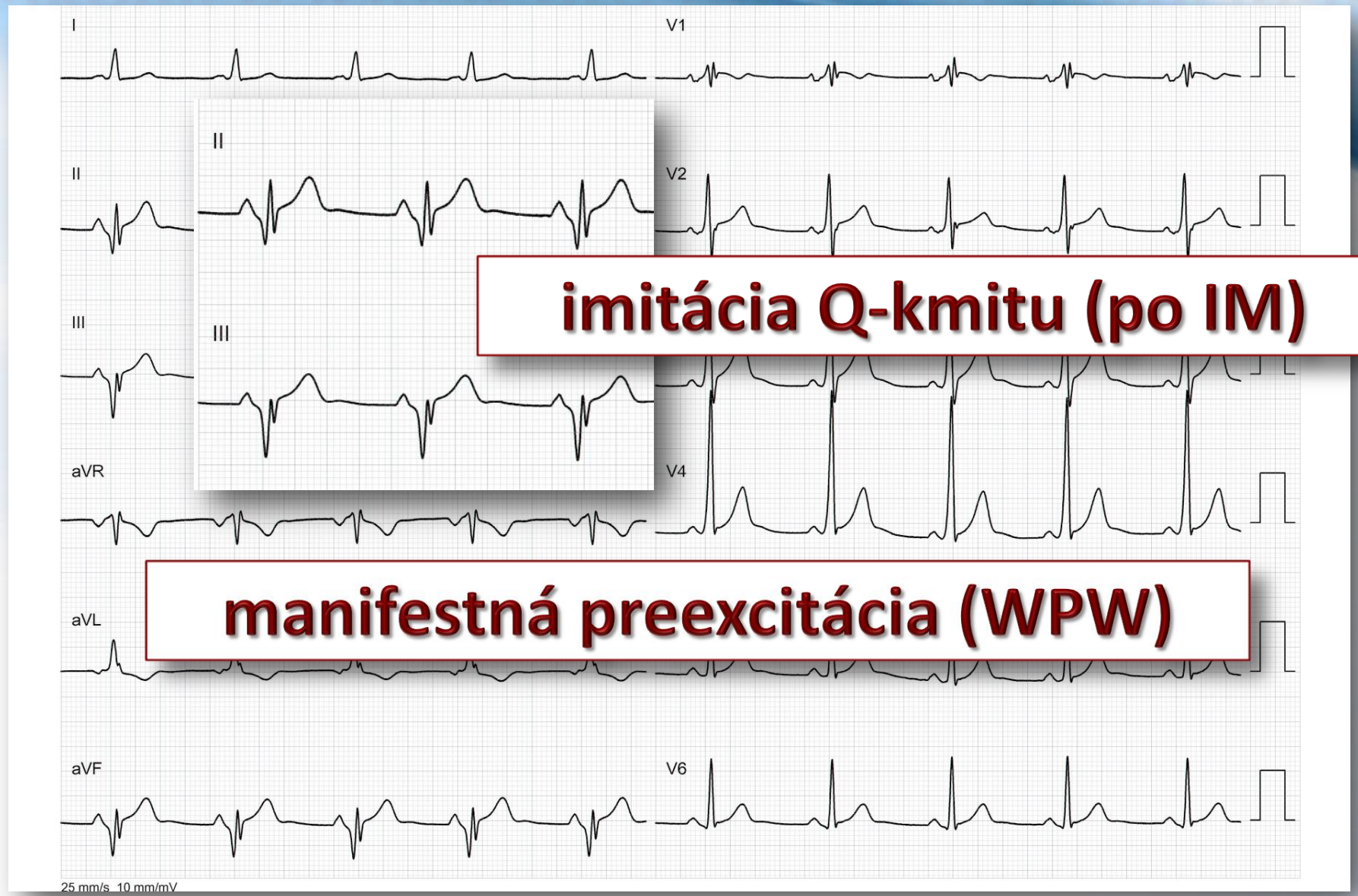
EKG

archív **A. Bystriansky**
Odd. arytmií SÚSCCH BB

BARD

Rizikový pacient pre fibriláciu predsení





imitácia Q-kmitu (po IM)

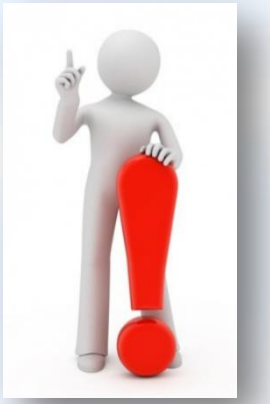
manifestná preexcitácia (WPW)

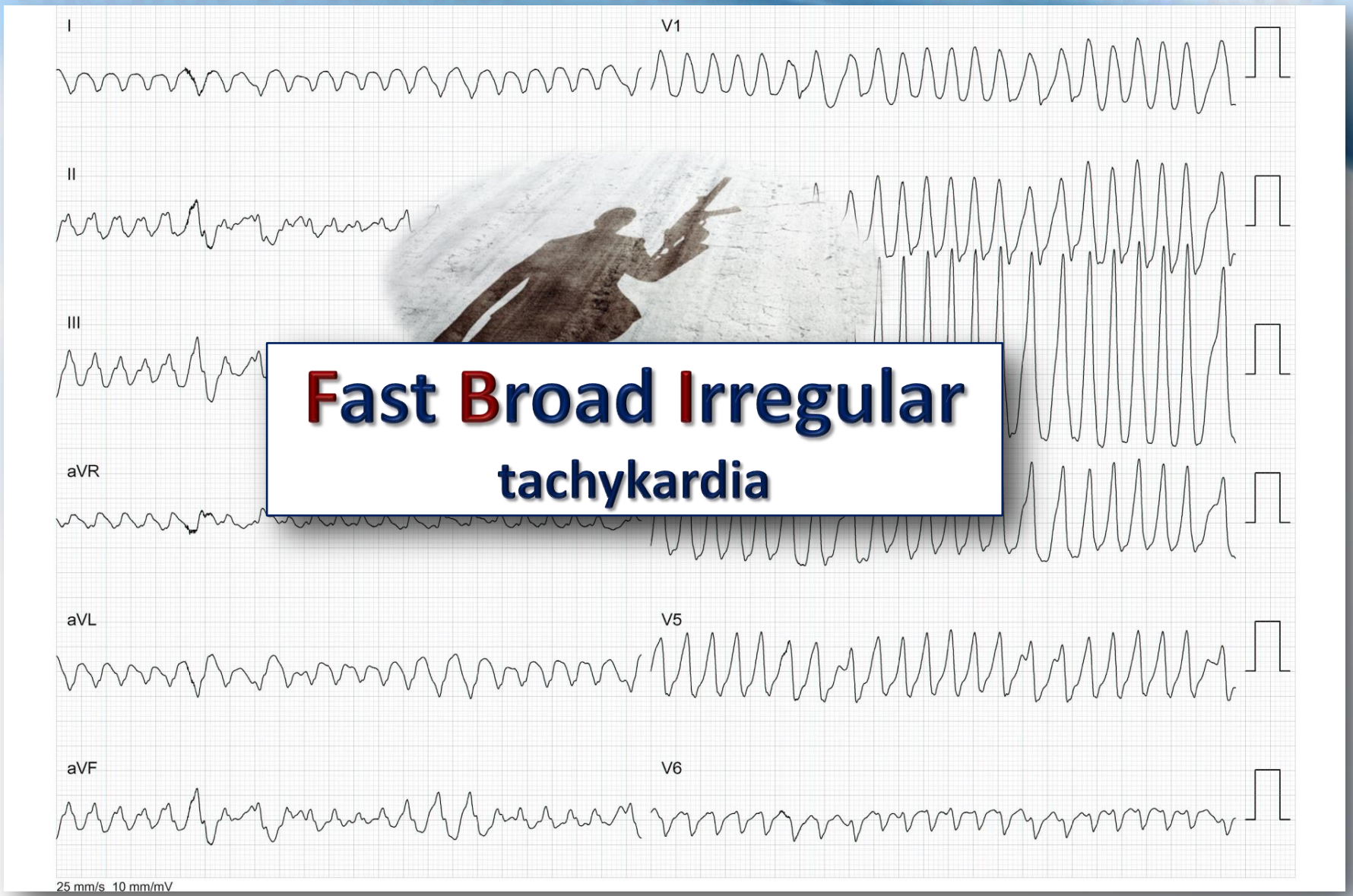
EKG

archív **A. Bystriansky**
Odd. arytmií SÚSCCH BB

BARD

Rizikový pacient s fibriláciou predsení



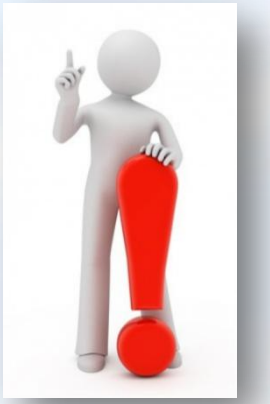


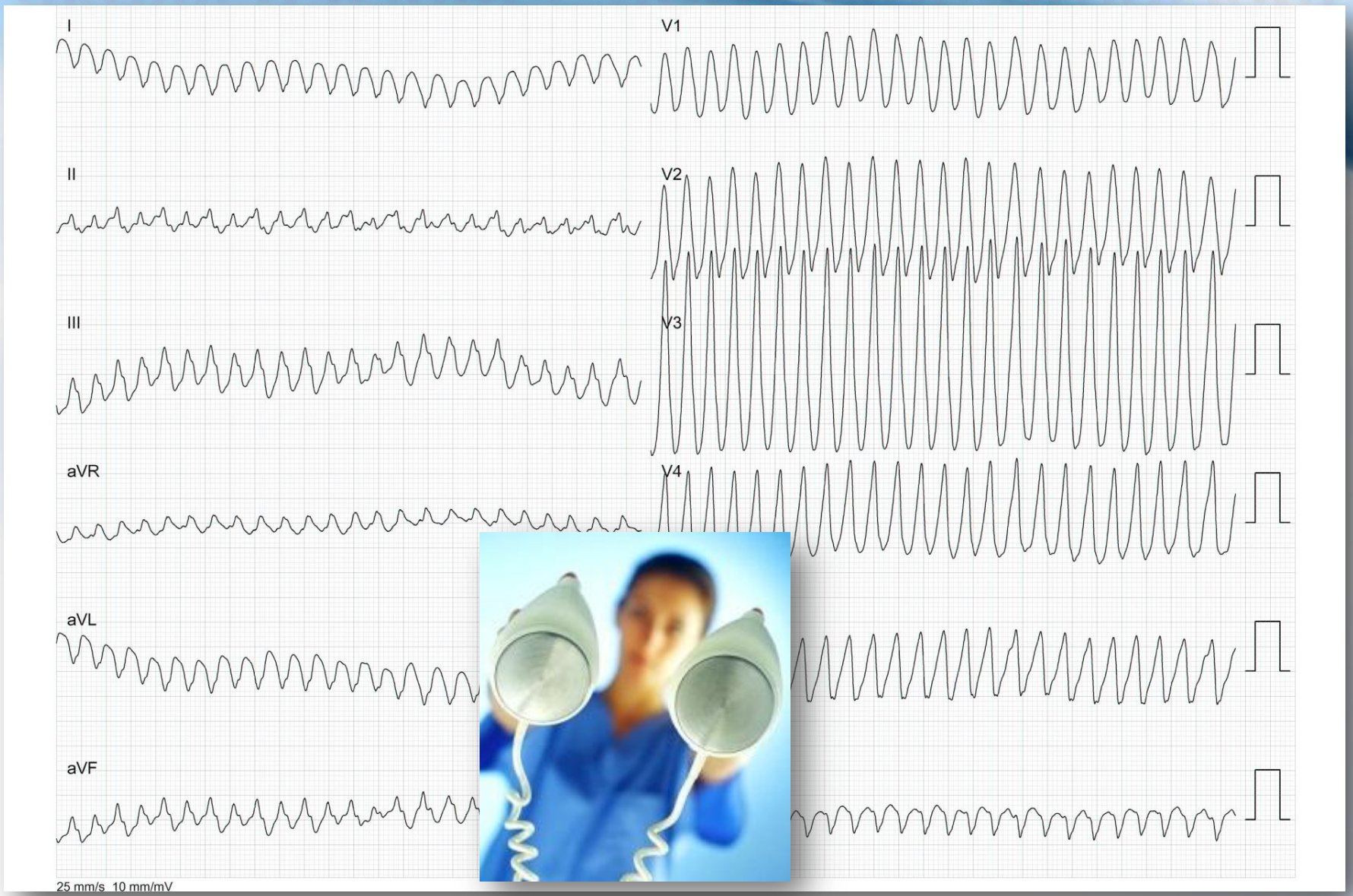
EKG

archív **A. Bystriansky**
Odd. arytmií SÚSCCH BB

BARD

Rizikový pacient s fibriláciou predsiení





EKG

archív **A. Bystriansky**
Odd. arytmií SÚSCCH BB

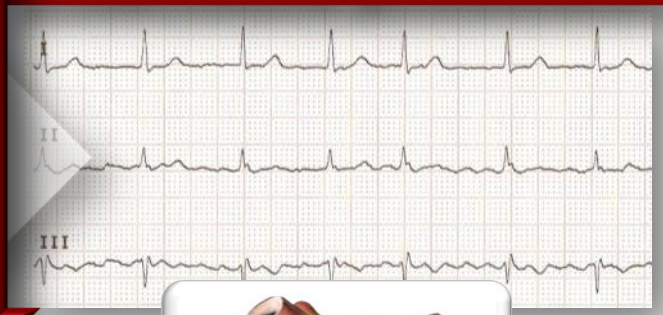
BARD

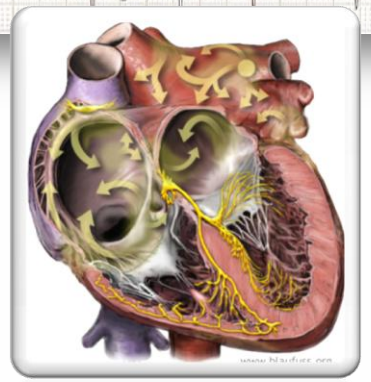
Prevencia fibrilácie predsienení

primárna
prevencia

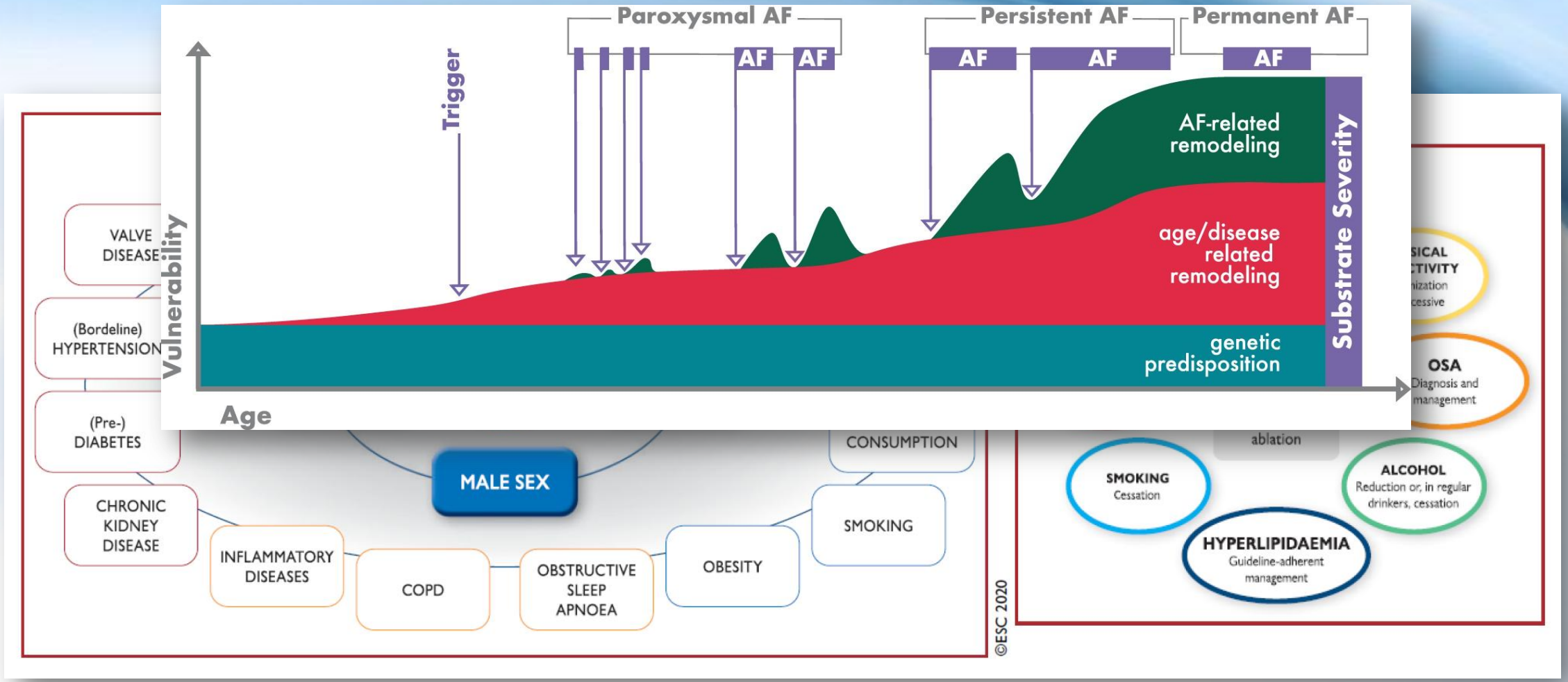
sínusový rytmus

fibrilácia predsienení



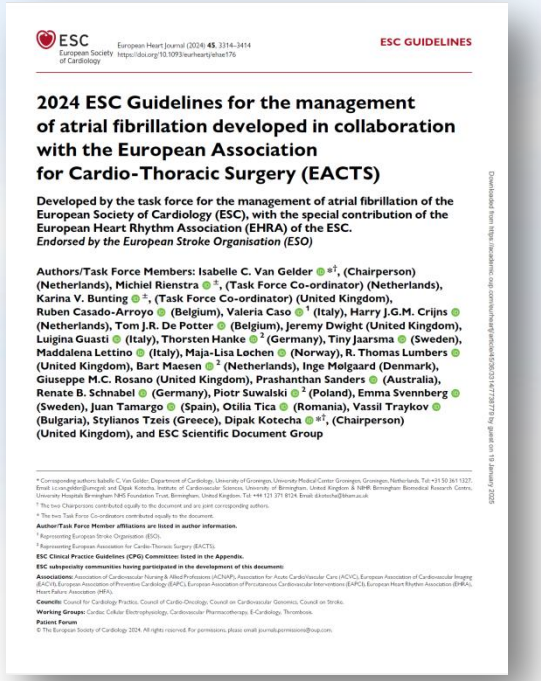


Rizikové faktory pre vznik fibrilácie predsiení



Hindricks, G. et al. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation. Eur Heart J. 2020; 00: 1-125

2024 ESC odporúčania pre fibriláciu predsiení



ESC European Society of Cardiology

European Heart Journal (2024) 45, 3314–3414 https://doi.org/10.1093/eurheartj/ehae176

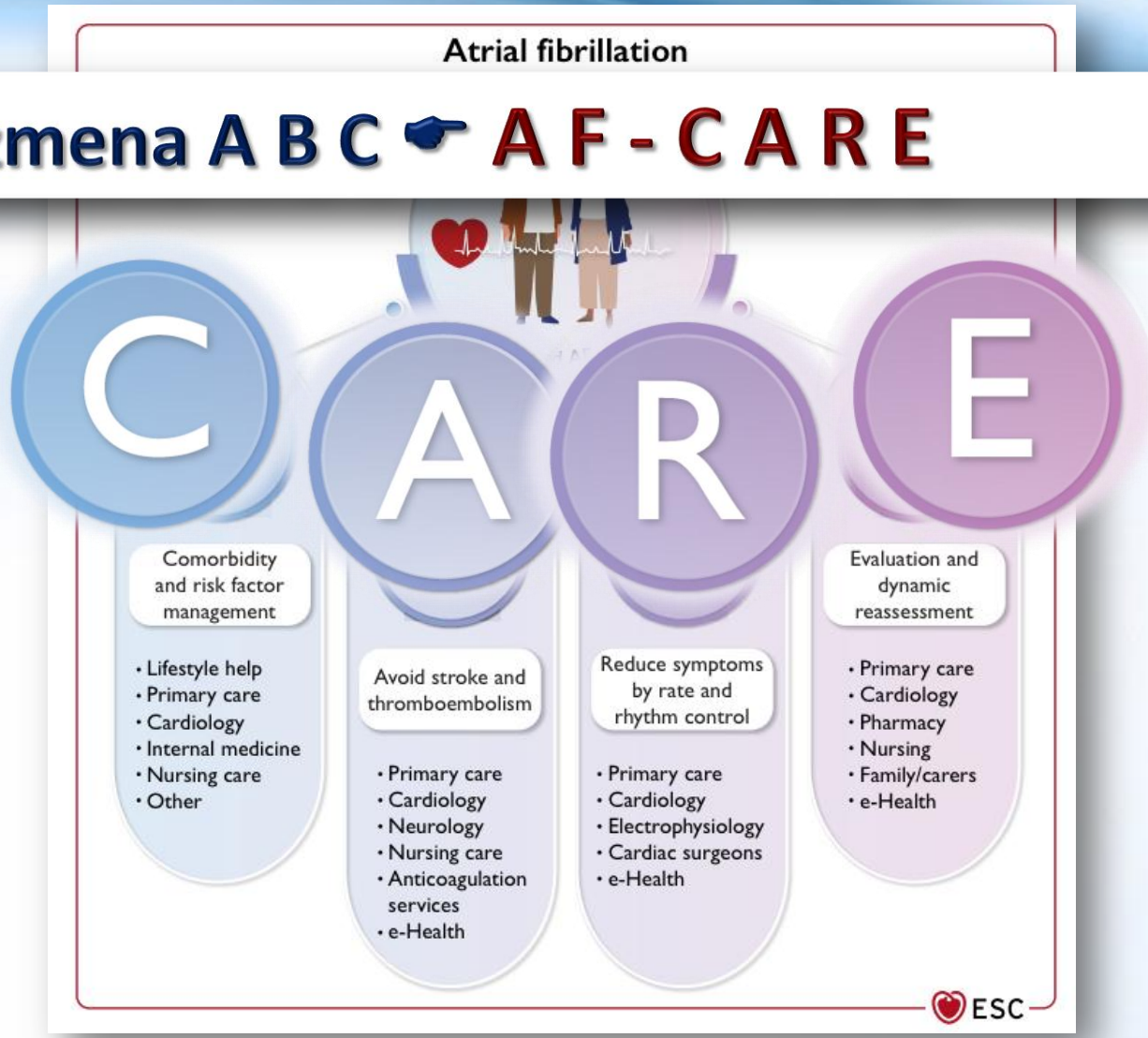
ESC GUIDELINES

2024 ESC Guidelines for the management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS)

Developed by the task force for the management of atrial fibrillation of the European Society of Cardiology (ESC), with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC.
Endorsed by the European Stroke Organisation (ESO)

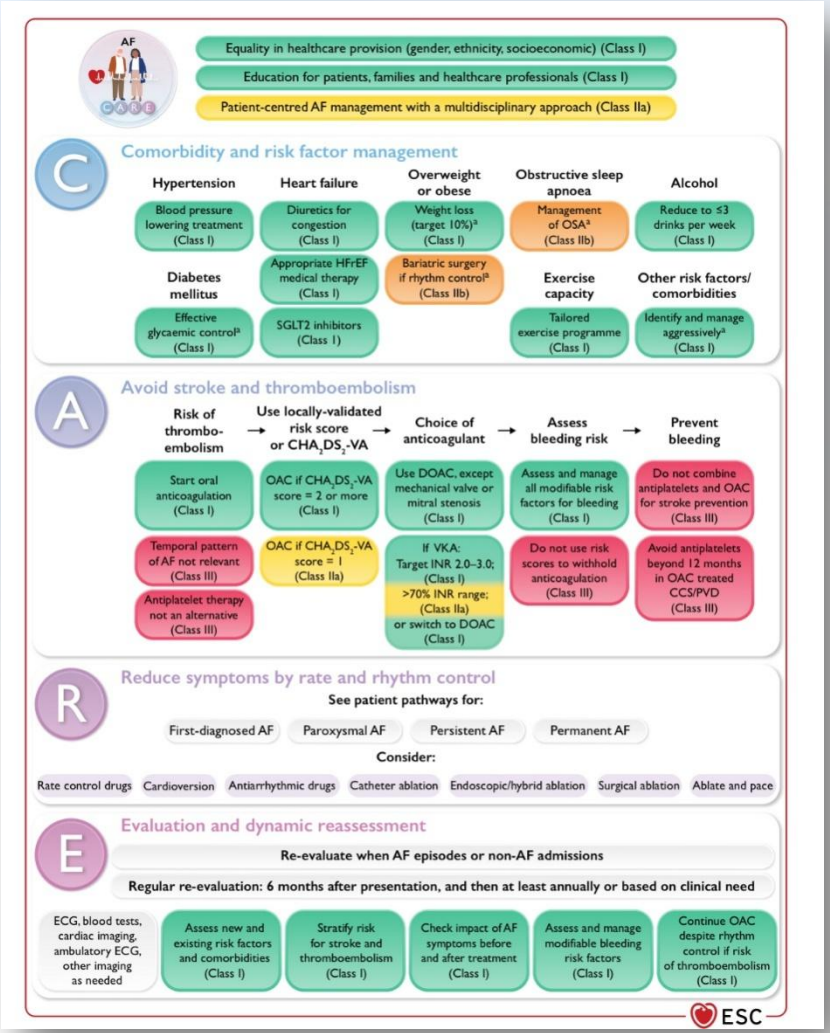
Authors/Task Force Members: Isabelle C. Van Gelder [*†], (Chairperson) (Netherlands), Michiel Rienstra [‡], (Task Force Co-ordinator) (Netherlands), Karina V. Bunting [‡], (Task Force Co-ordinator) (United Kingdom), Ruben Casado-Arroyo (Belgium), Valeria Caso [1] (Italy), Harry J.G.M. Crijns (Netherlands), Tom J.R. De Potter (Belgium), Jeremy Dwight (United Kingdom), Luigina Guasti (Italy), Thorsten Hanke [2] (Germany), Tiny Jaarsma (Sweden), Maddalena Lettino (Italy), Maja-Lisa Løchen (Norway), R. Thomas Lumbers (United Kingdom), Bart Maesen [2] (Netherlands), Inge Mølgaard (Denmark), Giuseppe M.C. Rosano (United Kingdom), Prashanthan Sanders (Australia), Renate B. Schnabel (Germany), Piotr Suwalski [2] (Poland), Emma Svennberg (Sweden), Juan Tamargo (Spain), Otilia Tica (Romania), Vassil Traykov (Bulgaria), Stylianos Tzeis (Greece), Dipak Kotecha [*‡], (Chairperson) (United Kingdom), and ESC Scientific Document Group

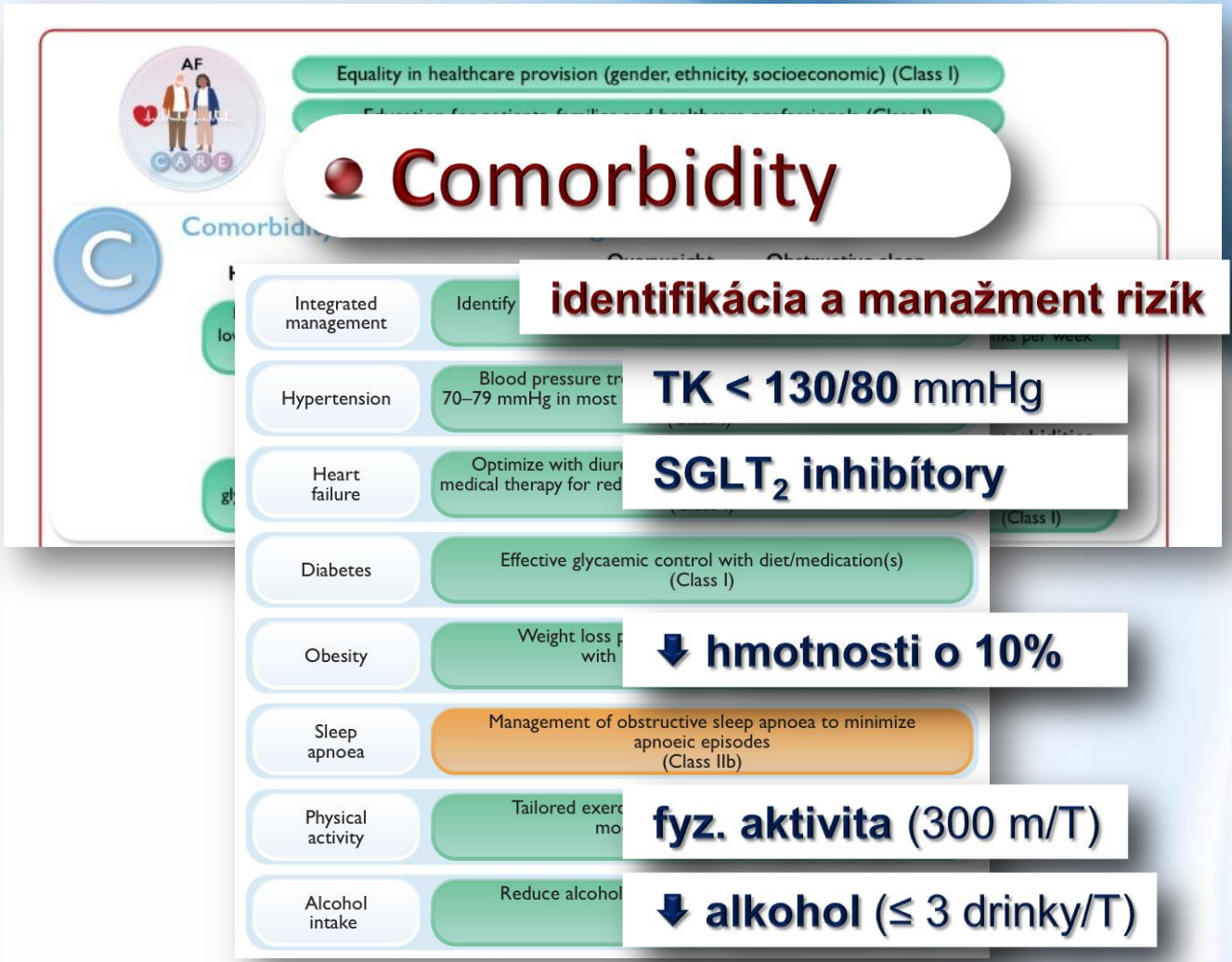
- zmena A B C ☛ A F - C A R E



Van Gelder IC, et al. 2024 ESC Guidelines for the management of atrial fibrillation Eur Heart J. 2024;45(36):3314-3414. doi:10.1093/EURHEARTJ/EHAE176

2024 ESC odporúčania pre fibriláciu predsiení

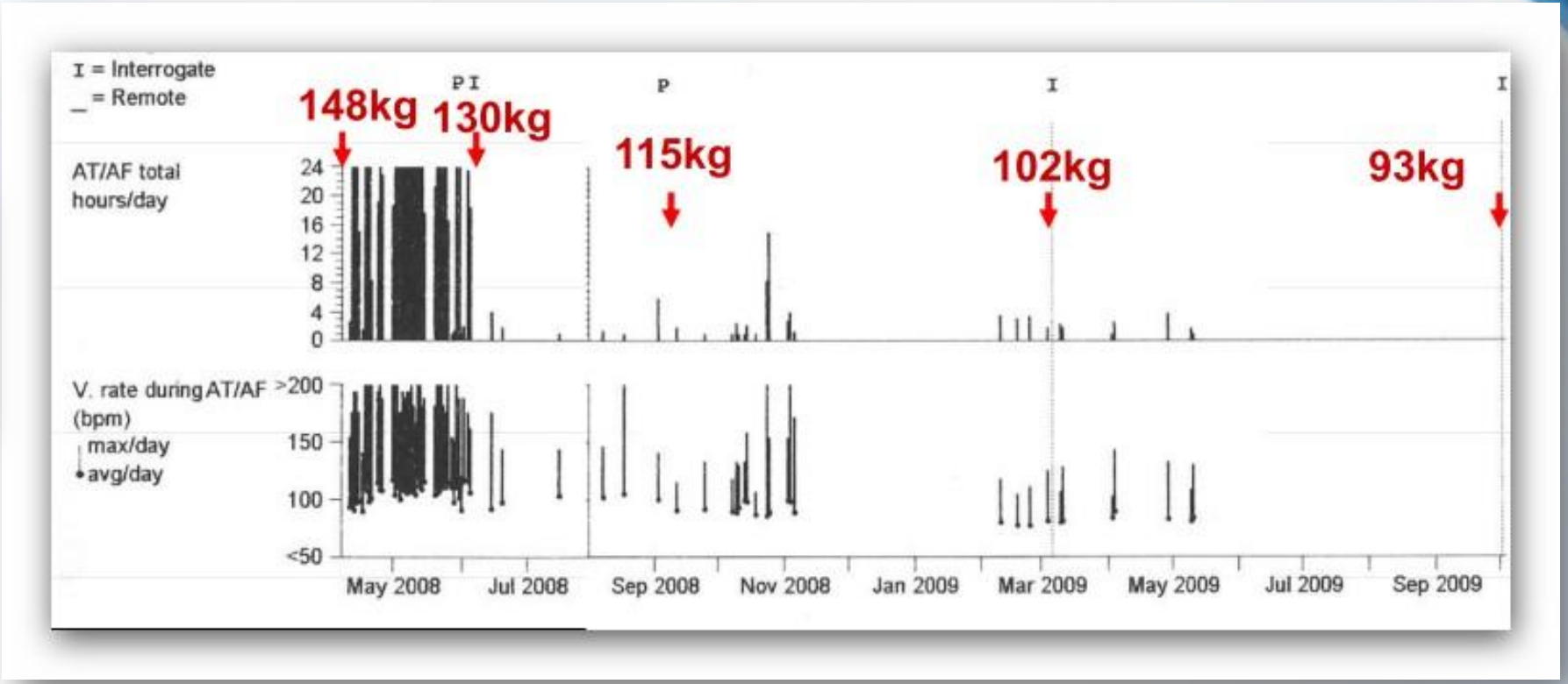




Van Gelder IC, et al. 2024 ESC Guidelines for the management of atrial fibrillation Eur Heart J. 2024;45(36):3314-3414. doi:10.1093/EURHEARTJ/EHAE176

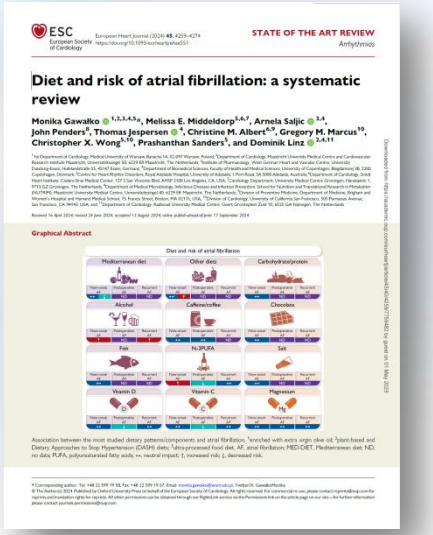
Redukcia hmotnosti a fibrilácia predsení

- **redukcia telesnej hmotnosti ☛ miznutie FP**



Urban L., Hatala R. a spol.: Prínos monitorovania pre manažment fibrilácie predsení

Diéta a riziko fibrilácie predsiení


ESC European Society of Cardiology

European Heart Journal (2024) 45, 4259–4274

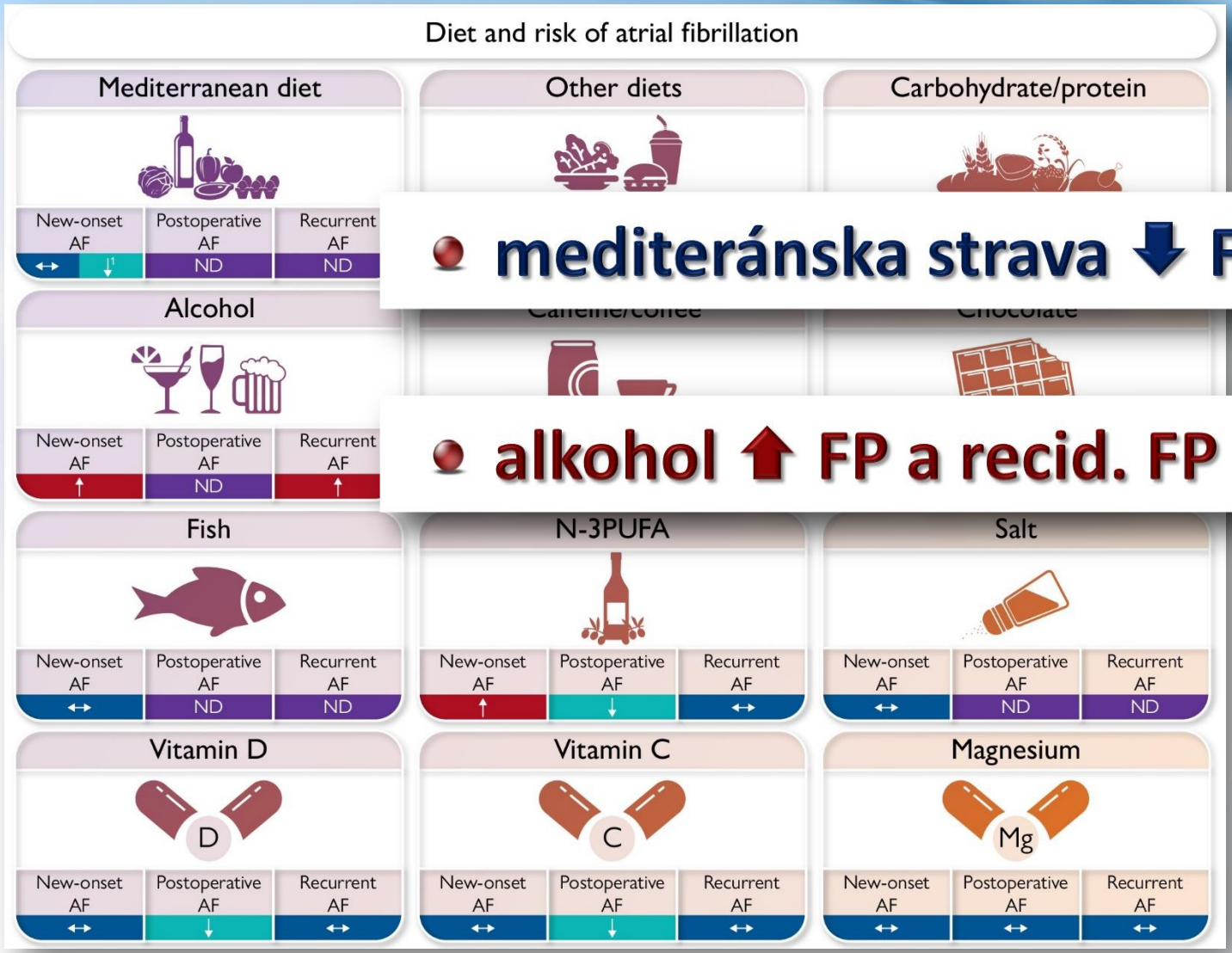
STATE OF THE ART REVIEW

Arrhythmias

Diet and risk of atrial fibrillation: a systematic review

Monika Gawałko, Melissa E. Middeldorp, Arnela Saljic, John Penders, Thomas Jespersen, Christine M. Albert, Gregory M. Marcus, Christopher X. Wong, Prashanthan Sanders, and Dominik Linz

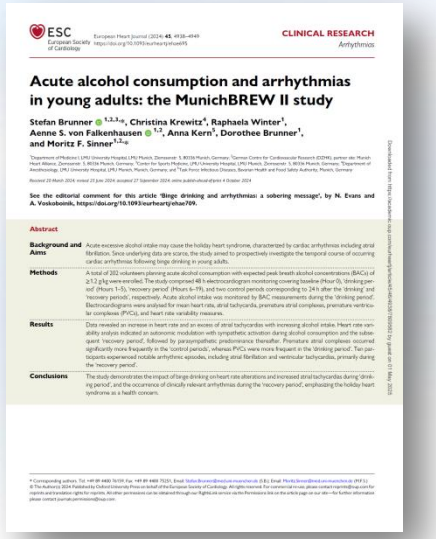
Graphical Abstract



- mediteránska strava ⬇ FP
- alkohol ⬆ FP a recid. FP

Gawałko, M., et al. (2024). Diet and risk of atrial fibrillation: a systematic review. European Heart Journal, 45(40), 4259–4274.

Alkohol a riziko fibrilácie predsiení


ESC European Society of Cardiology — European Heart Journal (2024) 45, 4938–4949 — CLINICAL RESEARCH Arrhythmias

Acute alcohol consumption and arrhythmias in young adults: the MunichBREW II study

Stefan Brunner, Christina Krewitz, Raphaela Winter, Aenne S. von Falkenhausen, Anna Kern, Dorothee Brunner, and Moritz F. Sinner

See the editorial comment for this article 'Binge drinking and arrhythmias: a sobering message', by N. Evans and A. Voskoboinik, https://doi.org/10.1093/eurheartj/ehae709.

Abstract

Background and Aims Acute excessive alcohol intake may cause the holiday heart syndrome, characterized by cardiac arrhythmias including atrial fibrillation. Since underlying data are scarce, the study aimed to prospectively investigate the temporal course of occurring cardiac arrhythmias following binge drinking in young adults.

Methods A total of 202 volunteers planning acute alcohol consumption with expected peak breath alcohol concentrations (BAC) of ≥1.2 g/kg were enrolled. The study comprised 48 h electrocardiogram monitoring covering baseline (Hour 0), 'drinking period' (Hours 1–5), 'recovery period' (Hours 6–19), and two control periods corresponding to 24 h after the 'drinking' and 'recovery periods', respectively. Acute alcohol intake was monitored by BAC measurements during the 'drinking period'. Electrocardiograms were analysed for mean heart rate, atrial tachycardia, premature atrial complexes, premature ventricular complexes (PVCs), and heart rate variability measures.

Results Data revealed an increase in heart rate and an excess of atrial tachycardias with increasing alcohol intake. Heart rate variability analysis indicated an autonomic modulation with sympathetic activation during alcohol consumption and the subsequent 'recovery period', followed by parasympathetic predominance thereafter. Premature atrial complexes occurred significantly more frequently in the 'control periods', whereas PVCs were more frequent in the 'drinking period'. Ten participants experienced notable arrhythmic episodes, including atrial fibrillation and ventricular tachycardias, primarily during the 'recovery period'.

Conclusions The study demonstrates the impact of binge drinking on heart rate alterations and increased atrial tachycardias during 'drinking period', and the occurrence of clinically relevant arrhythmias during the 'recovery period', emphasizing the holiday heart syndrome as a health concern.

Key Question

Acute excessive alcohol intake may cause the Holiday Heart Syndrome, characterized by cardiac arrhythmias including atrial fibrillation. This study prospectively investigated the temporal course of the occurrence of cardiac arrhythmias following binge drinking.

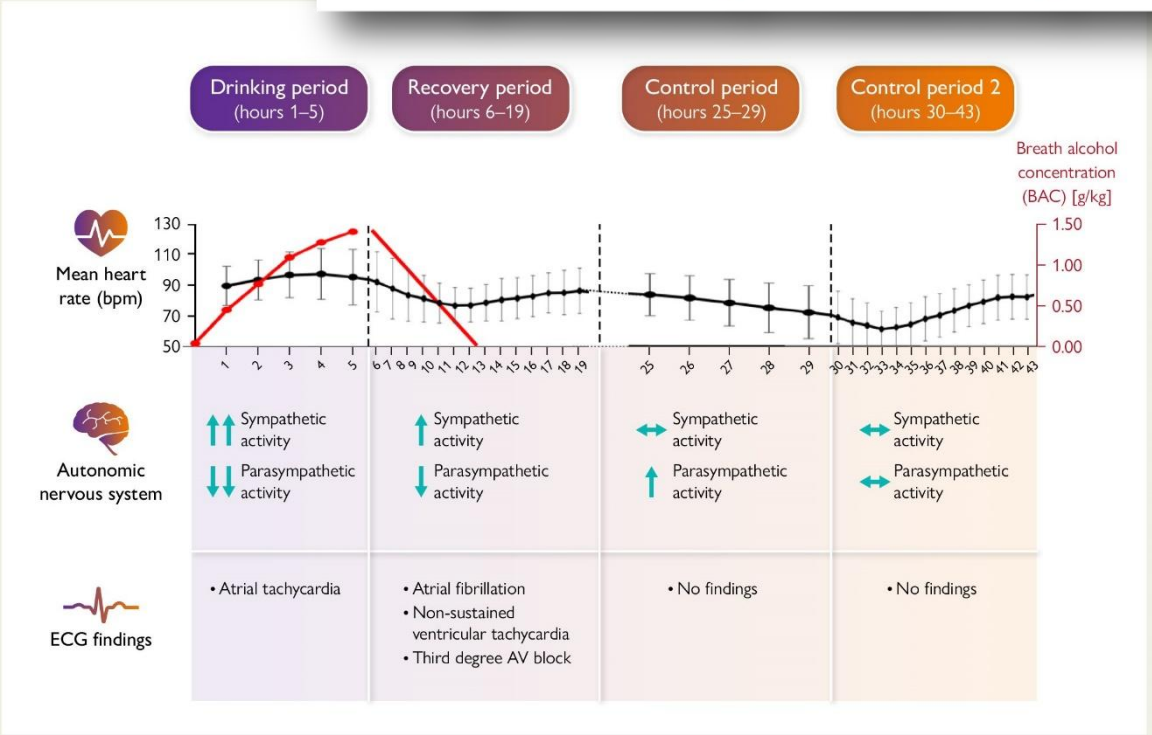
Key Finding

In 202 volunteers planning acute alcohol consumption, alcohol intake increased heart rate and atrial tachycardias. Heart rate variability analysis indicated a modulation of autonomic tone, with sympathetic activation during consumption and recovery. Arrhythmic episodes, including atrial fibrillation and non-sustained ventricular tachycardias, occurred primarily during the recovery period in 5.2% of participants.

Take Home Message

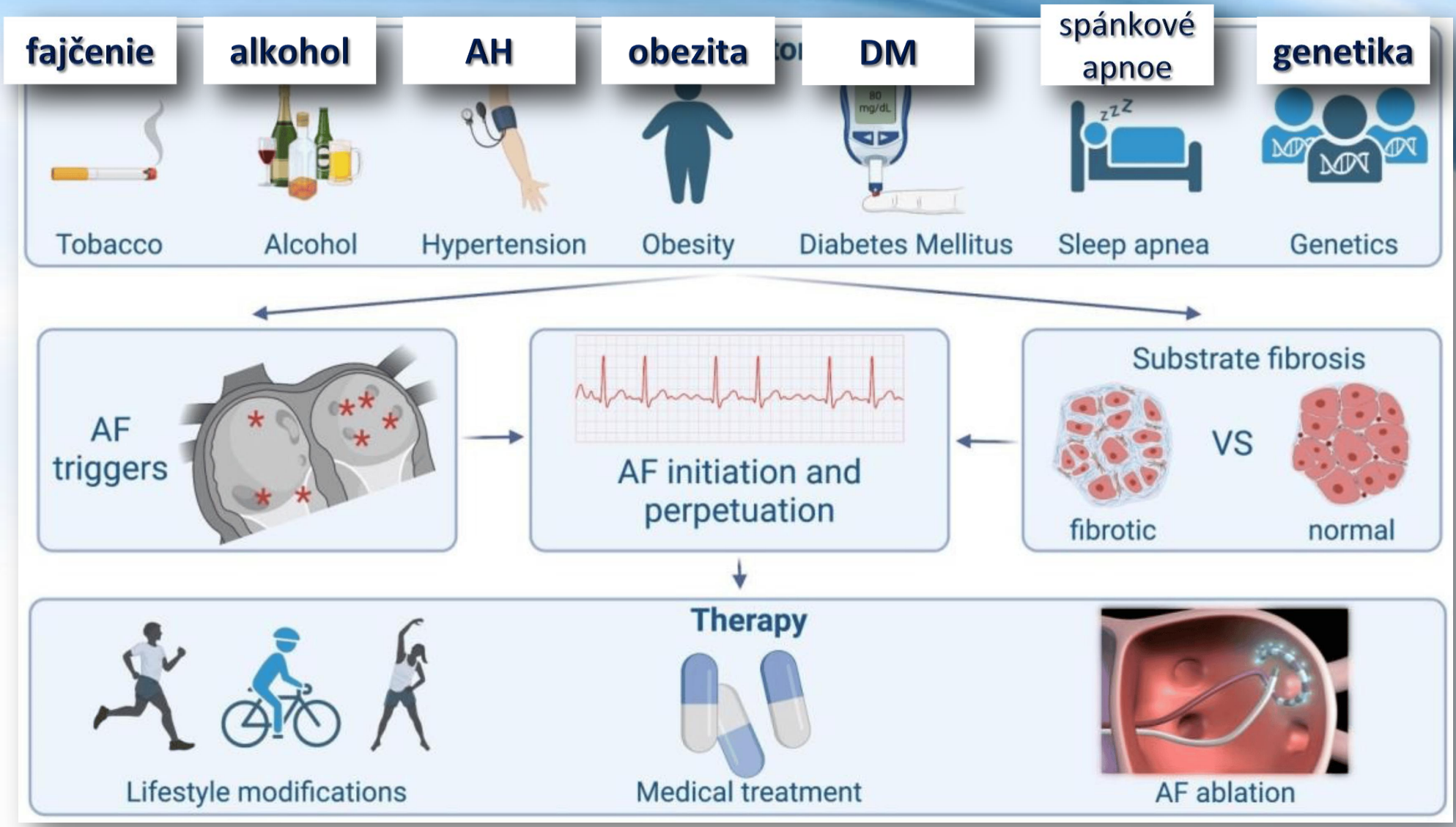
Binge drinking interferes with autonor
relevance of the Holiday Heart Syndro

- „Holiday Heart Syndrome“



Brunner, S., et al. (2024). Acute alcohol consumption and arrhythmias in young adults: the MunichBREW II study. European Heart Journal, 45(46), 4938–4949.

„Tradičné“ riziká fibrilácie predsiení



Leventopoulos, G., et al. (2023). Mechanisms of Atrial Fibrillation: How Our Knowledge Affects Clinical Practice. Life 2023, Vol. 13, Page 1260, 13(6), 1260.

Lieky zvyšujúce riziko fibrilácie predsiení

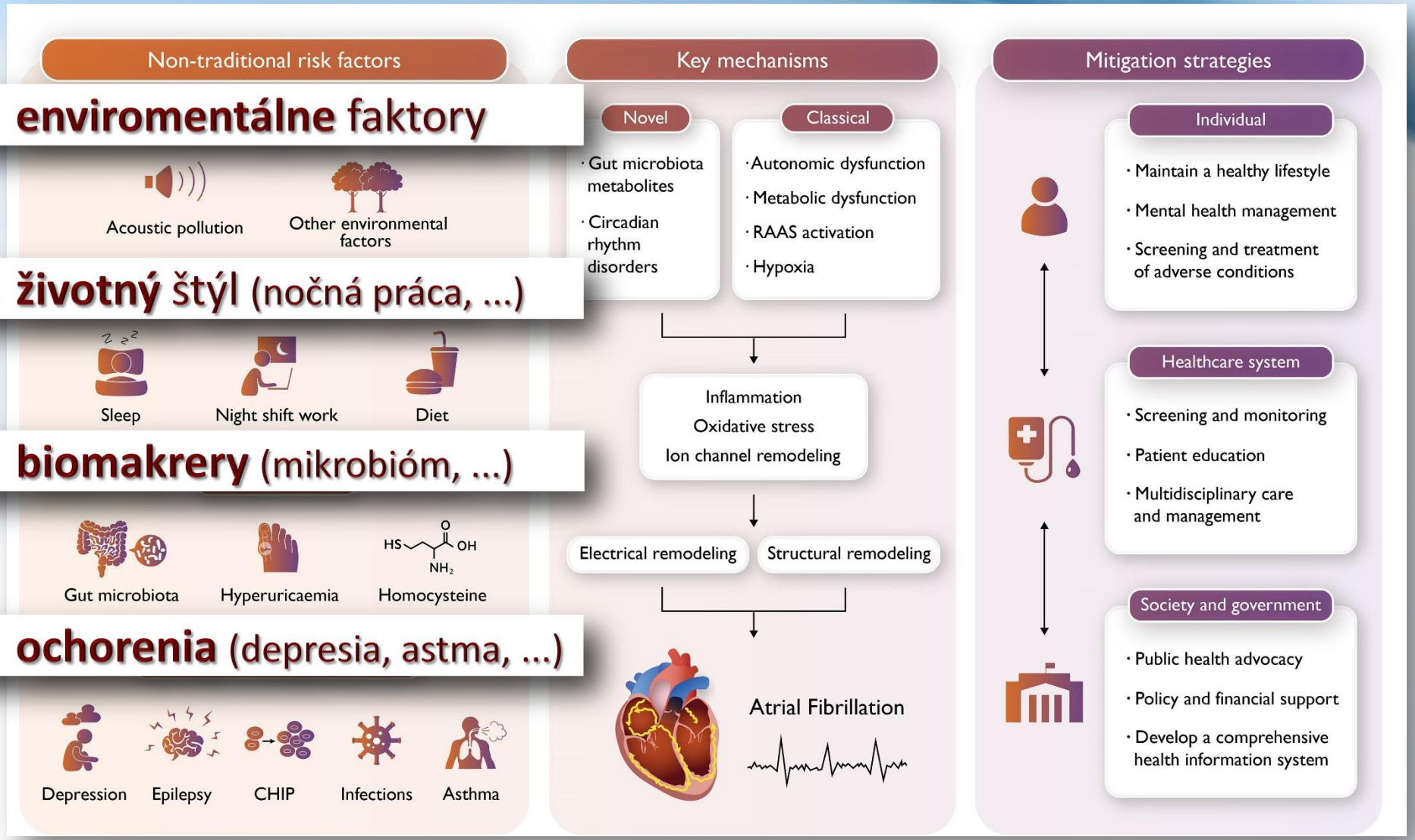
Table 11 Medications associated with risk of incident AF

	Medications
Common (>20%)	Dobutamine,[187] Cisplatin[187,188]
Infrequent (5–20%)	Anthracyclines,[187,188] Melphalan,[187,188] Interleukin-2,[187,188] NSAIDS,[189] Bisphosphonates[190,191]
Rare (<5%)	Adenosine,[187] Corticosteroids,[187] Aminophylline,[187] Antipsychotics,[192] Ivabradine[193] Ondansetron[187]

- **dobutamín, cisplatina**
- NSAIDS, bisfosfonáty, ...
- adenozín, kortikoidy, psychofarmaká, ivabradin, ondasetron, ..
  .

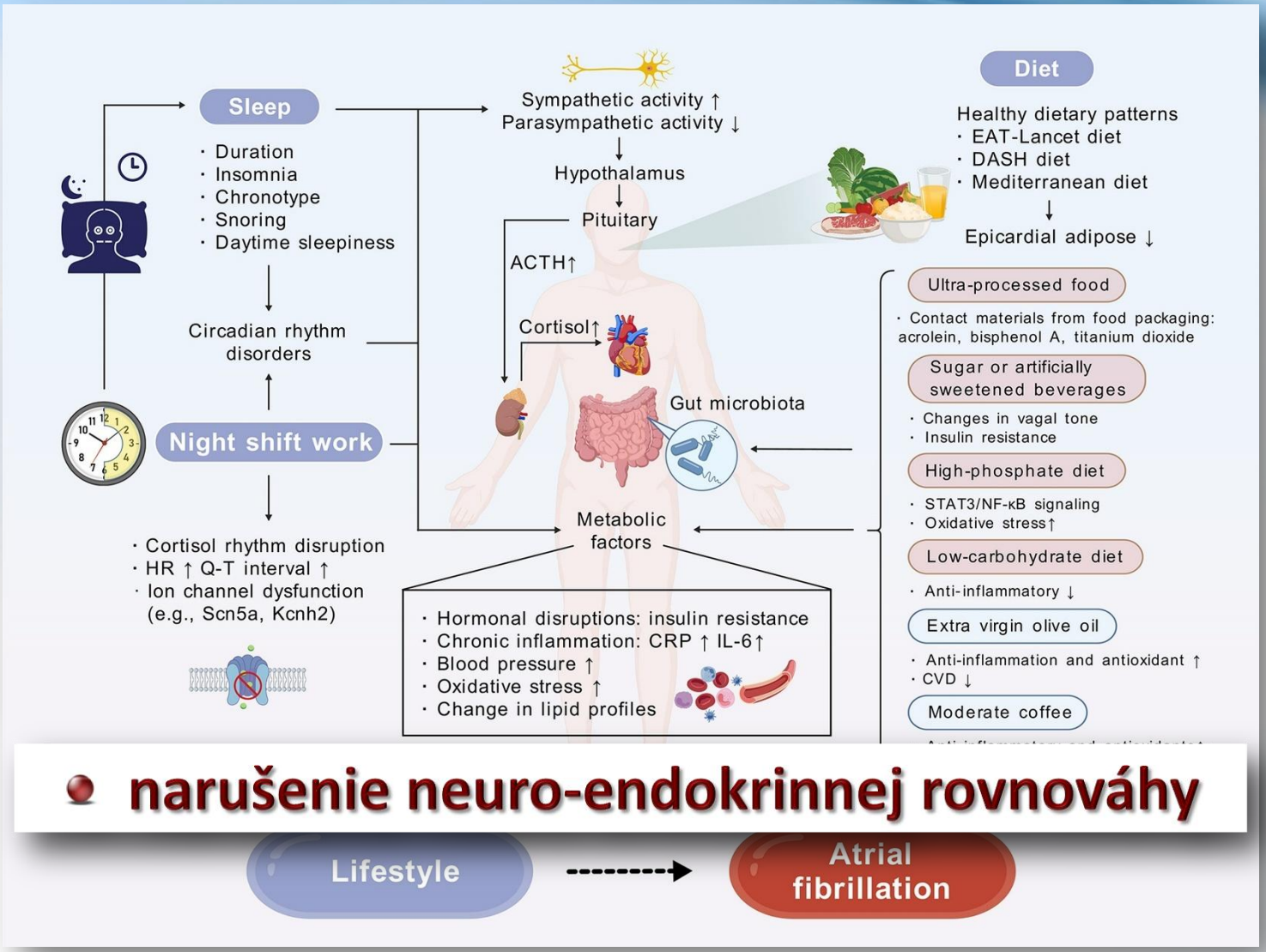
Gorenek, B., et al. (2017). EHRA /EACPR/HRS/ APHRS position paper on how to prevent atrial fibrillation. EP Europace, 19(2), 190–225. https://doi.org/10.1093/EUROPACE/EUW242

„NE-tradičné“ riziká fibrilácie predsiení



Lu, Y., et al. (2025). Non-traditional risk factors for atrial fibrillation: epidemiology, mechanisms, and strategies. European Heart Journal, 2025;46(9), 784–804.

„NE-tradičné“ riziká fibrilácie predsiení



Lu, Y., et al. Non-traditional risk factors for atrial fibrillation: epidemiology, mechanisms, and strategies. European Heart Journal, 46(9), 784–804.

Prevencia fibrilácie predsienní ☛ odkaz do praxe

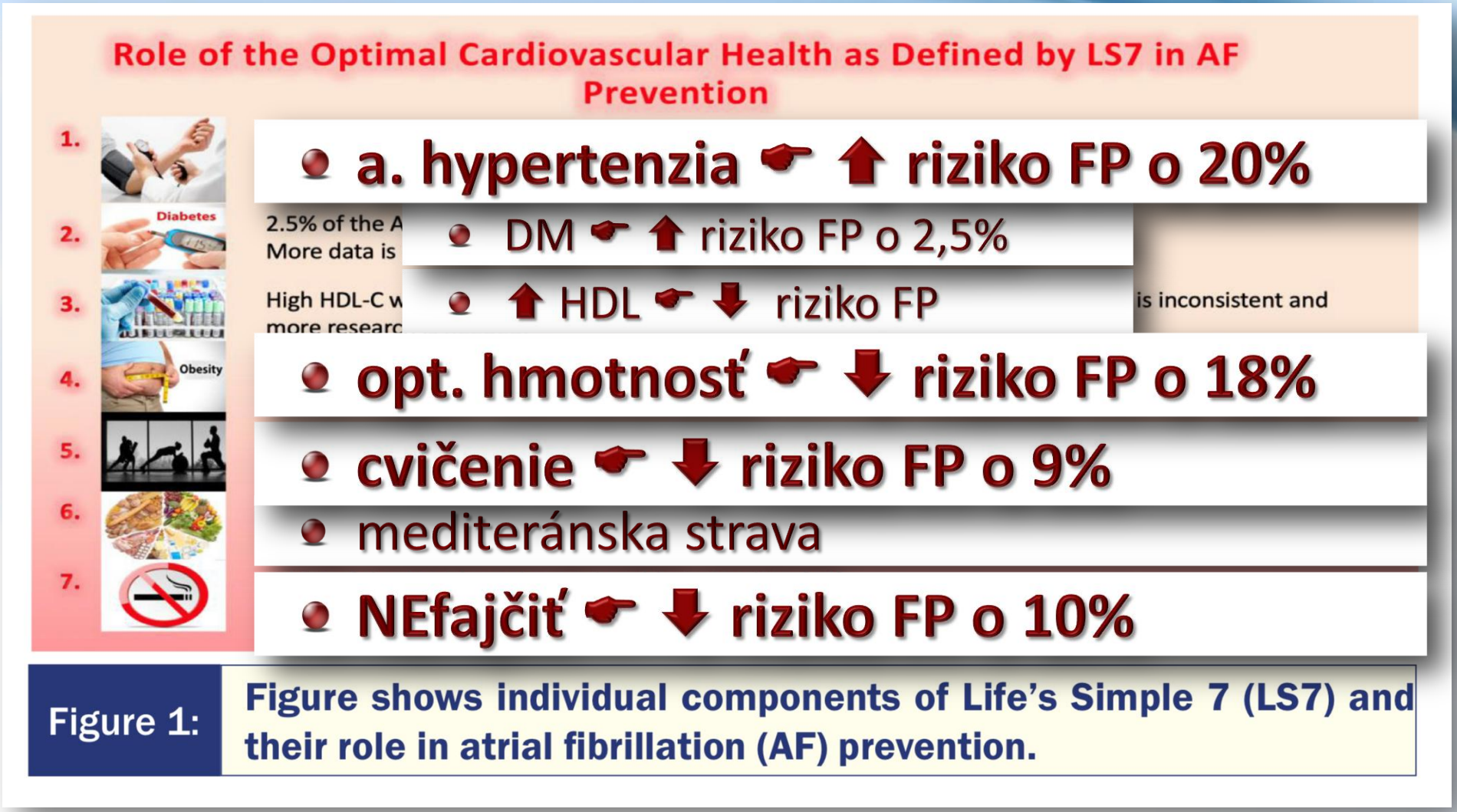


Figure 1: Figure shows individual components of Life's Simple 7 (LS7) and their role in atrial fibrillation (AF) prevention.

Isakadze, N., et al. (2018). Life's simple 7 approach to atrial fibrillation prevention. Journal of Atrial Fibrillation, 11(3).

Ďakujem za pozornosť