



Je srdcové zlyhávanie preventabilné ochorenie?

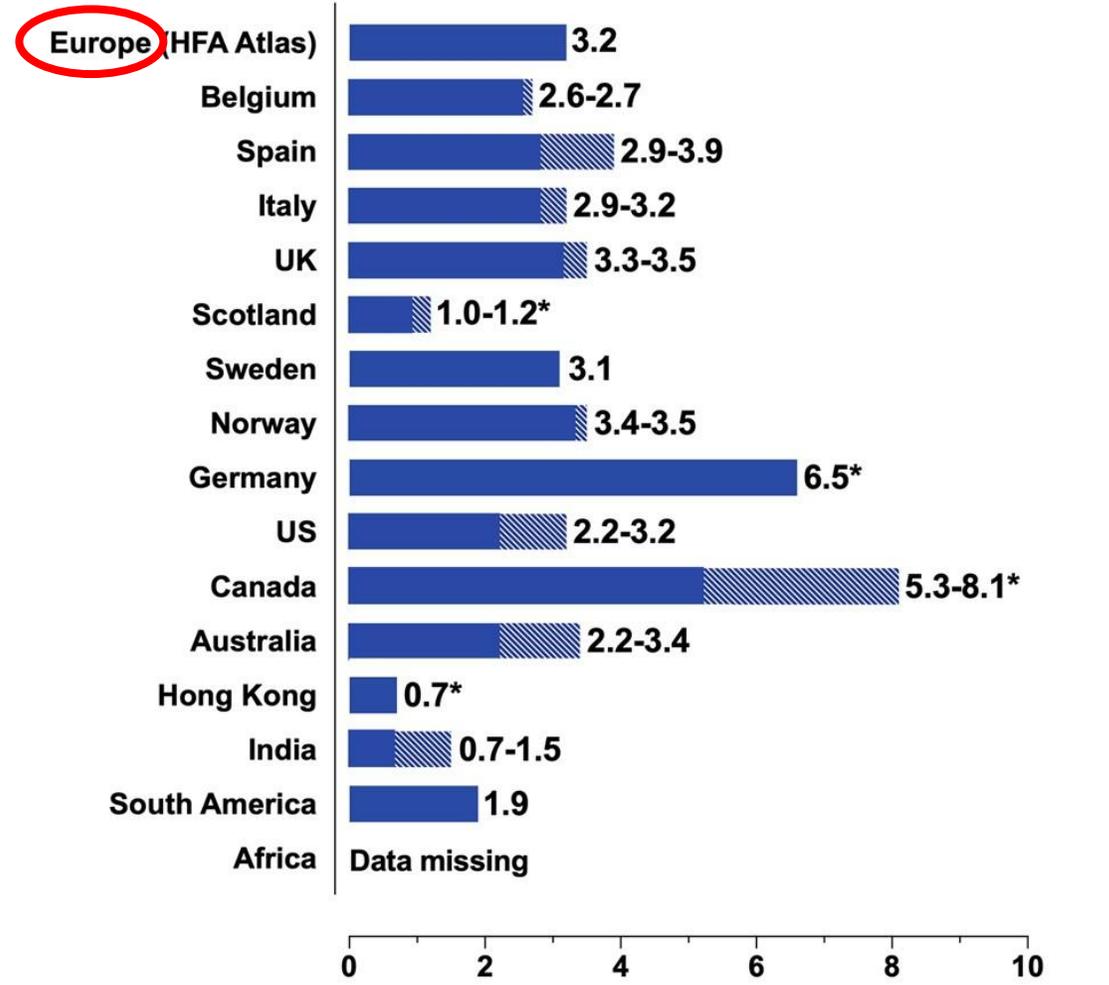
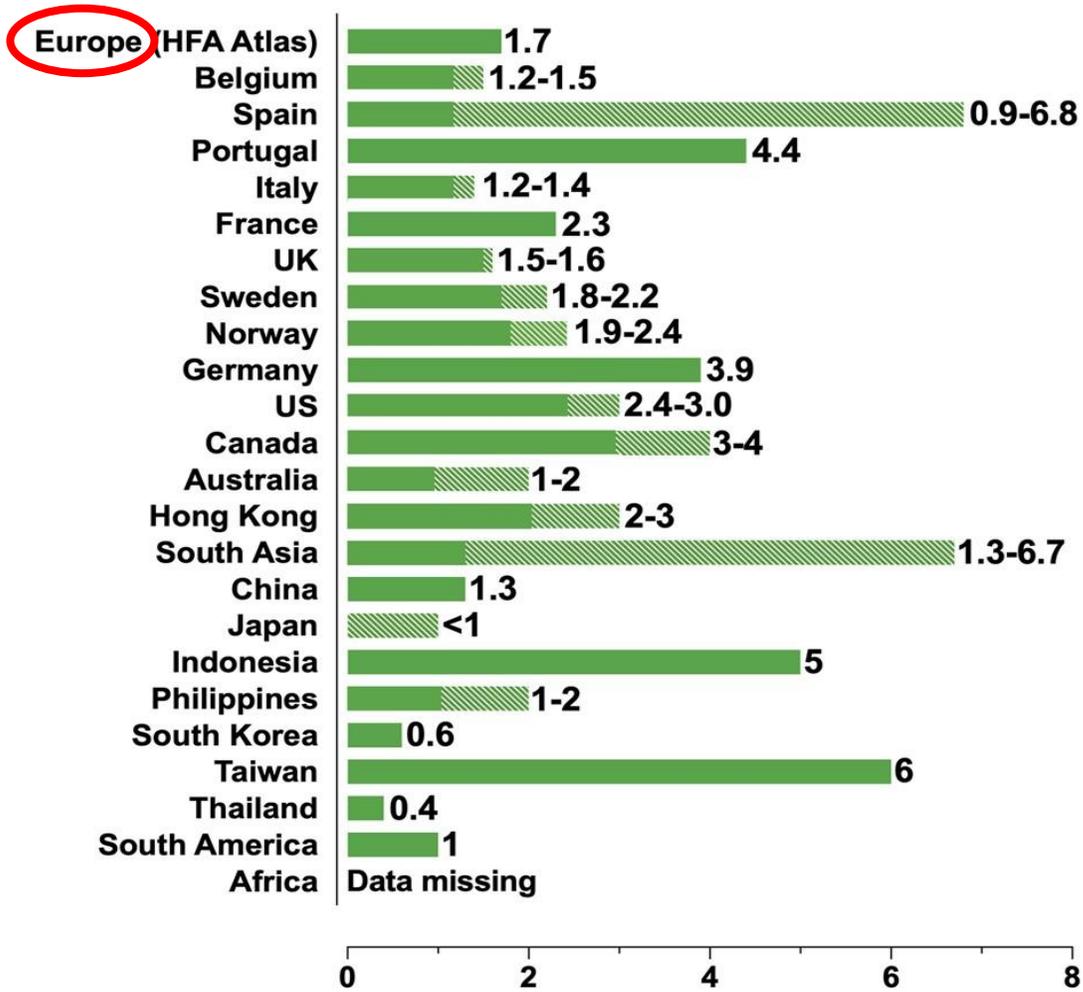
Ivana Šoóšová

NÚSCH, a.s. Bratislava

**BLOK
SLOVENSKEJ
KARDIOLOGICKEJ
SPOLOČNOSTI**



~ 26 miliónov ľudí s dg SZ celosvetovo



Srdcové zlyhávanie podľa EF ĽK

EF ĽK

≤ 40 %

SZ s redukovanou EF
(HFrEF)

41 – 49 %

SZ s mierne
redukovanou EF
(HFmrEF)

≥ 50 %

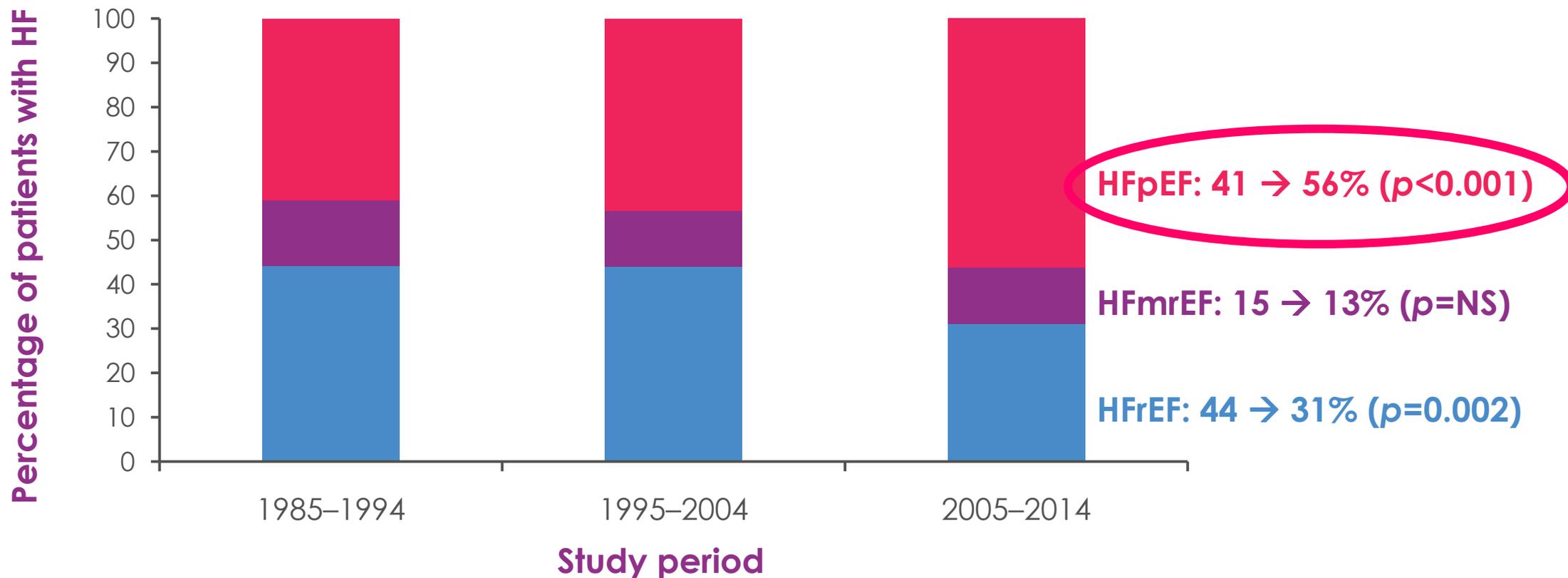
SZ so zachovanou EF
(HFpEF)



SZ so zlepšenou EF ĽK (HFimpEF)
Pôvodne EF ĽK ≤ 40% následne vzostup
EF ĽK aspoň o 10% a nad 40%

Podiel pacientov s HFpEF sa zvyšuje

Framingham study participants with new-onset HF (n=894) over 3 decades



HF, heart failure; HFmrEF, heart failure with mildly reduced ejection fraction; HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction; NS, not significant.

Pacienti so srdcovým zlyhávaním so zachovanou EF



- SZ je najčastejšou príčinou hospitalizácie u pacientov nad 65 rokov²
- viac ako 50% pacientov so SZ trpí HFpEF a tento podiel sa výrazne zvyšuje³
- cca 30% pacientov, ktorí sú hospitalizovaní kvôli HFpEF zomrie do 1 roka⁴

Štádiá srdcového zlyhávania

ACC/AHA/HFSA four stages of Heart Failure

Stage A "At risk"

- *Diabetes*
- *Obesity*
- *Hypertension*
- *Atherosclerotic CVD*
- *Exposure to cardiotoxic agents*
- *Genetic variant for cardiomyopathy*
- *Positive family history of cardiomyopathy*

Stage B "Pre-Heart Failure"

- Asymptomatic with evidence of*
1. *Structural heart disease*
 2. *Raised filling pressures*
 3. *Raised cardiac biomarkers (in the absence of alternative diagnosis)*

Stage C "Symptomatic"

Evidence of structural heart disease with current/previous symptoms of heart failure.

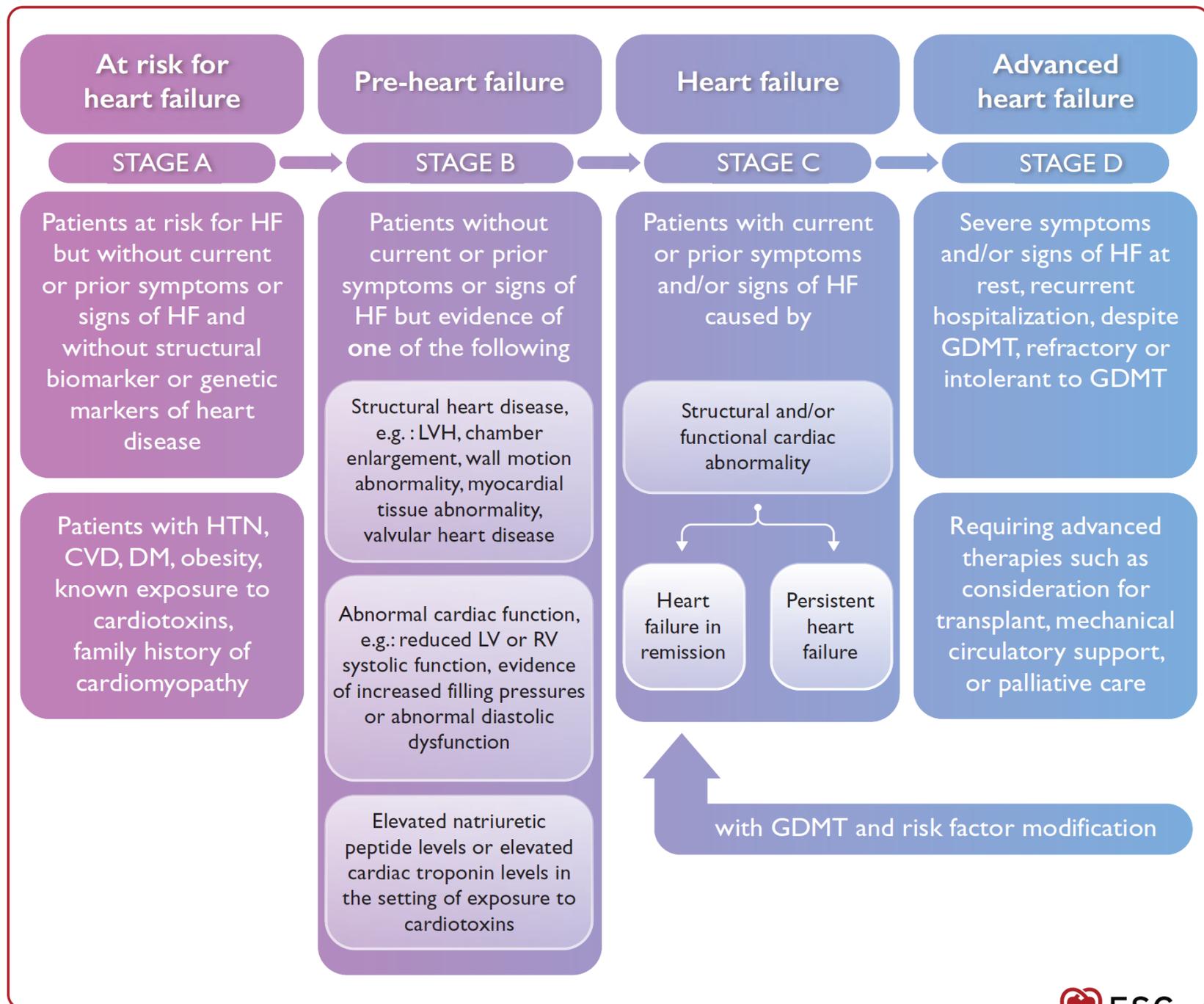
Stage D "End-stage"

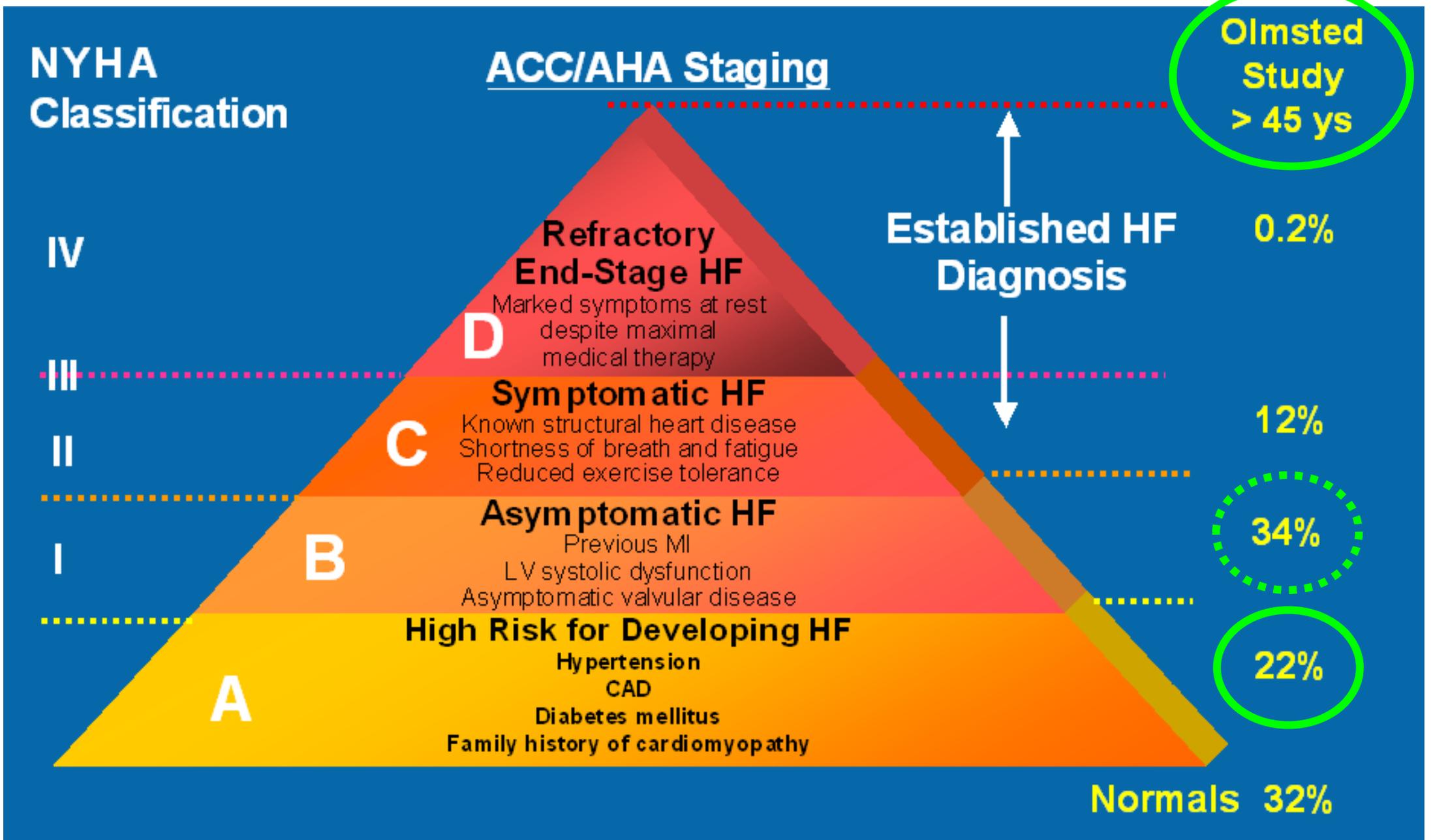
Marked symptoms and recurrent heart failure hospitalisations despite maximally tolerated guideline directed therapy.

Prevenca a liečba SZ

Bozkurt B, et al. Universal definition and classification of heart failure: a report of the Heart Failure Society of America, Heart Failure Association of the European Society of Cardiology, Japanese Heart Failure Society and Writing Committee of the Universal Definition of Heart Failure: Endorsed by the Canadian Heart Failure Society, Heart Failure Association of India, Cardiac Society of Australia and New Zealand, and Chinese Heart Failure Association. *Eur J Heart Fail* 2021;23:352380.

European Heart Journal (2021) 00, 142
ESC GUIDELINES
doi:10.1093/eurheartj/ehab368
Supplementary data





Rizikové faktory SZ

Kardiovaskulárne

- Artériová hypertenzia
- Koronárna choroba
- Arytmie
- Chlopňové chyby
- Genetická predispozícia KMP
- Familiárna KMP

Metabolické, hormonálne a iné

- Diabetes mellitus
- Obezita
- HLP
- CKD
- Sleep apnoe syndróm
- Gravidita
- Thyreopatia
- Pľúcne ochorenia
- Infekcie
- Anémia
- Kardiotoxické lieky

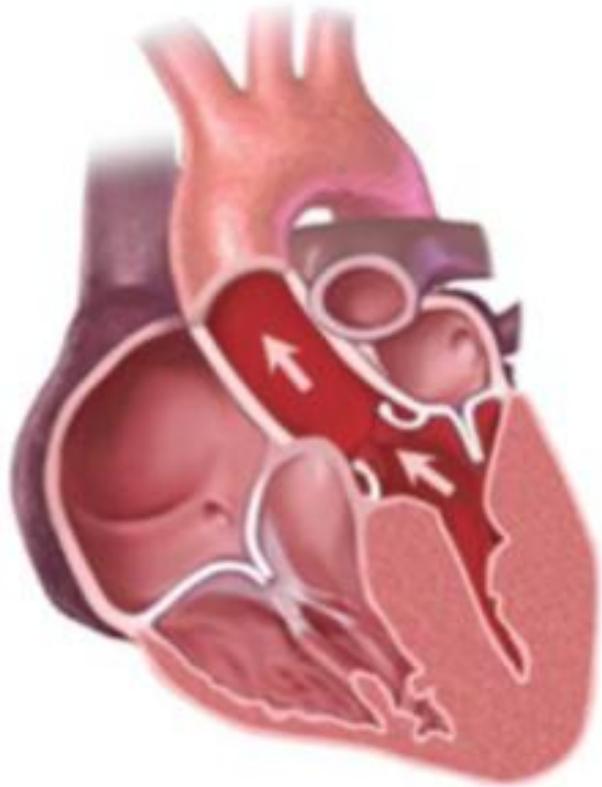
Faktory životného štýlu

- Fajčenie
- Alkohol
- Nedostatok fyzickej aktivity
- Nevhodná strava
- Nadmerný energetický príjem
- Non-compliance k liečbe

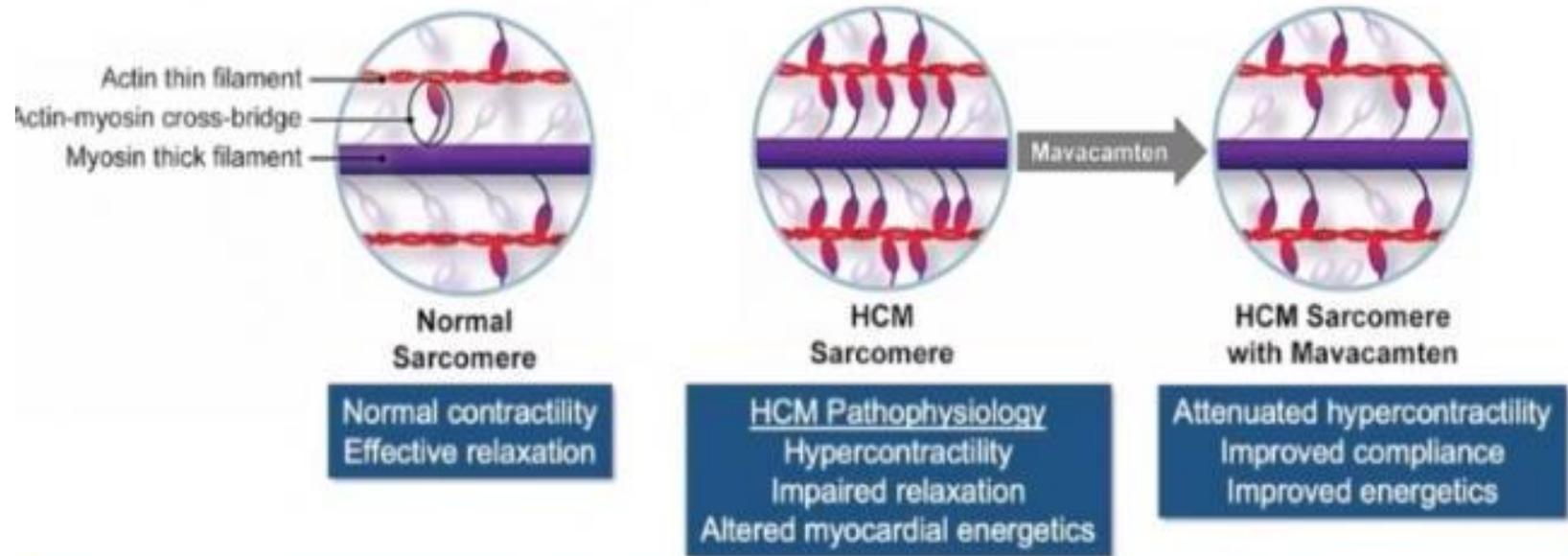
Neovplyviteľné

- Vek (> 65 rokov)
- Ženské pohlavie

Hypertrofická KMP



Mavacamten: Mechanism of Action



Mavacamten is a targeted inhibitor of cardiac myosin that reduces the number of myosin-actin cross-bridges and decreases contractility



Vakcinácia

Cardiac risk factors and prevention



ORIGINAL ARTICLE

Acute myocardial infarction and influenza: a meta-analysis of case-control studies

Michelle Barnes, Anita E Heywood, Abela Mahimbo, Bayzid Rahman, Anthony T Newall, C Raina Macintyre

1738



Barnes M, et al. *Heart* 2015;101:1738–1747. doi:10.1136/heartjnl-2015-307691

BMJ

Review



Influenza vaccine as a coronary intervention for prevention of myocardial infarction

C Raina MacIntyre,^{1,2} Abela Mahimbo,¹ Aye M Moa,¹ Michelle Barnes¹

BMJ

MacIntyre CR, et al. *Heart* 2016;102:1953–1956. doi:10.1136/heartjnl-2016-309983



1953

Table 10 Risk factors for the development of heart failure and potential corrective actions

Risk factors for heart failure	Preventive strategies
Sedentary habit	Regular physical activity
Cigarette smoking	Cigarette smoking cessation
Obesity	Physical activity and healthy diet
Excessive alcohol intake ²⁸⁶	General population: no/light alcohol intake is beneficial Patients with alcohol-induced CMP should abstain from alcohol
Influenza	<u>Influenza vaccination</u>
Microbes (e.g. <i>Trypanosoma cruzi</i> , Streptococci)	Early diagnosis, specific antimicrobial therapy for either prevention and/or treatment
Cardiotoxic drugs (e.g., anthracyclines)	Cardiac function and side effect monitoring, dose adaptation, change of chemotherapy
Chest radiation	Cardiac function and side effect monitoring, dose adaptation
Hypertension	Lifestyle changes, antihypertensive therapy
Dyslipidaemia	Healthy diet, statins
Diabetes mellitus	Physical activity and healthy diet, SGLT2 inhibitors
CAD	Lifestyle changes, statin therapy

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2024 ESC Guidelines for the management of chronic coronary syndromes

Developed by the task force for the management of chronic coronary syndromes of the European Society of Cardiology (ESC)

Endorsed by the European Association for Cardio-Thoracic Surgery (EACTS)

Authors/Task Force Members: Christiaan Vrints *[†], (Chairperson) (Belgium), Felicità Andreotti *[†], (Chairperson) (Italy), Konstantinos C. Koskinas[‡], (Task Force Co-ordinator) (Switzerland), Xavier Rossello [‡], (Task Force Co-ordinator) (Spain), Marianna Adamo  (Italy), James Ainslie (United Kingdom), Adrian Paul Banning  (United Kingdom), Andrzej Budaj  (Poland), Ronny R. Buechel  (Switzerland), Giovanni Alfonso Chiariello  (Italy), Alaide Chieffo  (Italy), Ruxandra Maria Christodorescu  (Romania), Christi Deaton  (United Kingdom), Torsten Doenst ¹ (Germany), Hywel W. Jones (United Kingdom), Vijay Kunadian  (United Kingdom), Julinda Mehilli  (Germany), Milan Milojevic ¹ (Serbia), Jan J. Piek  (Netherlands), Francesca Pugliese  (United Kingdom), Andrea Rubboli  (Italy), Anne Grete Semb  (Norway), Roxy Senior  (United Kingdom), Jurrien M. ten Berg  (Netherlands), Eric Van Belle  (France), Emeline M. Van Craenenbroeck  (Belgium), Rafael Vidal-Perez  (Spain), Simon Winther  (Denmark), and ESC Scientific Document Group

Table 7 Practical advice on lifestyle counselling and interventions

Topic	Recommendation and treatment goals in patients with established CCS
Lifestyle counselling	
Immunization	<ul style="list-style-type: none"> • Vaccination against influenza, pneumococcal disease and other widespread infections, e.g. COVID-19
Sleep quality	<ul style="list-style-type: none"> • Treat sleep-related breathing disorders
Sexual activity	<ul style="list-style-type: none"> • Males and females: low risk for stable patients who are not symptomatic at low-to-moderate activity levels • Males: PDE-5 inhibitors are generally safe, not to be taken in combination with nitrate medications because of risk of severe hypotension
Psychosocial aspects	<ul style="list-style-type: none"> • Avoid psychosocial stress • Treat depression and anxiety by psychological or pharmacological interventions
Environment/pollution	<ul style="list-style-type: none"> • Avoid passive smoking • Reduce environmental noise • Avoid exposure to air pollution

Oral Health and Cardiovascular Disease



Steven Hopkins, MD,^b Saivaroon Gajagowni, MD,^b Yusuf Qadeer, MD,^b Zhen Wang, PhD,^{c,d} Salim S. Virani, MD,^{e,f} Jukka H. Meurman, MD, PhD, Dr Odont,^g Chayakrit Krittanawong, MD^a

^aCardiology Division, NYU Langone Health and NYU School of Medicine, New York, NY; ^bDepartment of Medicine, Baylor College of Medicine, Houston, Texas; ^cRobert D. and Patricia E. Kern Center for the Science of Health Care Delivery; ^dDivision of Health Care Policy and Research, Department of Health Sciences Research, Mayo Clinic, Rochester, Minn; ^eSection of Cardiology and Cardiovascular Research, Department of Medicine, Baylor College of Medicine, Houston, Texas; ^fOffice of the Vice Provost (Research), The Aga Khan University, Karachi, Pakistan; ^gDepartment of Oral and Maxillofacial Diseases, Institute of Dentistry, Helsinki University Central Hospital, University of Helsinki, Finland.

RESEARCH

Oral hygiene, mouthwash usage and cardiovascular mortality during 18.8 years of follow-up

Sok-Ja Janket,^{*1} Caitlyn Lee,² Markku Surakka,³ Tejasvini G. Jangam,⁴ Thomas E. Van Dyke,¹ Alison E. Baird⁵ and Jukka H. Meurman⁶

Key points

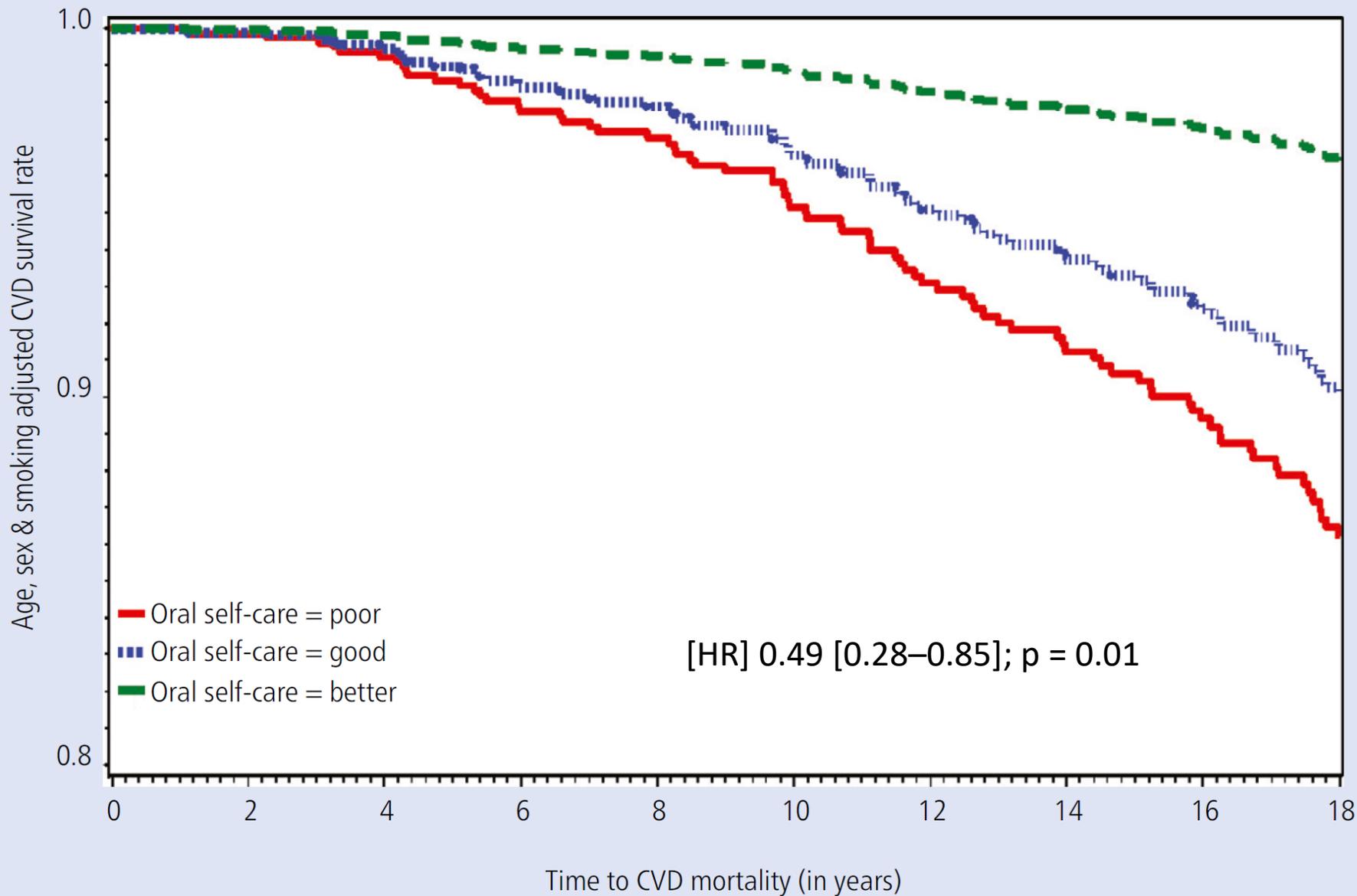
Good oral hygiene self-care (OHS) that encompasses both brushing and flossing was associated with significantly lower risk of cardiovascular mortality compared with poor OHS during a median follow-up of 18.8 years.

The patients who had coronary artery disease at baseline also experienced a marginally significant decrease in the risk of cardiovascular mortality with good OHS ($p = 0.07$).

The additional use of mouthwash with OHS did not influence the risk of cardiovascular mortality.



Ústna hygiena a KV mortalita



denne zubná kefka + zubná niť

denne zubná kefka

žiadne /občasné čistenie zubov

RESEARCH

Open Access



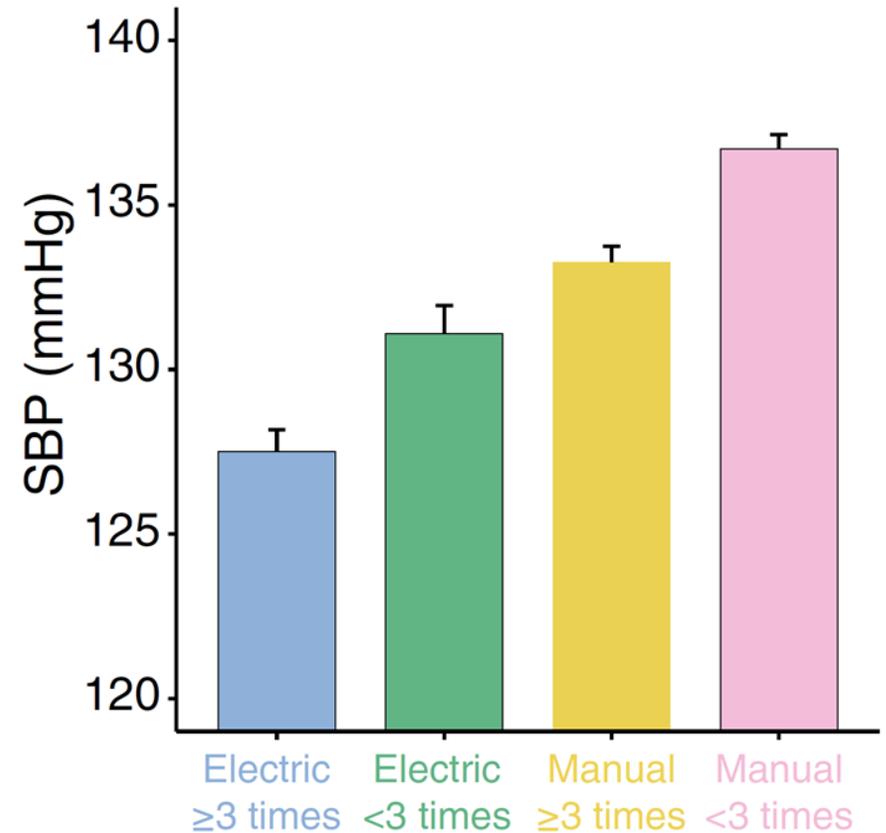
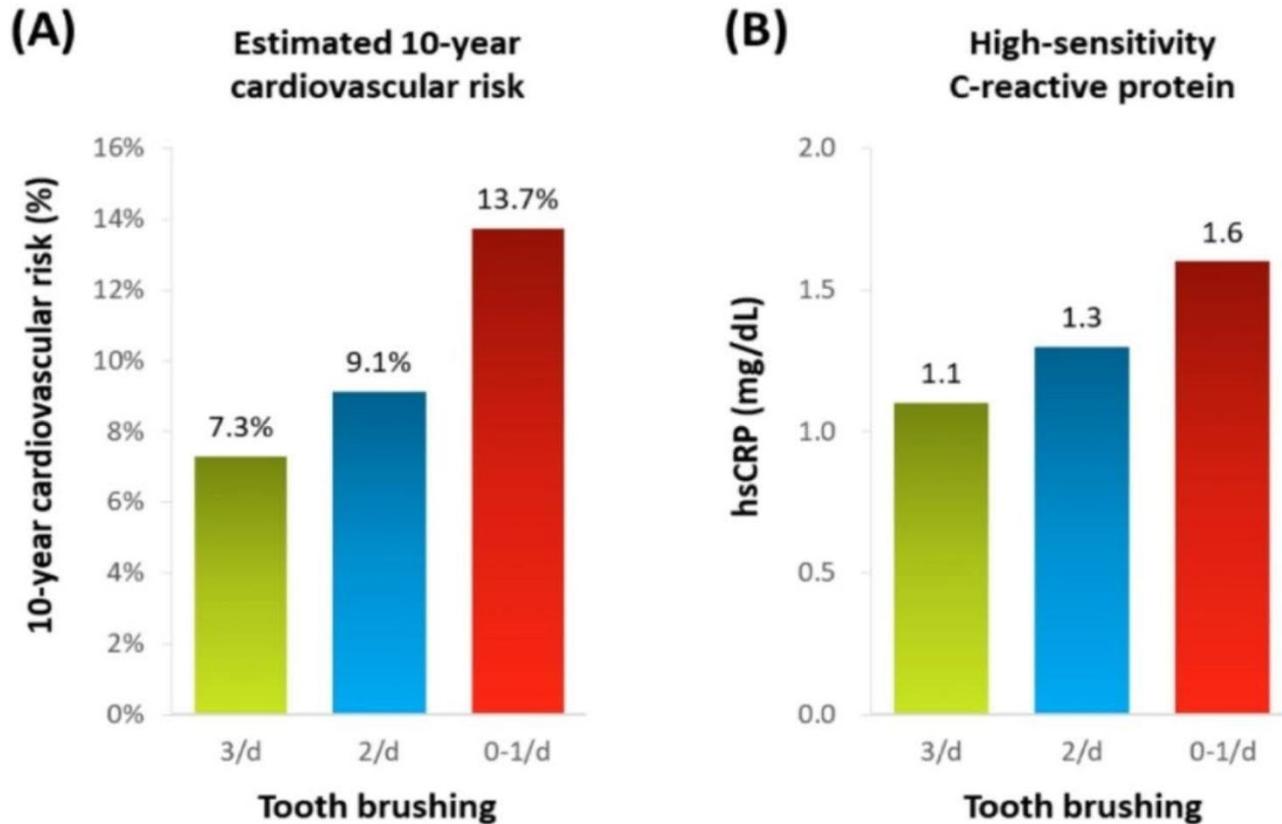
Association between toothbrushing and cardiovascular risk factors: a cross-sectional study using Korean National Health and Nutrition Examination Survey 2015–2017

Mi-Gil Moon^{1,2†}, Si-Hyuck Kang^{1,2†}, Sun-Hwa Kim¹, Shin-Young Park^{3,4*}, Yang-Jo Seol⁵, Chang-Hwan Yoon^{1,2}, Hyo-Jung Lee⁶, Tae-Jin Youn^{1,2}, In-Ho Chae^{1,2}, Yago Leira⁷, Eva Munoz-Aguilera⁷ and Francesco D'Aiuto⁷

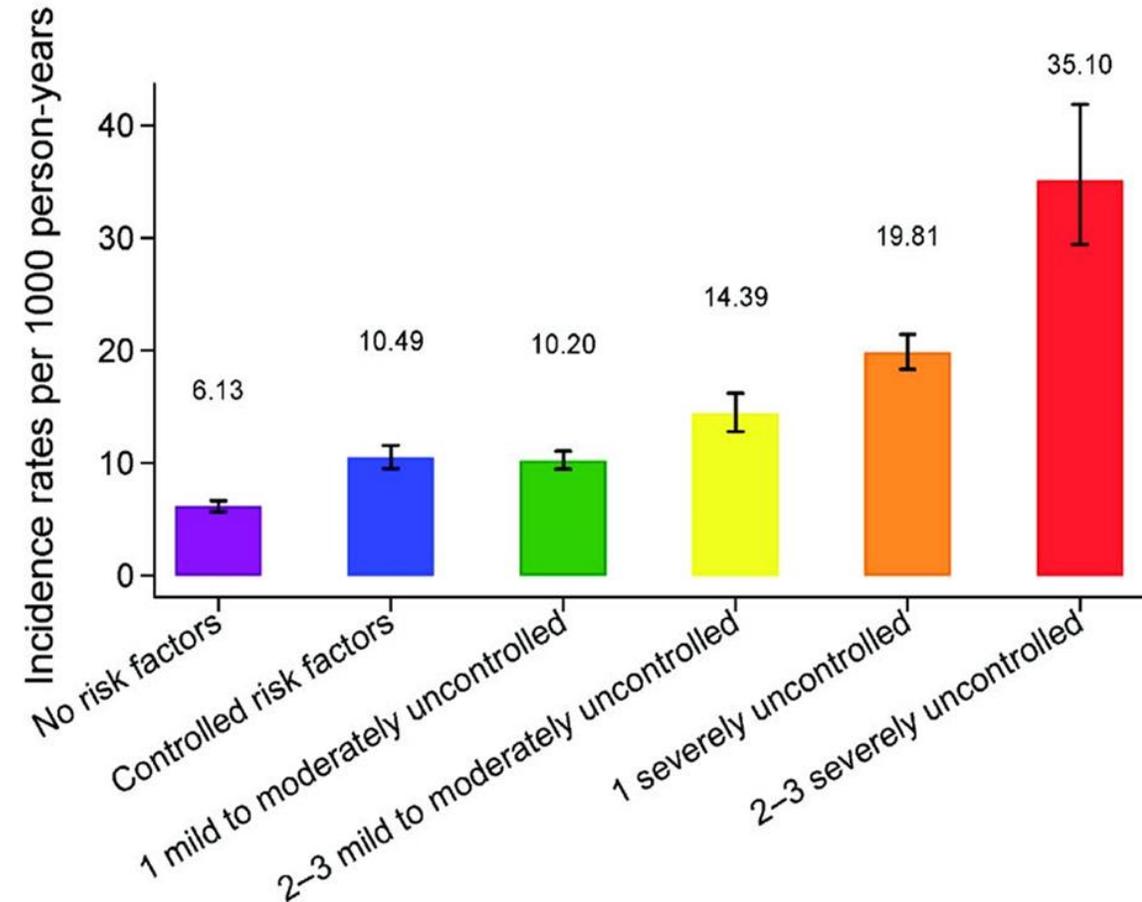
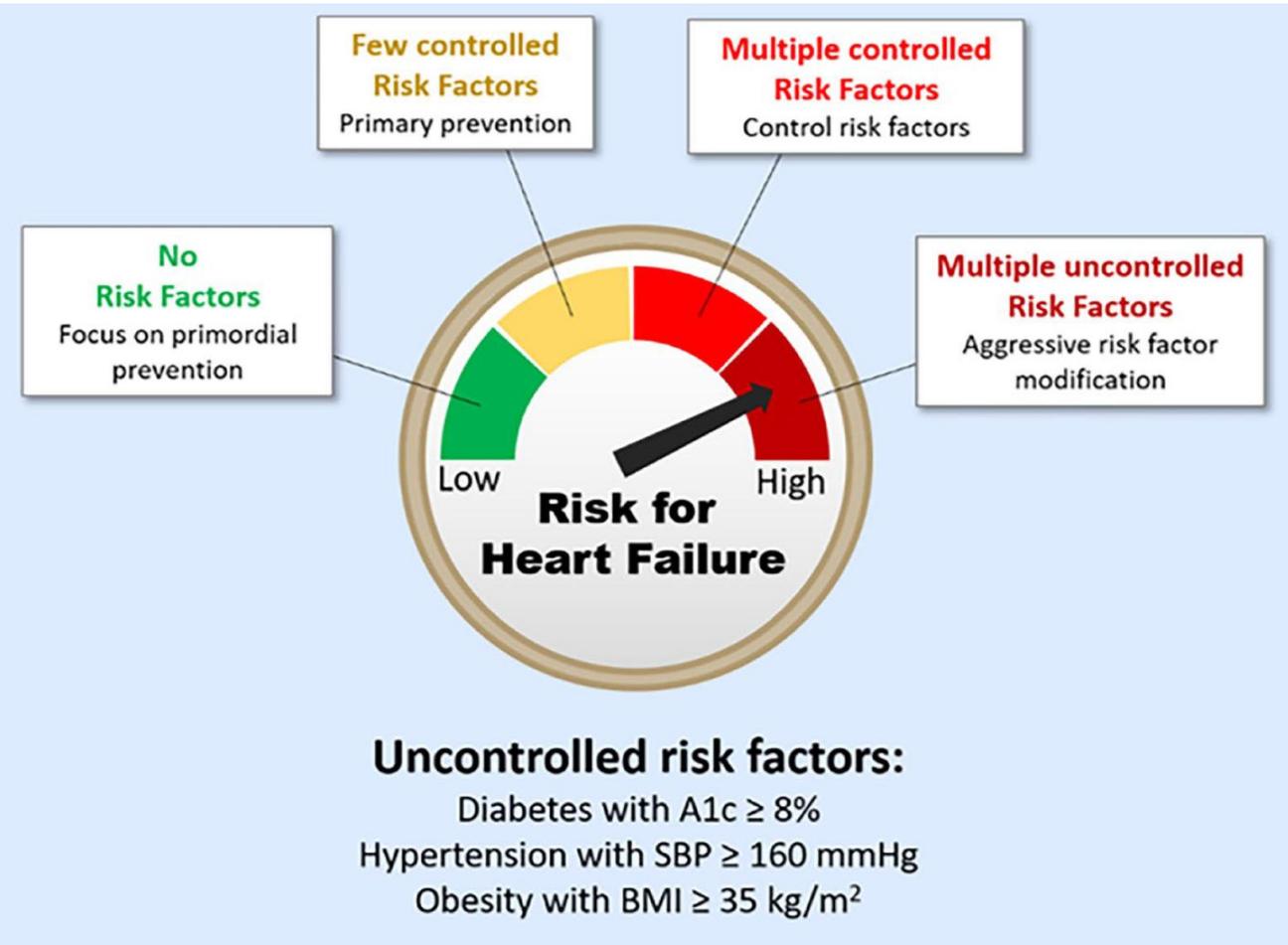
ORIGINAL ARTICLE

Home oral hygiene is associated with blood pressure profiles: Results of a nationwide survey in Italian pharmacies

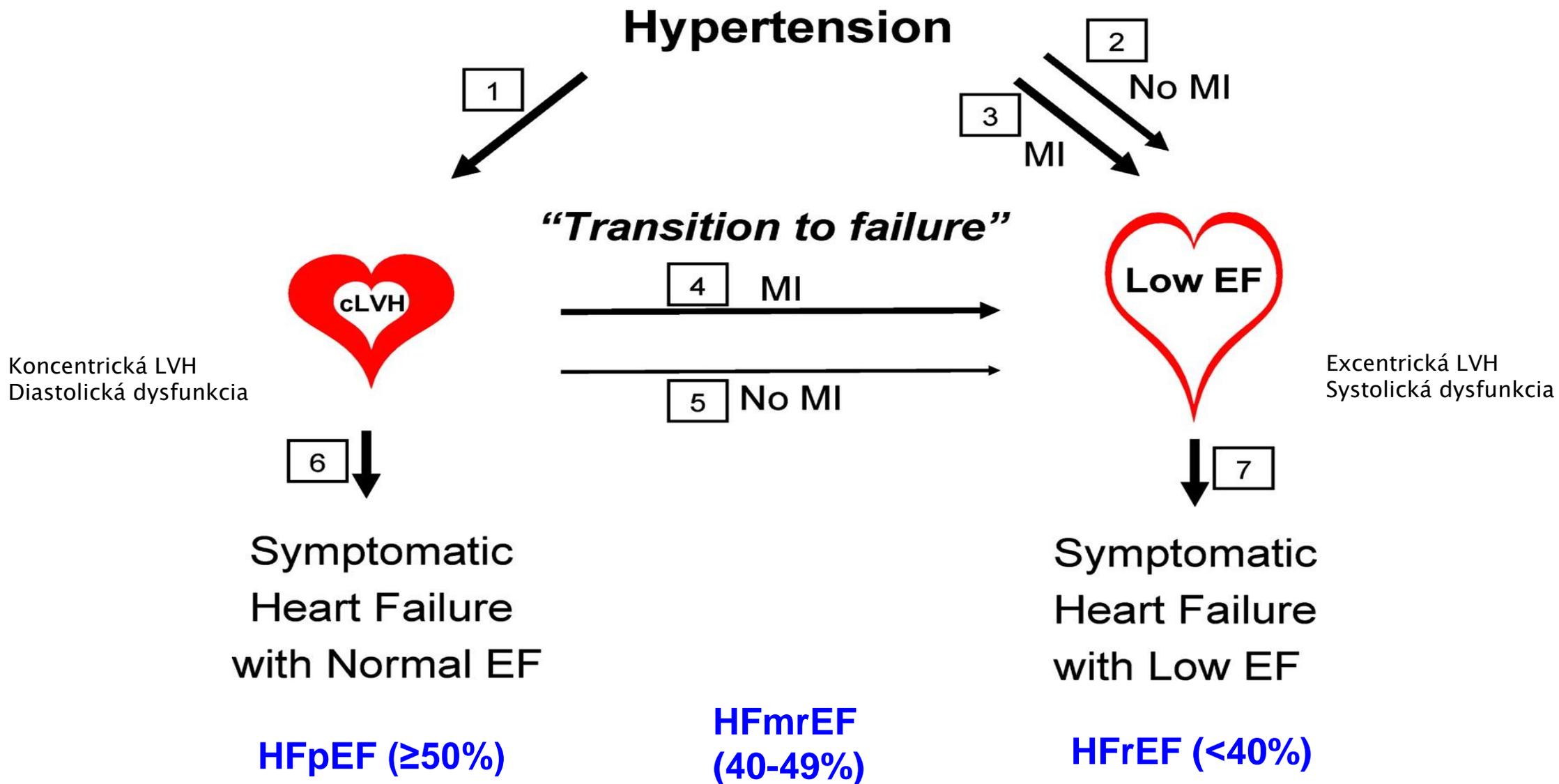
Rita Del Pinto^{1,2,3,4,5} | Davide Pietropaoli^{1,3,4,6} | Guido Grassi^{7,8} |
Maria Lorenza Muiasan^{9,8} | Annalisa Monaco^{1,4,6} | Marco Cossolo¹⁰ |
Alfredo Procaccini¹⁰ | Claudio Ferri^{1,2,4,8}



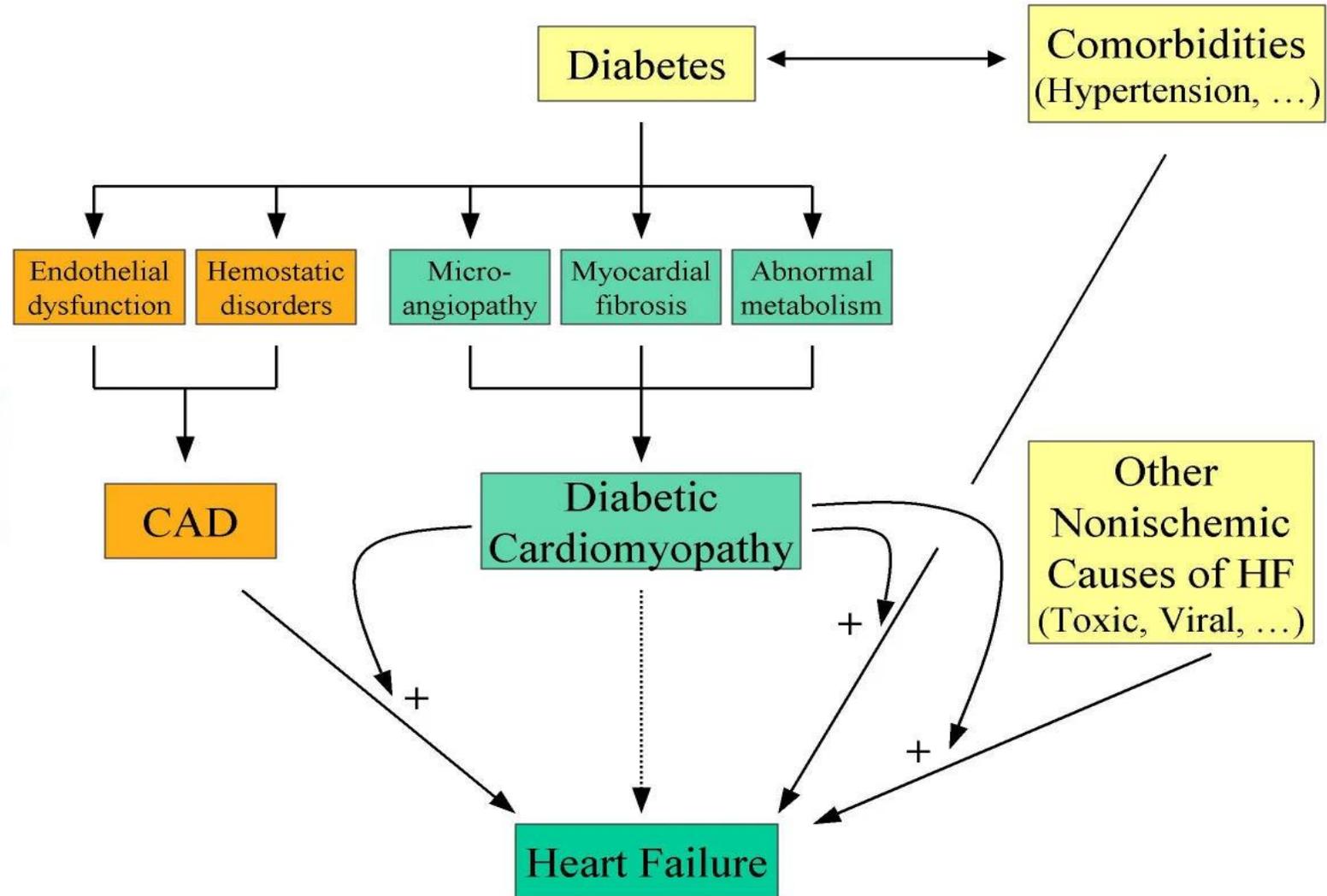
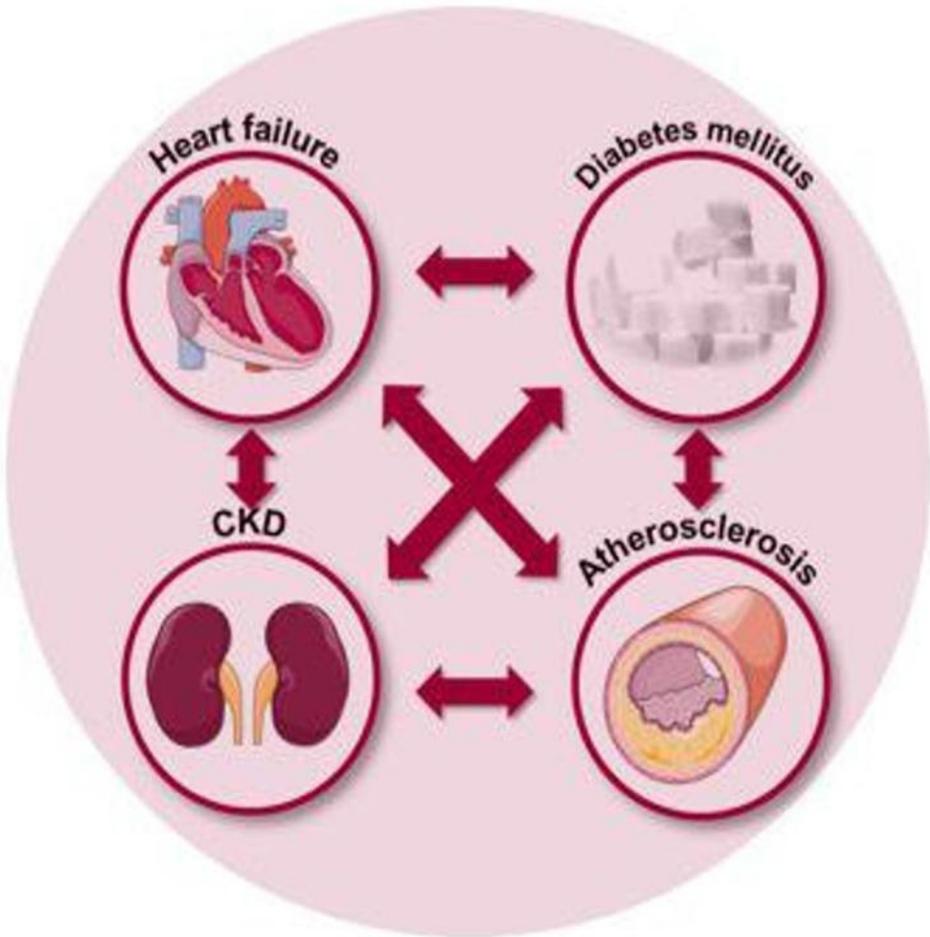
Modifikovateľné RF a vznik SZ



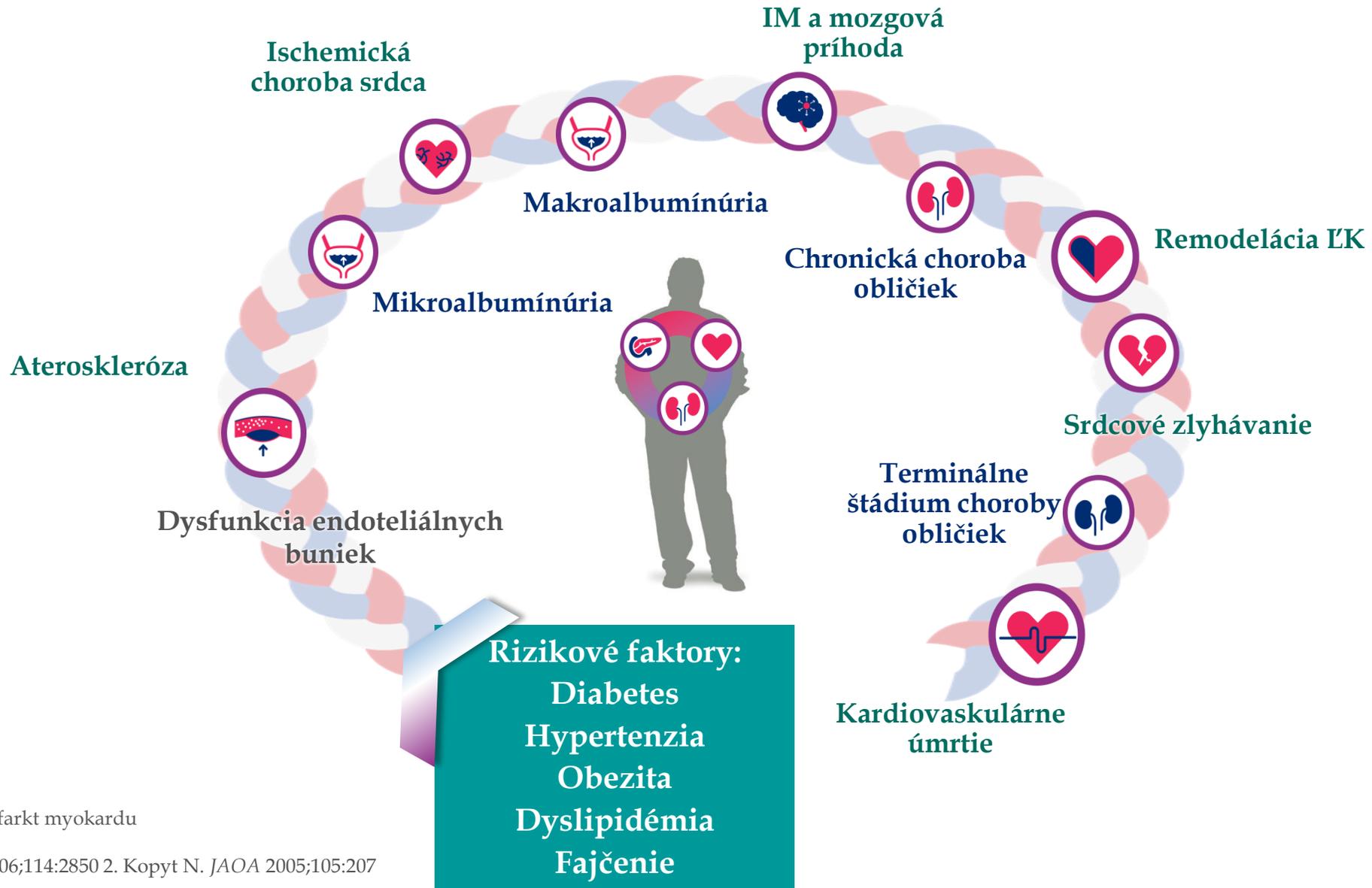
Od hypertenzie po srdcové zlyhávanie



DM zvyšuje riziko KVO 2-4 násobne



„Všetko so všetkým súvisí“ - kardio-renálno-metabolické ochorenia sú spôsobené kaskádou multisystémovej dysfunkcie



LK, ľavo - komorový; IM, infarkt myokardu

1. Dzau V *et al.* *Circulation* 2006;114:2850 2. Kopyt N. *JAHA* 2005;105:207

10-Year Heart Failure Risk Calculator

Pooled Cohort Equations to Prevent HF (PCP-HF)

Age:
(30-80 years)

Enter age

Hypertension treatment?

YES NO

Gender:

M F

Fasting Glucose:

Enter Fasting Glucose

Race:

WHITE BLACK

Diabetes treatment?

YES NO

Currently smoke?

Y N

Total Cholesterol:
(80-300 mg/dL)

Enter Total Cholesterol

BMI:

Enter BMI

HDL Cholesterol:
(15-100 mg/dL)

Enter HDL Cholesterol

Systolic Blood Pressure:
(80-200 mm Hg)

Enter Systolic Blood Pressure

QRS Duration:
(ms)

Enter QRS Duration

<https://hf-risk-calculator.surge.sh/>

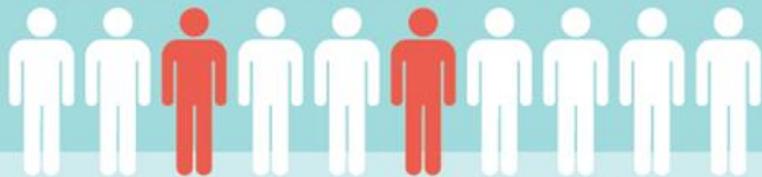
Khan S, et al. 10-Year Risk Equations for Incident Heart Failure in the General Population. JACC. 2019 May, 73 (19) 2388–2397.

<https://doi.org/10.1016/j.jacc.2019.02.057>

Calculate Risk

How to Prevent Heart Failure

1 in **5** adults develop **HEART FAILURE**



Ways to reduce risk of developing heart failure

Lifestyle factors

Regular physical activity



Healthy weight



No illegal drugs such as cocaine



No smoking

No excessive alcohol drinking

Healthy eating



Medical conditions

Treat high blood pressure



Control diabetes



Maintain healthy cholesterol levels



Take heart protective medications as prescribed



Primárna prevencia SZ u pacientov s rizikovými faktormi

Recommendations	Class ^a	Level ^b
Treatment of <u>hypertension</u> is recommended to prevent or delay the onset of HF, and to prevent HF hospitalizations. ^{287–290}	I	A
Treatment with <u>statins</u> is recommended in patients at high risk of CV disease or with CV disease in order to prevent or delay the onset of HF, and to prevent HF hospitalizations. ^{291,292}	I	A
<u>SGLT2 inhibitors</u> (canagliflozin, dapagliflozin, empagliflozin, ertugliflozin, sotagliflozin) are recommended in patients with diabetes at high risk of CV disease or with CV disease in order to prevent HF hospitalizations. ^{293–297}	I	A
Counselling against sedentary habit, obesity, cigarette smoking, and alcohol abuse is recommended to prevent or delay the onset of HF. ^{298–302}	I	C

2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. European Heart Journal 2021;42: 3599-3726. doi:10.1093/eurheartj/ehab368

Prevenencia SZ u pacientov s DM2T a CKD

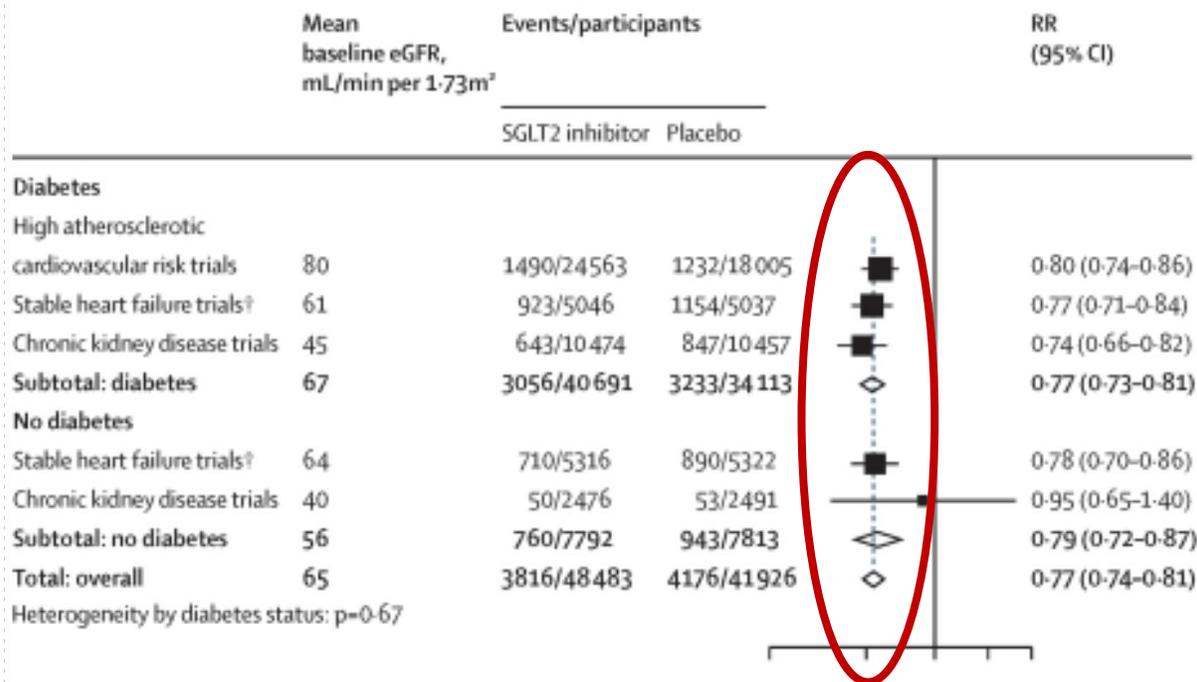
Recommendation Table 4 — Recommendations for the prevention of heart failure in patients with type 2 diabetes mellitus and chronic kidney disease

Recommendations	Class ^a	Level ^b
In patients with T2DM and CKD, ^c <u>SGLT2 inhibitors</u> are recommended to reduce the risk of HF hospitalization or CV death. ³⁵	I	A
In patients with T2DM and CKD, ^c <u>finerenone</u> is recommended to reduce the risk of HF hospitalization. ^{10,11,34,40}	I	A

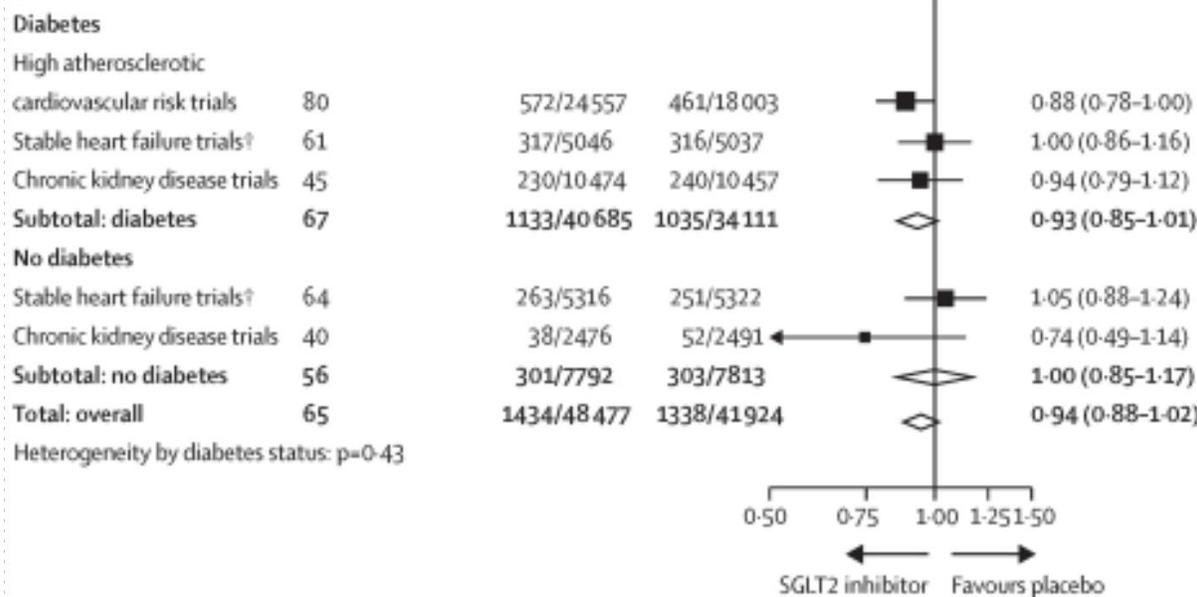
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Meta-analýza štúdií s SGLT2i

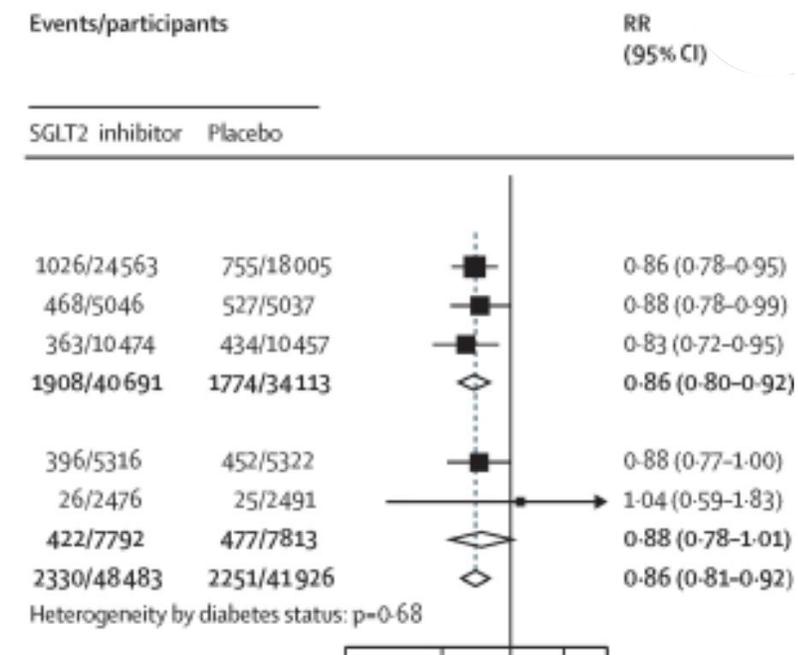
KV mortalita alebo H pre SZ



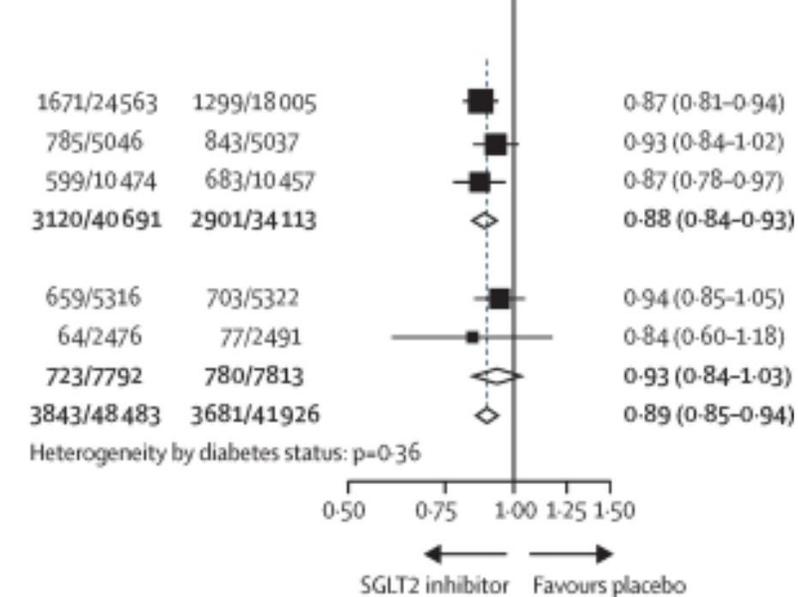
Non-cardiovascular death



KV mortalita



All-cause death



Kardio-renálne benefity empaglifozínu

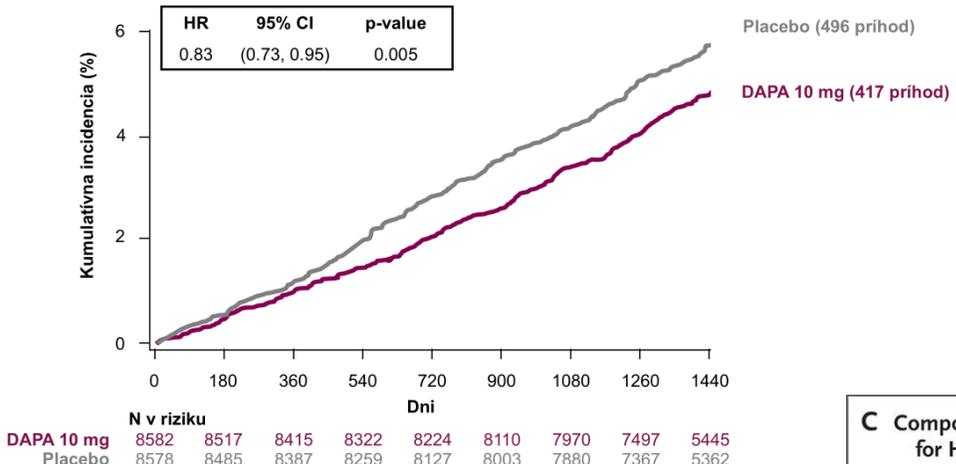
U pacientov s DM2T a rozvinutým KV ochorením



3P-MACE, 3-point major adverse CV events (CV death, non-fatal myocardial infarction or non-fatal stroke); HHF: hospitalisation for heart failure statistically significant
1. Zinman et al. N Engl J Med 2015;373:2117–2128. 2. Wanner et al. N Engl J Med;375:323–334.

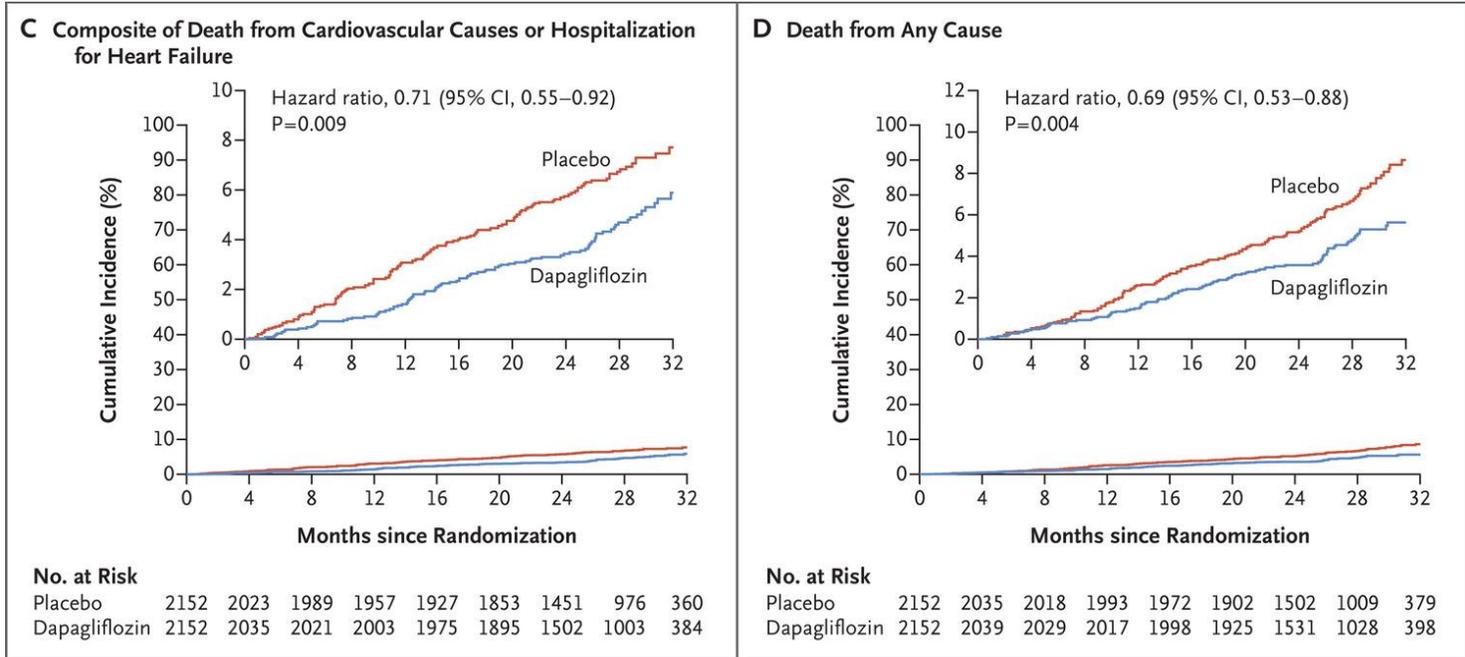
Primárny cieľ: hospitalizácie z dôvodu SZ alebo KV úmrtie

Kardio-renálne benefity dapagliflozínu



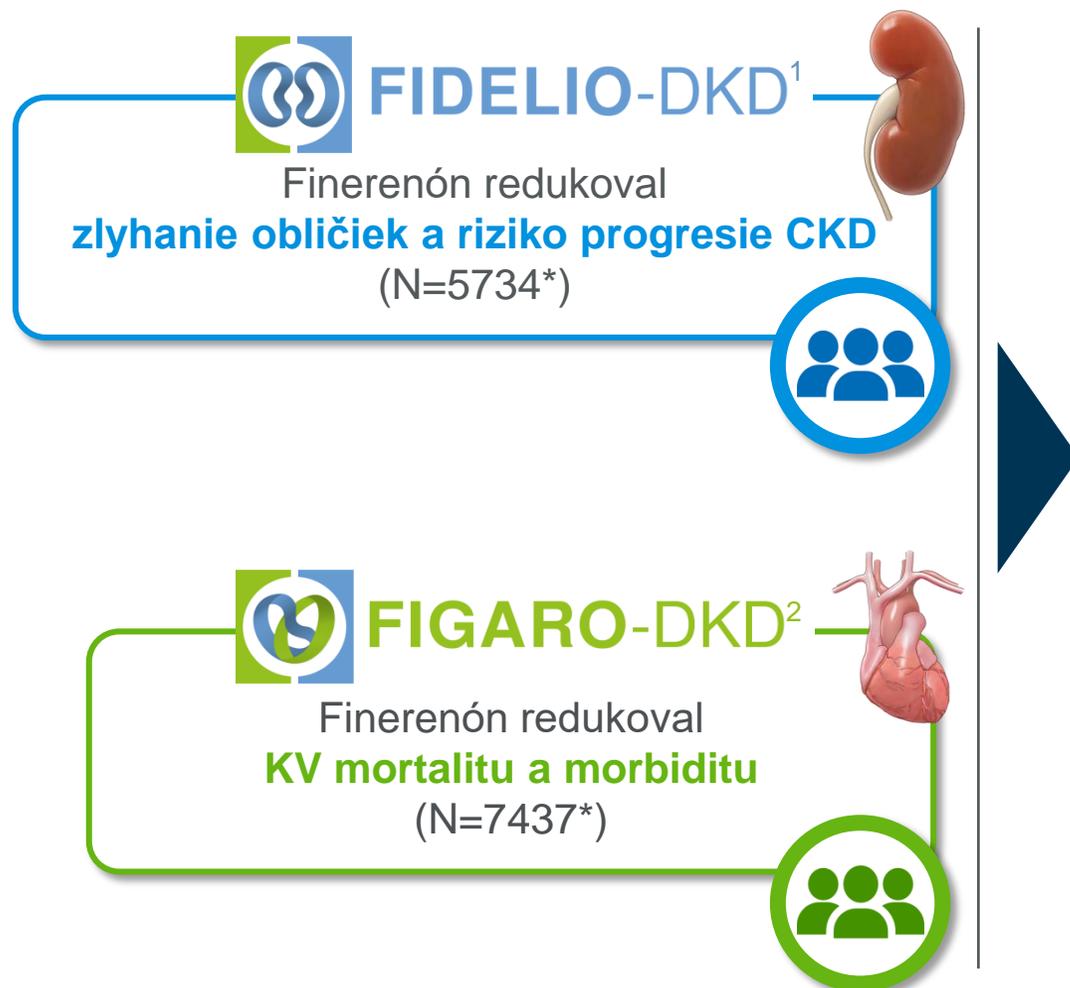
Preložené a upravené podľa:
 N at risk is the number of patients at risk at the beginning of the period.
 CV, cardiovascular, kardiovaskulárny, DAPA, dapagliflozín; hHF, hospitalization for heart failure, hospitalizácia z dôvodu srdcového zlyhávania.
 Wiviott SD et al. Online ahead of print. *New Engl J Med.* 2018.

Štúdia DAPA-CKD: Dapagliflozin in Patients with Chronic Kidney Disease



Finerenón – selektívny, nesteroidný MRA

Program klinického skúšania u viac ako 13 000 pacientov s CKD a DM2T



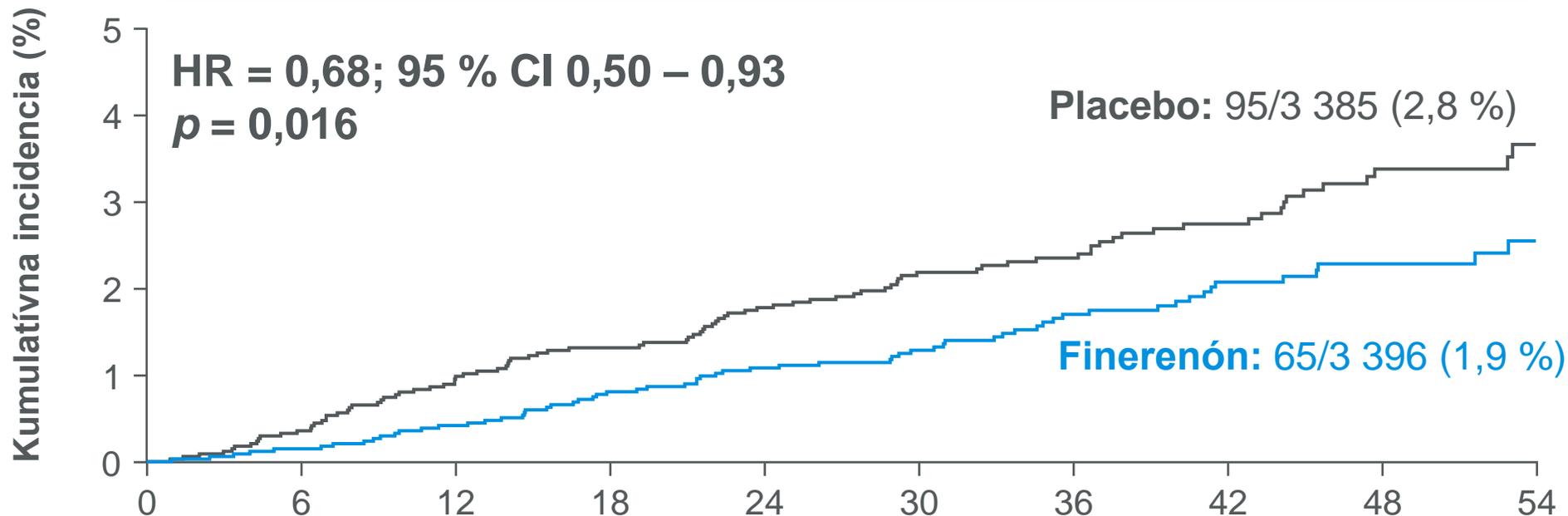
*Randomizovaní pacienti

CKD, chronická choroba obličiek; KV, kardiovaskulárny; DM2, diabetes mellitus 2. typu

Upravené podľa: 1. Bakris GL, et al. *N Engl J Med.* 2020 Dec 3;383(23):2219-2229; 2. Pitt B, et al. *N Engl J Med.* 2021 Dec 9;385(24):2252-2263; 3. Agarwal R, et al. *Eur Heart J.* 2022 Feb 10;43(6):474-484

Finerenón znížil riziko novozisteného SZ o 32 %

Finerenón znížil novozistené SZ* u pacientov bez anamnézy SZ na začiatku sledovania o 32 % v porovnaní s placebom



Počet pacientov v riziku	Čas do prvej udalosti (mesiace)									
	0	6	12	18	24	30	36	42	48	54
Finerenón	3 396	3 367	3 323	3 274	3 195	2 710	2 168	1 705	1 091	608
Placebo	3 385	3 351	3 294	3 236	3 154	2 694	2 131	1 674	1 091	606

* Prieskumný ukazovateľ
CI, interval spoľahlivosti; HR, pomer rizika; SZ, srdcové zlyhávanie
Upravené podľa: 1 . Filippatos G, et al. *Circulation* 2022;145:437–447



Review

New Mechanisms to Prevent Heart Failure with Preserved Ejection Fraction Using Glucagon-like Peptide-1 Receptor Agonism (GLP-1 RA) in Metabolic Syndrome and in Type 2 Diabetes: A Review

Jorge E. Jalil ^{1,*}, Luigi Gabrielli ^{1,†}, María Paz Ocaranza ^{1,*}, Paul MacNab ¹, Rodrigo Fernández ¹, Bruno Grassi ², Paulina Jofré ², Hugo Verdejo ¹, Monica Acevedo ¹, Samuel Cordova ¹, Luis Sanhueza ¹ and Douglas Greig ¹

¹ Pontificia Universidad Católica de Chile, School of Medicine, Division of Cardiovascular Diseases, Santiago 8330055, Chile; lgabrielli@ucchristus.cl (L.G.); paul.mcnab123@gmail.com (P.M.); jrodrigo.fernandez@gmail.com (R.F.); hugoverdejo@gmail.com (H.V.); macevedo@ucchristus.cl (M.A.); samuelcordovaalvestegui@gmail.com (S.C.); luissanac@gmail.com (L.S.); douglasgreig@gmail.com (D.G.)

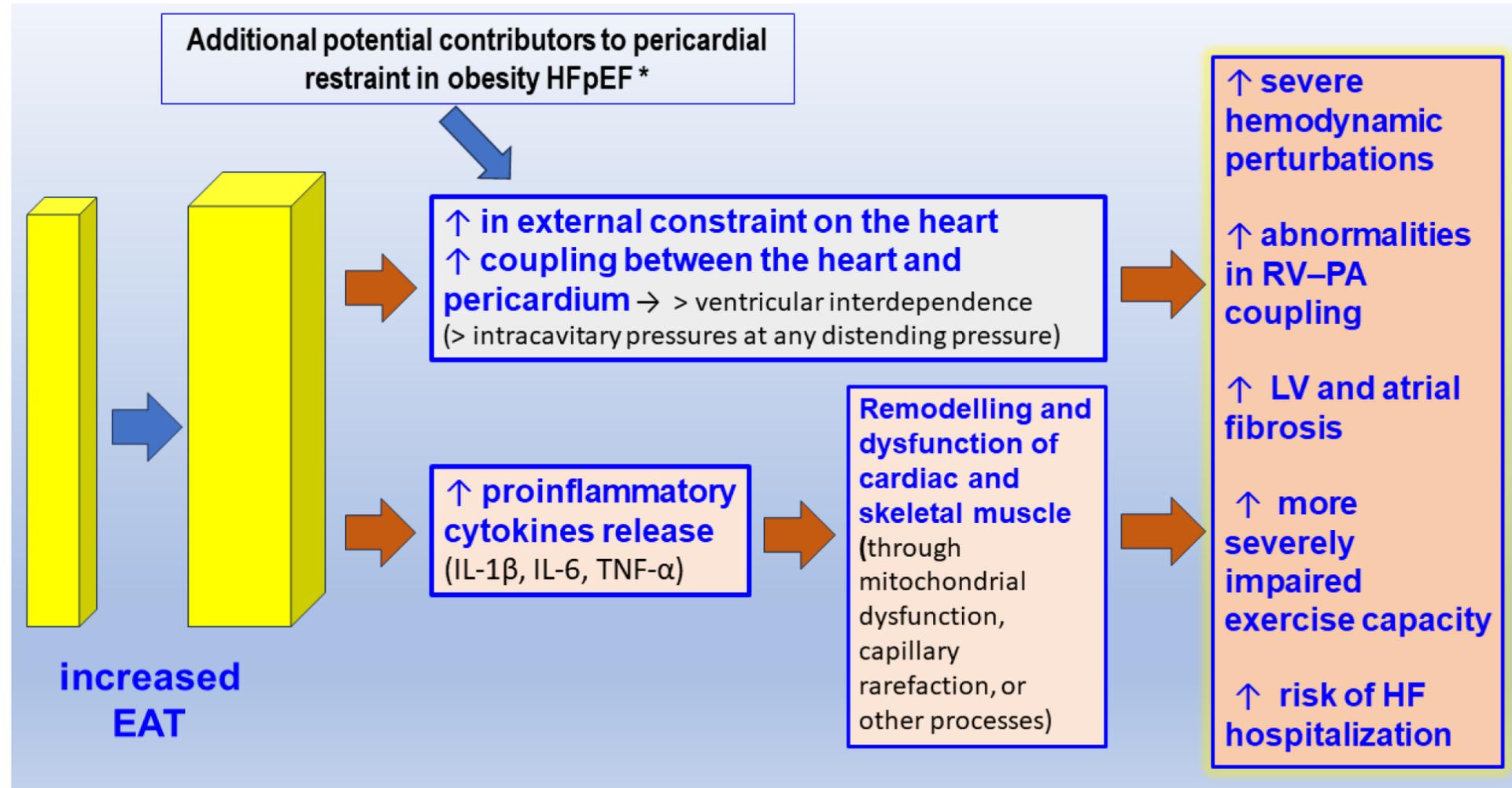
² Pontificia Universidad Católica de Chile, School of Medicine, Department of Nutrition and Diabetes, Santiago 8330055, Chile; bagrassi@gmail.com (B.G.); pejofre@uc.cl (P.J.)

* Correspondence: jorgejalil1956@gmail.com or jjalil@med.puc.cl (J.E.J.); mocaran@med.puc.cl (M.P.O.)

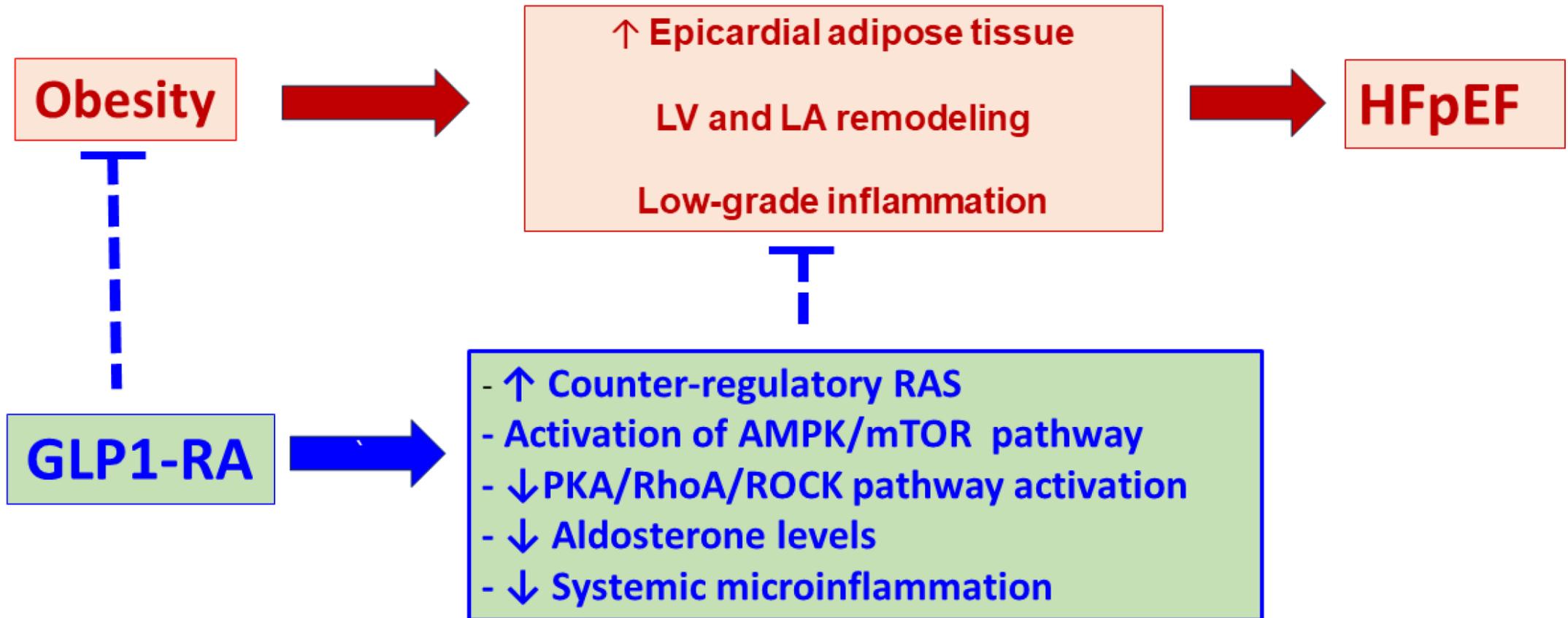
† These authors contributed equally to this work.

Abstract: This review examines the impact of obesity on the pathophysiology of heart failure with preserved ejection fraction (HFpEF) and focuses on novel mechanisms for HFpEF prevention using a glucagon-like peptide-1 receptor agonism (GLP-1 RA). Obesity can lead to HFpEF through various mechanisms, including low-grade systemic inflammation, adipocyte dysfunction, accumulation of visceral adipose tissue, and increased pericardial/epicardial adipose tissue (contributing to an increase in myocardial fat content and interstitial fibrosis). Glucagon-like peptide 1 (GLP-1) is an

Parakrinný efekt epikardiálneho tukového tkaniva na štruktúru a funkciu myokardu



Protektívny efekt GLP-1 RA na rozvoj HFpEF



Tirzepatide for Heart Failure in Patients with Obesity

A PLAIN LANGUAGE SUMMARY

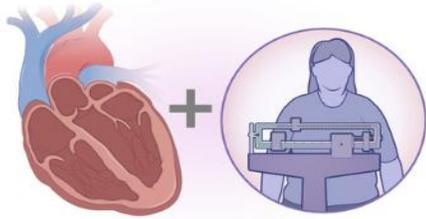
Based on the NEJM publication: Tirzepatide for Heart Failure with Preserved Ejection Fraction and Obesity by M. Packer et al. (published November 16, 2024)

In this trial, researchers examined cardiovascular outcomes of treatment with tirzepatide in patients with heart failure with preserved ejection fraction and obesity.

Most patients with heart failure and a preserved ejection fraction also have obesity, and visceral adiposity contributes to the evolution and progression of heart failure.

WHY WAS THE TRIAL DONE?

Tirzepatide, a long-acting agonist of glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 receptors, causes considerable weight loss, but data on its effects on cardiovascular outcomes are lacking.



HOW WAS THE TRIAL CONDUCTED?

Adults with chronic heart failure, an ejection fraction of at least 50%, and a body-mass index (BMI) of at least 30 were assigned to receive subcutaneous tirzepatide (up to 15 mg per week) or placebo, in addition to usual therapy. The two primary end points were a composite of adjudicated death from cardiovascular causes or a worsening heart-failure event resulting in hospitalization, intravenous therapy in an urgent care setting, or intensification of oral diuretic therapy, and the change in the Kansas City Cardiomyopathy Questionnaire clinical summary score (KCCQ-CSS; range, 0 to 100, with higher scores indicating better quality of life) at 52 weeks.

PATIENTS

WHO 731 adults
Age: at least 40 years (mean, 65 years)
Women: 54%; **Men:** 46%

CLINICAL STATUS **Chronic heart failure (NYHA class II to IV)**
Left ventricular ejection fraction: at least 50%
BMI: at least 30
6-minute walk distance: 100 to 425 m
KCCQ-CSS: 80 or lower
One of the following: an elevated NT-proBNP level, left atrial enlargement, or elevated filling pressures
Heart-failure decompensation within 12 months before baseline or an eGFR of less than 70 ml per minute per 1.73 m² at baseline

TRIAL DESIGN

- DOUBLE-BLIND
- RANDOMIZED
- PLACEBO-CONTROLLED
- LOCATION: 129 CENTERS IN 9 COUNTRIES

Tirzepatide



(Maximum tolerated dose after dose-escalation period)

364 Patients

Once weekly



+
Usual therapy

Placebo



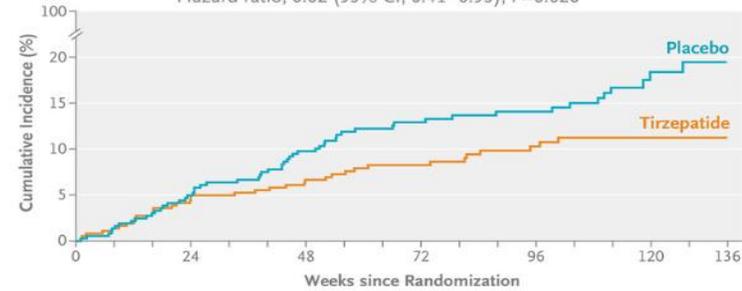
367 Patients

RESULTS

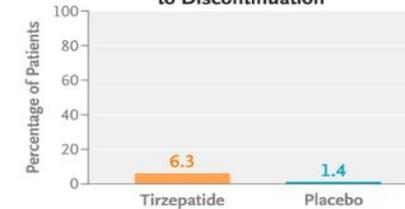
During a median follow-up of 2 years, death from cardiovascular causes or a worsening heart-failure event occurred significantly less often in the tirzepatide group than in the placebo group. At 52 weeks, improvement in the KCCQ-CSS was significantly greater in the tirzepatide group.

Death from Cardiovascular Causes or a Worsening Heart-Failure Event

Hazard ratio, 0.62 (95% CI, 0.41–0.95); P=0.026

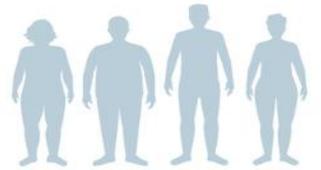


Nonfatal Adverse Events Leading to Discontinuation



Nonfatal adverse events leading to discontinuation of the regimen — mainly gastrointestinal events — were more common in the tirzepatide group.

BODY-MASS INDEX



The risk of heart failure (especially in patients with preserved ejection fraction) increases as BMI increases. The mean BMI of patients in this trial was 38.3 at baseline.

LIMITATIONS AND REMAINING QUESTIONS

- This study included only patients with a BMI of 30 or greater; however, many patients with heart failure with preserved ejection fraction have a BMI of less than 30 but an abnormal waist-to-height ratio, which is a more reliable indicator of excess visceral adiposity. More study is needed in these patients.

CONCLUSIONS

Treatment with tirzepatide led to a lower risk of a composite of death from cardiovascular causes or worsening heart failure than placebo and improved health status in patients with heart failure with preserved ejection fraction and obesity.

LINKS: FULL ARTICLE | NEJM QUICK TAKE | EDITORIAL

FURTHER INFORMATION

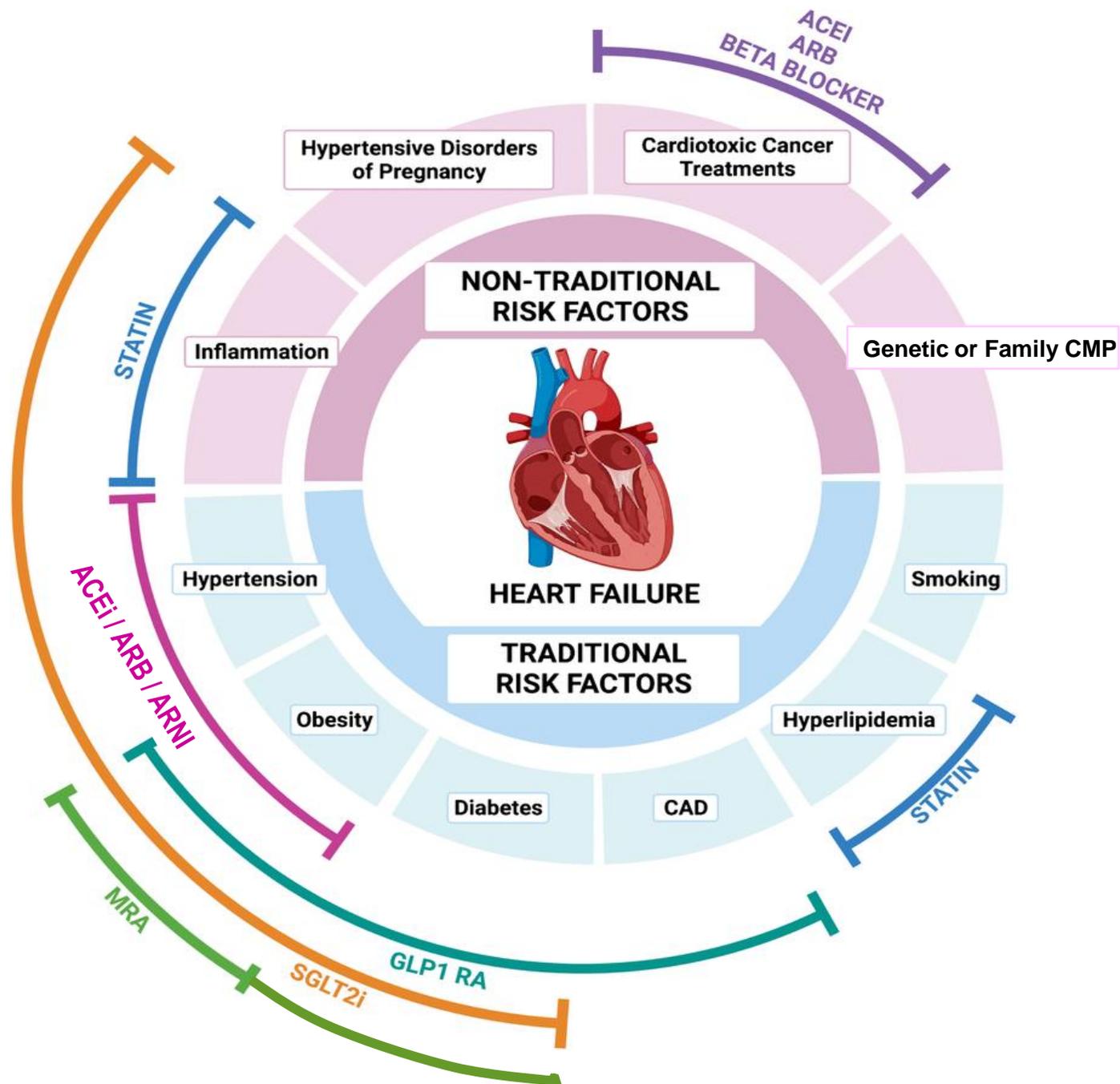
Trial registration: ClinicalTrials.gov number, NCT04847557

Trial funding: Eli Lilly

Full citation: Packer M, Zile MR, Kramer CM, et al. Tirzepatide for heart failure with preserved ejection fraction and obesity. N Engl J Med 2025;392:427-37. DOI: 10.1056/NEJMoa2410027.

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Schéma RF SZ a možností th ovplyvnenia



Záver

- SZ je preventabilné ochorenie
- správna životospráva je kľúčom ku zdraviu
- dôsledný mng KV RF ovplyvňuje vznik a progresiu SZ
- osvedčené terapeutické stratégie fungujú (ACEi / ARB / statíny)
- nové lieky pôsobiace na úrovni „metabolizmu“ (SGLT2i a GLP-1 RA) a RAAS (nesteroidné MRA) majú potenciál znížiť riziko vzniku SZ



